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Preface

The twenty-seventh annual meeting of Formal Approaches to Slavic Linguistics was held at Stanford University on May 4-6, 2018. The invited keynote speakers were Maria Gouskova, Ivona Kučerova, and Roumyana Pancheva. 50 abstracts were submitted for consideration; 24 were accepted as paper presentations. All of the presenters and alternate presenters were invited to submit papers for this volume. The 16 papers included in this volume were carefully reviewed and revised.

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Contents

Predicate Doubling in Russian: One Process or Two?[*]

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In Predicate Doubling constructions, either an entire predicate (VP-Doubling) or a bare verb (V-Doubling) occurs in the CP-domain. In both cases, the doubled verb in the CP-domain exhibits non-finite morphology, while the lower instance of the verb is finite. In the case of VP-Doubling, the arguments of the verb only occur in the higher position; in the case of V-Doubling, verb arguments occupy their base position. Here I introduce novel data from Russian and argue that while they appear to be similar, VP-Doubling and V-Doubling must be analyzed differently.

1 Introduction

The Predicate Doubling (PD) construction, also known as Predicate Clefting, appears in a variety of languages, such as Russian, Spanish, Yiddish, Hebrew, and others. In such constructions, the predicate is fronted and occurs at the beginning of the sentence, presumably in the CP-domain. There are two versions of these constructions that have been observed in previous literature. In the first one, an entire predicate, i.e., a verb and all its arguments, is clefted. In the second version of the construction, only the verb is fronted. In the both versions, the verb in the

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"cleft" exhibits non-finite morphology. According to Landau's (2006) generalization, in the PD construction, either all of the verbal arguments are fronted together with the verb (we refer to this version of the construction as VP-doubling) or they all stay in their base-positions (we will refer to this version as V-doubling). Examples of the PD construction from a variety of languages are given below. The doubled constituent is bolded. In what follows, I refer to the upper instance of the V/VP as the "cleft," without actually assuming that clefting in traditional sense is involved in deriving such constructions.

(1) *V-Doubling; only the verb is fronted:*
    a. **Čitat'-to** Ivan knigu čitaet, no ničego ne ponimaet.
       read$_{INF}$-TO Ivan book   reads,   but nothing not understands
       'Ivan does read the book, but he doesn't understand a thing.'
                              Russian (Abels 2001)
    b. **Leer**,   Juan ha   leído   un libro. *Spanish* (Vicente 2009)
       read$_{INF}$ Juan has   read   a   book
       'As for reading, Juan has read a book.'
    c. **Liknot**, hi kanta   et   ha-praxim. *Hebrew* (Landau 2006)
       buy$_{INF}$ she bought ACC the-flowers
       'As for buying, she bought the flowers'
    d. **Essen**   est Maks fish.   *Yiddish* (Cable 2004)
       eat$_{INF}$ eats Max   fish
       'As for eating, Max eats fish'

(2) *VP-Doubling; the entire VP is fronted:*
    a. **Čitat'**   **knigu**-to Ivan čitaet, no ničego ne ponimaet.
       read$_{INF}$ book-TO Ivan reads,   but nothing not understands
       'Ivan does read a book, but he doesn't understand a thing.'
                              Russian (Abels 2001)
    b. **Leer**   **el libro**, Juan lo ha leído. *Spanish* (Vicente 2009)
       read$_{INF}$ the book Juan CL has read
       'As for reading the book, Juan has indeed read it.'
    c. **Liknot**   **et**   **ha-praxim**, hi kanta. *Hebrew* (Landau 2006)
       buy$_{INF}$ ACC   the-flowers she bought
       'As for buying the flowers, she bought (them).'

d. **Essen   fish** est   Maks.   *Yiddish* (Cable 2004)
   eat_{INF}   fish eats Max
   'As for eating fish, Max eats them.'

In this paper I concentrate on PD in Russian, which, as (1a) and (2a) show, also exhibits two versions of the construction. Notice the presence of an optional particle -TO in Russian PD constructions. I assume that this is a topic-marking particle and occurs in the left periphery of the clause. An example with this particle serving as a head of the projection hosting the contrastive topic is given in (3).

(3) **Pivo**-to ja   ljublju,   a   vodku   net.
    beer-TO I   love   but vodka   not
    'As for beer, I like it, but not vodka.'

The fact that the clefted constituent occurs before -TO indicates that it is also located in the CP-domain. I will leave the question of the exact position of the clefted constituent within the left periphery for future research.

Data in (4a-b) provide additional examples of V-D and VP-D in Russian, and (4c) demonstrates that the verb's arguments cannot appear both in their base position and in the clefted constituent.

(4) a. **Kupit'**-to Ivan piva kupit, no pit'   ne budet.   **V-D**
       buy_{INF}-TO I.   beer buy_{FUT} but drink_{INF} not will
       'As for buying beer, Ivan will buy beer, but won't drink it.'
    b. **Kupit'   piva**-to Ivan kupit, no pit'   ne budet. **VP-D**
       buy_{INF}   beer-TO   I.   buy_{FUT} but drink_{INF} not will
       'As for buying beer, Ivan will buy beer, but won't drink it.'
    c. **Kupit'   piva**-to   Ivan (*piva)   kupit   (*piva), …
       buy_{INF}   beer-TO   I.   beer   buy   beer

In this paper, I argue that these two types of PD in Russian are generated by different analyses. I argue that V-Doubling is generated by v-to-Top movement, following Aboh and Dyakonova (2009), while VP-Doubling also allows for a base-generation analysis, where the doubled VP is merged directly into SpecTopP.

2 Previous analyses

A number of analyses have been proposed to account for similar configurations in languages such as Yiddish, Russian, Polish, Gungbe, and Spanish (Abels 2001, Cable 2004, Landau 2006, Aboh and Dyakonova 2009, Bondaruk 2009, 2012, a.o.). These analyses can be divided into two main categories: 1) movement analyses and 2) base-generation analyses.

For example, in one of the first analyses of Russian PD, Abels (2001) argues that both V-Doubling and VP-Doubling can be "accounted for as an instance of remnant VP movement." V-Doubling constructions differ from VP-Doubling constructions by the presence of object-shift, which allows internal arguments of the verb to vacate the VP; the remnant VP is then moved to the TopP projection. As I show below, this does not capture the entire paradigm, in part because locality constraints on PD in Russian are not as strong as Abels suggests.

Bondaruk (2009, 2012) proposes an analysis of Polish predicate clefts "based on a single chain with or without a multiple realization of copies." According to her analysis, Polish predicate clefts are derived via remnant V(v)P movement, and copy deletion is a phonological process.

Vicente (2009) analyzes the predicate clefting construction in Spanish and argues that movement theory must be extended to allow head-to-spec movement (following Landau 2006, Matushansky 2006). He then advocates for the analysis of V-Doubling as an instance of such head-to-spec movement of the verb.

On the other end of the spectrum is the analysis of Yiddish predicate clefting by Cable (2004), who argues that the topic-constituent (VP-cleft) is base-generated in a peripheral topic position.

Below I show that the full range of data in Russian cannot be accounted for by selecting only one of these approaches and that both of these analyses are necessary for Russian. I argue that the two types of PD in Russian have to be analyzed differently. V-Doubling is generated via

movement, while the VP-Doubling cleft is base-generated in the left periphery.

3 Properties of Predicate Doubling in Russian

In this section, I outline previously unreported properties of the PD construction in Russian and demonstrate that VP-Doubling and V-Doubling constructions behave differently with respect to island constraints, identity requirements, and long-distance extraction. There is some speaker variation in the degree of acceptability of some of these constructions, especially the ones presented in Sections 3.1 and 3.2. Further, a certain prosodic contour is required for most speakers' grammaticality judgments, presented below, which makes using a written questionnaire problematic. However, the majority of speakers I consulted agree with the contrasts presented below. In the conclusion of this paper, I take on the issue of speaker variation in more detail.

3.1 Issues of Identity
It has often been claimed that verbs in the cleft and in the base position must be identical in PD constructions. However, this is not always the case. Interestingly, while identity of the verb in the cleft and in the base position is strongly required in V-Doubling constructions, it is only a preference in VP-Doubling constructions.[1] Even though some speakers find sentences that violate this identity odd, all of my informants agree on the strong contrast between the a and b versions of the sentences below.

(5) a. ?**S'ezdit' v Ameriku**-to ja zavtra   tuda poleču. **VP-D**
        go$_{INF}$ to America-TO I   tomorrow   there fly$_{FUT}$
        'As for going to the USA, I'm flying there tomorrow.'
    b. ***S'ezdit'**-to   ja zavtra   v Ameriku leču   **V-D**
        go$_{INF}$-TO   I   tomorrow   in America   fly
        'As for going, I'm flying to the USA tomorrow.'

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[1] Vicente (2007: 82-83; 2009: 168, fn 14) discusses similar patterns for Spanish and Portuguese speakers: there are two distinct groups of speakers who differ in their acceptability levels of predicate clefting constructions violating the identity requirement.

(6) a. ? **Najti   deneg**-to   on v dolg voz'mët.   **VP-D**
       find_{INF}   money-TO he borrow_{FUT}
       'As for finding money, he will borrow some.'
    b. ***Najti**-to   on   deneg v dolg voz'mët   **V-D**
       find_{INF}-TO   he   money borrow_{FUT}
       'As for finding, he will borrow some money.'

As the data above show, the verb does not have to be identical in the case of VP-Doubling; further for sentences where identity requirement is violated, Landau's generalization is also not observed. For example, in (5), both verbs in the cleft and in the matrix have complements *v Ameriku* 'to America' and *tuda* 'there' respectively. There is, however, a restriction on the content of the cleft and the content of the base VP. The data that illustrate this restriction are provided in (7).

(7) a. ? **Najti   deneg**-to   on 100   rublej   najdet.
       find_{INF}   money-TO he 100   rubles   find_{FUT}
       'As for finding money, he will find 100 rubles.'
    b. ***Najti   100   rublej**-to on deneg   najdet.
       find_{INF}   100   rubles-TO he money   find_{FUT}
       'As for finding money, he will find 100 rubles.'

If we assume that the cleft is a topic—based on the meaning of the PD sentences and the presence of the particle -TO, as in the sentences in (7)—we can see that the topic must be less specific than the predicate; for further examination of such Genus-Species effects, see Cable (2004), who uses such data to argue for base-generation of VP-Doubling constructions in Yiddish. This is reminiscent of the requirement on topics seen in English sentences such as (8):

(8) a.   As for fruits, I like apples.
    b. *As for apples, I like fruits.

This is a semantic restriction on the nature of topics, which I am not concerned with in this paper. The crucial observation here is that it does not account for the (much stricter) identity requirement in V-Doubling constructions. For example, in (5b), the cleft *s'ezdit'* 'to go' is less

specific than the VP *v Ameriku leču* 'go to America,' but the sentence is still ungrammatical. That suggests that something else is at stake in V-Doubling constructions that renders them ungrammatical.

3.2 Island Effects
One of the previously unnoticed differences between the V-Doubling and VP-Doubling constructions in Russian concerns their (in)sensitivity to island boundaries.

(9) wh-*island*
    a. ? **Kupit' piva**-to ja ne znaju kogda on kupit.   **VP-D**
        buy$_{INF}$ beer-TO I not now when he buy
        'As for buying beer, I don't know when he will do so.'
    b. * **Kupit'**-to ja ne znaju kogda on piva kupit   **V-D**
        buy$_{INF}$-TO I not now when he beer buy
        'As for buying, I don't know when he will buy beer.'

(10) *Coordinate Structure Constraint*[2]
    a. **Kupit' piva**-to, on kupit i   vodki vyp'et.   **VP-D**
        buy$_{INF}$ beer-TO he buy and vodka drink
        'As for buying beer, he will buy it and drink some vodka.'
    b. ? **Kupit'**-to, on piva kupit i   vodki vyp'et.   **V-D**
        buy$_{INF}$-TO he beer buy and vodka drink
        'As for buying, he will buy beer and drink vodka.'

(11) *Complex NP Constraint*
    a. ? **Kupit' piva**-to, ja znaju čeloveka, kotoryj kupit. **VP-D**
        buy$_{INF}$ beer-TO I know person which buy
        'As for buying beer, I know a person who will buy it.'
    b. * **Kupit'**-to ja znaju čeloveka, kotoryj kupit piva.   **V-D**
        buy$_{INF}$-TO I know person which buy beer
        'As for buying, I know a person who will buy beer.'

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[2] It is worth noting that Vicente (2007) indicates that Spanish and Portuguese speakers who do not have identity requirements for cleft constructions also allow clefting out of Coordinate Structures. He does not, however, present data concerning other islands.

(12)   *Adjunct Island Constraint*
    a.??**Vypit'**   **piva**-to, on ušël tak kak   Maša vypila.   **VP-D**
        drink$_{INF}$ beer-TO he left   because M.   drank
        'As for drinking beer, he left because Maša drank it.'
    b. * **Vypit'**-to   on ušël tak kak   Maša piva vypila.   **V-D**
        drink$_{INF}$-TO he left   because M.   beer drank
        'As for drinking, he left because Maša drank beer.'

In the examples above, the a sentences demonstrate that VP-Doubling is immune to island violations, while b sentences show that V-Doubling cannot violate island constraints.[3]

3.3 Long-distance Predicate Doubling
In this section, I show that VP-Doubling and V-Doubling constructions behave differently if applied long-distance. It is well known that Russian employs (at least) three types of embedded clauses: indicative, subjunctive, and infinitive (control). With respect to various syntactic phenomena, such as extraction and binding, the indicative clause is the least transparent, and the control clause is the most transparent. In particular, long-distance *wh*-extraction is more acceptable out of subjunctives than out of indicatives (Comrie 1973, a.o.):

(13) a.*?Čto   ty   skazal čto   Ivan   vypil?   Indicative
        what   you   said   that I.   drank
        'What did you say that Ivan had drunk?'
    b. Čto   ty   xočeš čtoby Ivan vypil?   Subjunctive
        what   you   want   that$_{SUBJ}$ I.   drank
        'What do you want for Ivan to drink?'

Despite the differences between indicative and subjunctive clauses with respect to *wh*-extraction and binding, long-distance topicalization is

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[3] It is possible that CSC example in (10) allow an alternative analysis as a conjunction of two clauses, with a *pro*-dropped subject in the second clause. This would explain that the sentence (10b) is only mildly degraded for some speakers, compared to other examples involving other islands. A strong prosodic break after the cleft leads to a more dramatic difference in grammaticality judgments between (10a) and (10b).

allowed in Russian in all contexts, as the examples in (14) below demonstrate.

(14) a. **Piva**-to   Maša   skazala   čto Ivan kupit.   Indicative
       beer-TO   M.   said   that I.   buy$_{FUT}$
       'As for beer, Maša said that Boris will buy it.'

    b. **Piva**-to   Maša   xočet   čtoby Ivan kupit.   Subjunctive
       beer-TO   M.   wants   that$_{SUBJ}$ I.   buy
       'As for beer, Maša wants Boris to buy it.'

    c. **Piva**-to   Maša   xočet   kupit'.   Control
       beer-TO   M.   wants   buy$_{INF}$
       'As for beer, Maša wants to buy it.'

If we consider PD, we discover a pattern inconsistent with expectations. The only environment where long-distance PD is allowed is VP-Doubling out of indicative clauses; both long-distance V- and VP-Doubling are ungrammatical out of subjunctive and control clauses:

(14)   *Indicative complements*
    a. ??**Kupit' piva**-to   on dumaet   čto Boris   kupit.   **VP-D**
       buy$_{INF}$ beer-TO   he thinks   that B.   buy$_{FUT}$
       'As for buying beer, he heard that Boris will buy it.'

    b. ***Kupit'**-to on slyshal čto   Boris   piva   kupit.   **V-D**
       buy$_{INF}$-TO he heard   that B.   beer   buy$_{FUT}$
       'As for buying, he heard that Boris will buy beer.'

(15)   *Subjunctive complements*
    a. ***Kupit' piva**-to   Ivan xočet   čtoby   Boris   kupil. **VP-D**
       buy$_{INF}$ beer-TO I.   wants   that$_{SUBJ}$ B.   buy
       'As for buying beer, Ivan wants Boris to buy it.'

    b. ***Kupit'**-to Ivan xočet   čtoby   Boris   piva   kupil. **V-D**
       buy$_{INF}$-TO I.   heard   that$_{SUBJ}$ B.   beer   buy
       'As for buying, Ivan wants Boris to buy beer.'

(16)   *Control complements*
    a. ***Kupit' piva**-to   Marina xočet   kupit'.   **VP-D**
       buy$_{INF}$ beer-TO M.   wants   buy$_{INF}$
       'As for buying beer, Marina wants to buy it.'

    b. * **Kupit'**-to   Marina   xočet   piva   kupit'   **V-D**
         buy_{INF}-TO   M.   wants   beer   buy_{INF}
         'As for buying, Marina wants to buy beer.'

This contrast between long-distance topicalization and long-distance PD is unexpected. Even though both subjunctive and control clauses are more transparent than indicative clauses, and long-distance topicalization is available out of all types of embedded clauses, both types of PD are ungrammatical out of subjunctive and control clauses. Also, as seen earlier with islands and identity effects, we see fewer restrictions on VP-Doubling than on V-Doubling, which is allowed out of indicative embedded clauses.

3.4 Further Remarks
There are further effects that can be observed with PD constructions in Russian. It was pointed out by a reviewer that the topic particle -TO may impose certain limitations on the weight of the topicalized constituents; the heavier it is, the more degraded the example is:

(17)   ? **Pročitat' novuyu   knigu**-to   on pročital …
        read_{INF}   new   book-TO   he read_{PAST}

Speakers vary in their judgments and in how strong this effect is. It could be a phonological effect, and more research is needed to evaluate whether this is a general tendency affecting all topicalized phrases or if it is limited to instances of PD.

    Another often mentioned point about PD constructions is the preference for object-shift in case of V-D:

(18) a. **Čitat'**-to   Ivan   *knigu*   čitaet, …
        read_{INF}-TO   I.   book   read_{PRES}
     b. ?**Čitat'**-to   Ivan   čitaet   *knigu*, …
        read_{INF}-TO   I.   read_{PRES} book

It is claimed that some speakers find sentence (18b) ungrammatical; however, my informants agree that an appropriate intonational contour improves their status. In fact, if in (18b) the base position verb is

emphasized, the sentence is judged as only mildly deviant. While this effect is interesting, I leave its analysis for future work.

3.5 Summary of Data

In this section, I showed that the two types of PD in Russian behave differently. Thus, we need two distinct analyses that account for the observed differences. The summary is given in Table 1 below.

	VP-Doubling	**V-Doubling**
Identity Effects:	✘	✔
Islands/Constraints:	✔	✘
LD-Doubling out of:		
Indicatives	✔	✘
Subjunctives	✘	✘
Control	✘	✘

Table 1. Summary of Russian Predicate Doubling properties.

4 Data Analysis

As pointed out in the previous section, VP-Doubling and V-Doubling exhibit very different properties with respect to several syntactic phenomena. In this section I propose the following:

(17) a. **VP-Doubling** can involve **base-generation** of the VP-cleft in the left periphery of the clause; a **movement** analysis (for example, along the lines of Abels 2001) is also available.

    b. **V-Doubling** can be derived via **head-movement** of the verb to the peripheral position in the CP-domain (along the lines of Aboh & Dyakonova 2009).

Taking this proposal into consideration, there are several questions that should still be answered:

a. Why is identity necessary in the case of V-Doubling and optional in the case of VP-Doubling?

b. How can we account for the observed behavior of PD with respect to islands?

c. Why is long-distance V-Doubling prohibited, while VP-Doubling is allowed only out of indicatives?
d. What triggers the PD process?
e. Why does the clefted verb exhibit infinitival morphology?

In what follows, I explain how a base-generation vs. a head movement analysis can answer some of these questions. I return to the remnant VP-movement analysis of VP-Doubling in Section 5.

4.1 Identity Requirements and Island Effects

The first two questions can be addressed straightforwardly under the proposal above. Since VP-Doubling allows base-generation, it is allowed to escape island effects: a VP-cleft does not need to move to the peripheral position from its base. For the same reason, identity is not required for VP-Doubling (even though there are semantic restrictions): the cleft can be generated in the peripheral position and does not need to be identical to the main VP of the clause. V-Doubling is generated through the head-movement (as suggested by Aboh & Dyakonova 2009), and therefore, the clefted verb needs to be identical to the verb in its base position. Further, if we assume that head-movement respects islands, the analysis predicts that V-Doubling out of islands is ungrammatical, which is confirmed by the data.

4.2 Trigger of the Predicate Doubling

As can be seen from the semantics of the PD constructions, the cleft is interpreted as a contrastive topic (following Abels 2001) (18). Compatibility with the topic particle -TO confirms this (see example (3) above, which exemplifies the use of this particle in a non-clefting environment).

(18) a. **Prigotovit'**-to   on rybu prigotovit,   no est' ne budet.
           cook$_{INF}$-TO   he fish cook$_{FUT}$ but eat not will.
           'As for cooking, he will cook the fish, but he won't eat it.'
      b. **Prigotovit' rybu**-to   on prigotovit,   no est'   budet m'aso.
           cook$_{INF}$ fish-TO   he cook$_{FUT}$ but eat   will   meat.
           'As for cooking the fish, he will do it, but he will eat meat.'

Following Abels (2001), I assume that the particle -TO is the head of a TopP projection within the CP-domain of the clause. For the purposes of the analysis, the precise nature of this position is not crucial; the analysis will not change as long as this position is in the CP-domain.

Adopting the framework of Pesetsky and Torrego (2007), I assume that Top^0 (-TO) bears an interpretable unvalued instance of the Topic feature $<i$Top, -val$>$. The head of the phrase to be topicalized, possibly AspP, has an uninterpretable valued instance of the Topic feature, $<u$Top, +val$>$. The Agree relation between Top^0 and Asp^0 drives merge (*internal* or *external*) of the topicalized element into the TopP projection. This way, it is possible to value the Top-feature of Top^0 by movement or merging into its specifier, or by head-movement, deriving both V- and VP-Doubling constructions.

4.3 Infinitival Morphology in VP-Doubling Constructions
The next issue to be explained is why the verb in the cleft bears infinitival morphology. In the case of VP-Doubling, the non-finite form of the verb can be explained in Pesetsky and Torrego's (2007) framework. The finite form of the verb bears an uninterpretable valued instance of the T-feature $<u$T, +val$>$. This feature needs to be checked by T^0 with an interpretable unvalued instance of the T-feature $<i$T, -val$>$, which serves as a probe. According to the proposed analysis of VP-Doubling, the verb in the cleft is generated in the CP-domain, higher than T^0. This means that T^0 can never probe it (I assume that probing is done top-down universally), and the T-feature on the verb in the cleft will be left without an interpretable instance, leading the derivation to crash. The only way to save this derivation is to use the non-finite form of the verb in the cleft, a form which lacks the T-feature altogether. I assume that this is indeed the case in VP-Doubling construction. If such a form of the verb is used in the cleft, it does not need to be checked by T^0, and the derivation will converge. As a consequence, the verb in the cleft without a T-feature will exhibit non-finite morphology. Note that this explanation only works for the VP-Doubling construction. I will explain the non-finite morphology in V-Doubling constructions below.

4.4 Deletion of Arguments in VP-Doubling Constructions
As I demonstrate in (20), in the VP-Doubling construction, the arguments of the verb cannot be repeated in the base position and in the

cleft. I argue that this process is similar to the deletion process under ellipsis. Arguments of the verb, having the same form in the base-generated cleft in the *v*P, delete under identity in the lower instance. It is worth noting that deletion of arguments in base position can be an instance of verb-stranding VP-ellipsis (VVPE), along the lines proposed in Gribanova (2013). She shows that object drop is unacceptable within islands; it follows from her analysis that the deletion of arguments in the case of VP-Doubling is indeed derived by moving verb out of the *v*P to a higher projection, followed by *v*P-ellipsis. The VVPE analysis also entails that the lower instance of the verb is not deleted.

Another important question concerns the fact that ellipsis is usually optional. While the examples of VP-Doubling without eliding arguments are possible, they are nevertheless degraded:

(20)   a.   **Prigotovit' rybu**-to   on prigotovit …
            cook_{INF}   fish-TO   he cook_{FUT}
            'As for cooking the fish, he will do it…'
       b. ? **Prigotovit' rybu**-to   on *rybu* prigotovit …
            cook_{INF}   fish-TO   he fish cook_{FUT}

It is possible that pragmatic factors are involved in the explanation of the status of such examples. I leave this issue for future research.

Note that the arguments of the verb do not delete if they are not identical. A relevant example is given above in (6a).

4.5 On Long-Distance Predicate Doubling
As I have shown above, long-distance PD is only possible for VP-Doubling out of indicative clauses. To explain this pattern, we need to answer two questions: 1) why is long-distance V-Doubling disallowed and 2) why is long-distance VP-Doubling restricted to indicative complements only?

The impossibility of long-distance V-Doubling can be explained if we assume that long-distance head-movement is universally not allowed. Following Aboh and Dyakonova (2009), V-Doubling is derived through

head-movement, and we do not expect it to be possible out of embedded clauses at all.

Now I present the differences between indicative and subjunctive/control clauses and show how they explain why VP-Doubling is only possible out of indicative embedded clauses.

The contrastive topic position is unavailable in subjunctive and control complements, as shown in (21).

(21) a. Maša   skazala čto   **Lenu**-to Ivan vstretil, a   Annu net.
        M.   said   that   L.-TO   I.   met   but A.   not
        'Maša said that Ivan to met Lena, but not Anna.'
     b. * Maša   xočet   čtoby **Lenu**-to Ivan vstretil, a   Annu net.
        M.   wants   that_SUBJ L.-TO   I.   meet_SUBJ but A.   not
        'Maša wants Ivan to meet Lena but not Anna.'
     c. * Maša   xočet **piva**-to kupit', a   vodki   net.
        M.   wants beer-TO buy_INF but vodka   not
        'Maša wants to buy beer, but not vodka.'

In (21a), the embedded clause is indicative, and the contrastive topic is allowed in the left periphery of the embedded CP. (21b) and (21c) are examples of the subjunctive and control complements respectively, and the embedded topic is not allowed in their CP-domain. It is beyond the scope of this paper to explain why TopP is incompatible with embedded subjunctive and control clauses. It is possible that the complementizer needs to enter into a relation with T^0 in clauses with defective tense (subjunctives and control) in order to establish dependency between the embedded T^0 and the matrix T^0. The non-empty TopP with the head -TO serves to block such a relationship, and as a result, examples (21b,c) are ungrammatical. In indicative embedded clauses, there is no need to establish a tense dependency, and therefore it is possible to have an intermediate projection between the CP, which hosts the complementizer, and the embedded TP.

In order to account for the facts of long-distance VP-Doubling, I assume that the topic cleft has to be base-generated in the CP-domain of the clause with the vP, which is doubled by the cleft. That is, clefts in the

long-distance VP-Doubling construction are generated in the embedded clauses, and they further can move to the matrix left periphery position. Since it is impossible to base-generate a VP in the embedded CP-domain of subjunctive and control clauses, as shown in (21b-c), long-distance VP-Doubling is impossible in such cases.

Further, note that the upper instance of VP does not necessarily move to the matrix SpecTopP and can remain in the embedded SpecTopP, if this position is available.

(22) a. Maša   skazala čto **vstretit' Sergeja**-to Ivan vstretil…
         M.   said   that meet$_{INF}$ S.-TO   I.   met
         'Maša said that as for Sergej, Ivan met him…'
     b. *Maša   xočet   čtoby **vstretit' Sergeja**-to Ivan vstretil…
         M.   wants   that$_{SUBJ}$ meet$_{INF}$ S.-TO   I.   met
         'Maša wants Ivan to meet Sergej…'
     c. *Maša   xočet **vstretit' Sergeja**-to PRO vstretit'…
         M.   wants meet$_{INF}$ S.-TO   meet$_{INF}$
         'Maša wants to meet Sergej….'

The base generation of the cleft in the embedded TopP, and its subsequent movement, is shown in (23).

(23) *Generation of the cleft v*P *in the embedded* TopP
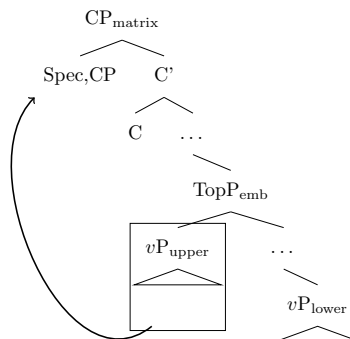
Interestingly, this requirement to base-generate the topic in SpecTopP of the embedded clause does not seem to be operative for non-

*v*P topics, as the examples in (14) show: long-distance nominal topicalization is allowed out of all types of embedded clauses, not just out of indicatives. That suggests that in examples (14), the topic is base-generated in its thematic position and undergoes successive cyclic movement to the TopP projection in the matrix clause. That also predicts that the movement analysis of VP-Doubling constructions, which I claim is also a possibility, successfully derives ungrammatical examples of long-distance VP-Doubling. At present, I do not have a solution to this problem: there might be some other factors at play that restrict such long-distance movement of *v*Ps and not of other constituents. Explaining the contrast between the availability of long-distance *v*P-Doubling out of subjunctives and out of indicatives assuming a movement analysis is a problem for all movement-based approaches to predicate clefting as well. I leave this question for future research.

4.6 Deriving V-Doubling via Head-Movement
Finally, in this section, I demonstrate that V-Doubling constructions are derived through head-movement and that my analysis derives the properties of the V-Doubling construction. This approach is similar to the analysis suggested by Aboh and Dyakonova (2009) and involves the reduction of multiple chains. As before, I assume Pesetsky and Torrego's (2007) framework.

Let us once again consider the featural content of the elements involved in the derivation. The little *v* has an uninterpretable valued instance of the T-feature $<u$T, +val$>$, and T has a matching interpretable unvalued instance of the T-feature $<i$T, -val$>$. In addition to the T-feature, *v* also has the Top feature $<u$Top, +val$>$, which is matched by an interpretable instance of the Top feature on Top, $<i$T, -val$>$. Unvalued instances of the features search their domain for valued instances of the features and agree with them. This way, the T-feature on T triggers it to probe *v*, and the Top-feature on Top triggers it to probe *v* as well. In Russian, the T-feature on T is weak and does not trigger the movement of *v* to T. The Top-feature on Top is strong, and triggers movement of its goal.

Following Chomsky (2008), I assume that both T and C/Top probe simultaneously, and both of them have *v* as their Goal. As a result of

these two instances of probing, two chains are created: 1) Top-*v*/V chain (based on Top-probing) and 2) T-*v*/V chain (based on T-probing). Each of these chains will have to have one of its links pronounced. In case of Top-*v* chain, the upper link is spelled out, since the Top-feature is strong, and Topics need to be pronounced. In this chain, the verb is still uninflected, as it has not yet entered into an Agree relation with T. On the other hand, in the T-*v* chain, the lower link of the chain is pronounced, since T is weak in Russian; in addition, since T is in a probe-goal relation with *v*, the instance of the verb inside the *v*P will show up with finite morphology.

These two chains are shown in (24). In order to explain the infinitival morphology on the cleft verb, we need to assume that tense only gets spelled out on *v*+V after it is probed by T and/or moved out of *v*P (for evidence of this movement, see Gribanova 2013 and references therein). Alternatively, it is possible to adopt Aboh and Dyakonova's (2009) analysis, which makes reference to the topic requiring nominalizing morphology, morphologically realized as infinitive.

(24)   *Two chains:* Top-*v and* T-*v:*
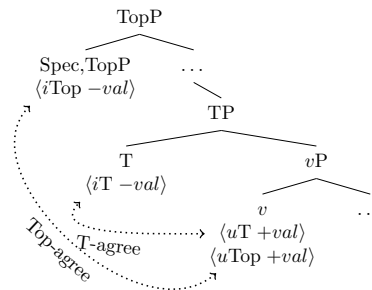
It is also worth noting that Esipova (to appear) observes that the PD construction does not always require an infinitive.

(25)   Poët-to   on   poet,   no   ploxo.
        sings-to   he   sings   but   poorly
        'As for singing, he sings, but poorly.'

In order to account for constructions of this sort, the timing of the chain creation in the process described above must be adjusted: probing by Top must happen after *v* has its Tense features valued by T. There is also a possibility that constructions of this sort require a different analysis. I leave this issue for future research.

5 VP-Movement and Speaker Variation

As mentioned above, nothing precludes VP-Doubling constructions from being derived as instances of VP-movement as well, for example along the lines of Abels (2001). This analysis, however, cannot derive the violations of island effects and violations of the identity requirement. In fact, there are speakers who do not allow these violations. It is possible that such speakers only allow the movement analysis of VP-Doubling constructions in Russian. A controlled experiment is required in order to establish whether there are in fact two dialects with respect to PD in Russian, similar to what was suggested in Vicente (2007) for Spanish and Portuguese speakers.

6 Conclusions and the Future Research

Previous analyses of PD construction in Russian did not differentiate between V-Doubling and VP-Doubling, proposing a similar analysis for both. In this paper I demonstrated different syntactic properties of these constructions and proposed that to account for the data both base-generation and movement analyses are needed.

A few questions are left for future research. I claimed that the embedded TopP projection does not exist in subjunctive and control clauses, but is available in indicative clauses. While I proposed the preliminary explanation of this fact, more work needs to be done to assess the validity of this argument and whether it holds crosslinguistically. In addition, more evidence is needed to establish that the cleft VP must originate in the embedded TopP projection prior to moving to the matrix left periphery. Further, it is unclear why on the movement analysis there are restrictions on vP-topicalization that are not observed if a constituent of another type is topicalized.

Another question concerns the crosslinguistic consequences of this analysis. To my knowledge, data similar to those presented in this paper have not been gathered for other languages with the PD construction, and all analyses that I am aware of treat VP-Doubling and V-Doubling uniformly. It is important to check if the patterns observed in Russian extend to the entire Slavic family, and also beyond Slavic, e.g., to Spanish, Portuguese, Yiddish, and German.

Finally, this analysis also presents several questions regarding the copy theory of movement. How is the upper copy of the *v*P created? Are the *v*P-internal elements doubled in the numeration? If so, are they exactly the same, but occur in the numeration twice, or are they different in their featural content?

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Coordination of Wh-Phrases in Sluicing Constructions[*]

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The phenomenon we investigate in this paper is coordinated wh-sluicing in Polish and Croatian, illustrated in (1a-b) (see also Scott 2012 for an analysis of this construction in Russian).

(1) a. Netko   je nekoga   pozvao na ples.   *Croatian*
         someone aux someone invited on dance
         Reci mi **tko   i   koga**.
         tell   me who$_{NOM}$ and whom$_{ACC}$
         'Someone invited someone to a dance. Tell me who and whom.'
     b. Ktoś   zaprosił kogoś   do tańca,   *Polish*
         someone invited   someone to dance
         ale nie pamiętam, **kto   i   kogo.**
         but not remember   who$_{NOM}$ and whom$_{ACC}$
         'Someone invited someone to dance, but I don't remember who
         (invited) whom.'

Our goal is to develop an analysis that derives the properties of coordinated wh-sluicing in Croatian and Polish. In doing so, we examine two related constructions as possible syntactic sources for it: regular, non-coordinated multiple sluicing and coordinated wh-questions (**CWHs**). We conclude, however, that coordinated wh-sluicing displays properties that set it apart from *both* multiple sluicing and CWHs. We propose that coordinated wh-sluicing involves coordination of two interrogative CPs with ellipsis in both conjuncts, as shown in (2).

(2) $[_{\&P}\ [_{CP}\ \textbf{wh}_1\ [_{TP}\ \overline{\dots t_1 \dots}]]\ \&\ [_{CP}\ \textbf{wh}_2\ [_{TP}\ \overline{\dots t_2 \dots}]]]$

1 Introducing Coordinated Wh-Sluicing

Coordinated wh-sluicing, illustrated in (1a-b) above, is possible not only in languages that allow multiple wh-sluicing, shown in (3a-b) (Stjepanović 2003, Grebenyova 2007, 2009, Szczegielniak 2008, a.o.), but also in English, which allows multiple sluicing only under very restricted circumstances, as shown in (4a-b).

(3) a. Svatko   je nekoga   pozvao na ples, ali ne *Croatian*
       everyone aux someone invited on dance but not
       znam **tko   koga**.
       know who$_{NOM}$ whom$_{ACC}$
       'Everyone invited someone to a dance, but I don't know who (invited) whom.'
   b. Każdy   zaprosił kogoś   do tańca, ale nie pamiętam, *Polish*
       every   invited someone to dance but not remember
       kto   kogo.
       who$_{NOM}$ whom$_{ACC}$
       'Everyone invited someone to dance, but I don't remember who (invited) whom.'   (Grebenyova 2007: 54)

(4) a. $^{?/}$*****Someone saw something, but I can't remember **who what**.
                                                    (Lasnik 2014: 8)
   b. Someone saw something, but I can't remember **who or what.**

Sluicing in general has been analyzed as PF deletion of the clause in which the remnant wh-phrases originate (Lobeck 1995, Merchant 2001,

van Craenenbroeck & Merchant 2013). On such an analysis, the multiple sluicing examples in (3a-b) can be derived as in (5).

(5) $[_{CP}$ **wh$_1$ wh$_2$** $[_{TP}\ ...t_1...t_2...]]$

An obvious hypothesis to consider is that coordinated wh-sluicing involves a comparable deletion structure, given in (6).[1]

(6) $[_{CP}\ [_{\&P}$ **wh$_1$ & wh$_2$**$]\ [_{TP}\ ...t_1...t_2...]]$

The structure in (6) is identical, modulo ellipsis, to one of the structures that has been proposed for wh-questions with coordinated wh-phrases in languages with multiple wh-fronting, illustrated in (7a-b) (Gračanin-Yuksek 2007, Zhang 2007, 2009, Citko & Gračanin-Yuksek 2013).

(7) a. **Što   i   kome**   Marija   čita?   *Croatian*
         what$_{ACC}$ and whom$_{DAT}$ Marija   reads
         'What and to whom is Marija reading?'
     b. **Co   i   kiedy**   Maria   przeczytała?   *Polish*
         what$_{ACC}$ and   when   Maria   read
         'What and when did Maria read?'

Positing the same structure for coordinated wh-sluicing and CWQs predicts that the two constructions should exhibit similar syntactic behavior. In the next section, we examine this prediction.

2 Coordinated Wh-Sluices versus Coordinated Wh-Questions

CWHs are known to be possible both in languages with multiple wh-fronting (e.g., Slavic languages like Croatian or Polish) and languages like English, as shown in (8a-c), although in the latter type of languages, CWHs are much more restricted.

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[1] We assume that (6) is derived along the lines proposed in Zhang (2007, 2009), with wh-phrases undergoing sideward movement to form a conjunction phrase (&P). In a sideward movement derivation (Nunes 2001, 2004), the second conjunct moves first and merges with the conjunction head and the first conjunct moves next to become the specifier of &P, which is then merged into SpecCP. We thank one of the reviewers for asking us to be explicit about the derivation of (6).

(8) a. **Što   i   kome**   Marija   čita?   *Croatian*
       what$_{ACC}$ and whom$_{DAT}$ Marija   reads
       'What and to whom is Marija reading?'
   b. **Co   i   kiedy** Maria   przeczytała?   *Polish*
       what$_{ACC}$ and when   Maria   read
       'What and when did Maria read?'
   c. **What and where** did Maria sing?

Cross-linguistically, CWHs can have either a mono-clausal structure in (9a) or a bi-clausal multi-dominant structure in (9b) (see Gračanin-Yuksek 2007, Citko & Gračanin-Yuksek 2013, and the references therein). In our previous work, we argued that the mono-clausal structure is available in languages with multiple wh-fronting, while languages like English only allow the bi-clausal structure in (9b).[2]

(9) a.

```
                        CP
               ┌─────────┴─────────┐
              &P                   C'
          ┌────┼────┐          ┌────┴────┐
        wh_i   &⁰   wh_j      C⁰         TP
                                        ╱╲
                                      t_i … t_j
```

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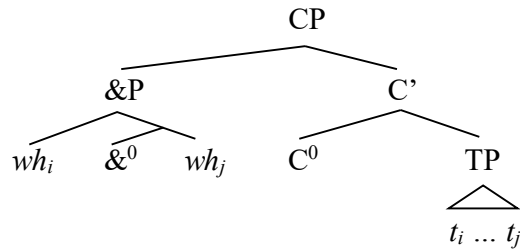
[2] We assume that the grammar includes some mechanism (such as Parallel Merge of Citko 2000, 2005 or horizontal sharing of Gračanin-Yuksek 2007) that allows a single node (e.g., V, T, C) to be multiply dominated/have two mothers. Space considerations prevent us from motivating such structures in detail.

b.

```
                                &P
                   ┌─────────────┴─────────────┐
                  CP                           CP
             ┌────┴────┐                  ┌────┴────┐
            Wh₁        C'                Wh₂        C'
                   ┌───┴────┐                  ┌────┴────┐
                   C        TP                          TP
                        ┌───┴───┐                   ┌────┴────┐
                       subj     T'                           T'
                            ┌───┴───┐                    ┌────┴────┐
                            T       VP                            VP
                                 ┌──┴──┐                     ┌─────┴─────┐
                                 V    t_Wh₁                            t_Wh₂
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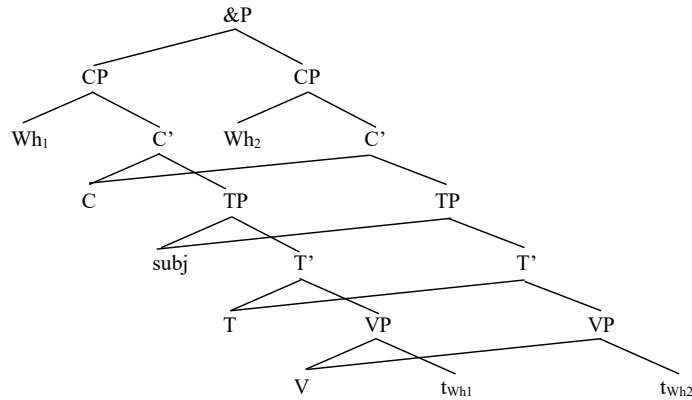
In Citko and Gračanin-Yuksek (2013), we showed that the unavailability
of the mono-clausal structure in English explains certain transitivity
restrictions on CWHs in English, the lack of superiority effects, and their
ungrammatical status when two arguments of the same verb are
coordinated. The availability of the mono-clausal structure in Polish and
Croatian explains why CWHs in these languages are not subject to these
restrictions. Here we illustrate the difference between CWHs in the two
types of languages with respect to the last property. Example (10a)
shows that in English coordination of wh-phrases that are arguments of
the ditransitive verb *give* is ungrammatical. On the account of
schematized in (9b), the ungrammaticality of (10a) reduces to that of
(10b), where each conjunct is missing an obligatory argument of a
ditransitive verb.[3]

(10)   a.   ***What and to whom** did John give?
       b.   *[**What** <u>did John give</u>] and [**to whom** <u>did John give</u>]?

The grammaticality of the Croatian and Polish counterparts in (11a-b)
follows from the mono-clausal structure in (9a), where both wh-phrases
are arguments of the same verb within the same clause.

---

[3] We refer the interested reader to Citko and Gračanin-Yuksek (2013) for a
discussion of other differences between CWHs in the two types of languages.

(11) a. **Što   i   kome**   Jan daje?   *Croatian*
         what$_{ACC}$ and whom$_{DAT}$ Jan gives
         Lit. 'What and to whom is Jan giving?'
   b. **Co   i   komu**   Jan dał?   *Polish*
         what$_{ACC}$ and whom$_{DAT}$ Jan gave
         Lit. 'What and to whom Jan gave?'

If a language has the structure in (9a) for CWQs, it is reasonable to hypothesize that it will have the structure in (12) for coordinated wh-sluicing, which differs from (9a) only in the presence of TP ellipsis.

(12)
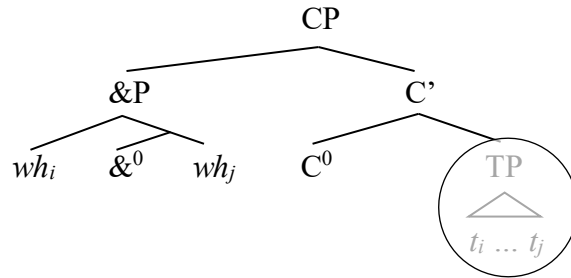
The structure in (12) might seem plausible for Slavic languages like Croatian or Polish, which allow the analogous structure for CWQs. However, it is much less plausible for English, which, as we saw in (4b), also allows coordinated wh-sluicing. Thus, even if (12) is the right structure for Croatian or Polish coordinated wh-sluicing, English coordinated wh-sluicing would have to involve a different structure. This is not implausible; we have argued that CHQs involve a different structure in English than they do in the languages of the Slavic type (i.e., multiple wh-fronting languages). In the next section, however, we show that the structure in (12) is not the right structure for coordinated wh-sluicing *even* in Slavic languages.

3 Distribution of the Particle *to* in Croatian

Our main evidence against the structure in (12) comes from the distribution of the particle *to* in Croatian wh-constructions (see Browne 1976, Rudin 1988, Progovac 1998 on *to* more generally). In Croatian,

this particle can appear in wh-questions (13a), multiple wh-questions (13b), and CWQs (13c).[4,5]

(13) a. **Koga**   **(to)**   Jan zove?
         who$_{ACC}$ TO   Jan calls
         'Who is Jan calling?'
    b. **Što**   **(to)** **kome**   Jan daje?
         what$_{ACC}$ TO   whom$_{DAT}$ Jan gives
         Lit: 'What to whom is Jan giving?'
    c. **Što**   **(to) i**   **kome**   Jan daje?
         who$_{ACC}$ TO and whom$_{DAT}$ Jan gives
         Lit: 'What and to whom is Jan giving?'

In multiple wh-questions, *to* can only appear once. We see this restriction in multiple wh-questions (14a), as well as in the necessarily mono-clausal coordinated wh-questions (14b). This suggests that there can be only one *to* per clause.

(14) a. **Što**   **(to) kome**   **(*to)** Jan daje?
         what$_{ACC}$ TO whom$_{DAT}$ TO Jan gives
         Lit: 'What to whom is Jan giving?'

    b. **Što**   **(to)** **i**   **kome**   **(*to)** Jan daje?
         who$_{ACC}$ TO   and whom$_{DAT}$ TO Jan gives
         Lit: 'What and to whom is Jan giving?'

---

[4] This particle also exists in Polish, but it has a different distribution (discussed by Tomaszewicz 2011, Tajsner 2015, for example). Tomaszewicz (2011) notes that in multiple wh-questions it can precede all wh-phrases but not appear between them (i), and that it can occur in CWQs (ii) (Tomaszewicz 2011: 192).

(i)   **To** kto (***to**) co   kupił?
     TO who   TO   what bought
     'What was it that who bought?'
(ii) Kto i   **to** co   kupił?
     who and TO   what bought
     'What was it that who bought?'

[5] Rudin (1988: 472) uses the distribution of *to* (the demonstrative particle) to argue for the claim that (Serbo-)Croatian is a [–MULTIPLY FILLED SPECCP] language. Halpern (1995: 89) adopts Rudin's analysis, but calls the particle "cleft-marking *to*".

Example (14b) is necessarily mono-clausal because it involves coordination of two obligatory arguments of the ditransitive verb *dati* 'give'. In the alternative, bi-clausal structure, the selectional restrictions of the ditransitive verb would not be met, as each conjunct would only contain one of the verb's obligatory arguments. A bi-clausal structure becomes available for the example in (15a) below, where the verb is optionally transitive. This means that each conjunct is grammatical with only one wh-phrase. In other words, the reason (15a) is grammatical is the same reason (15b) is grammatical. In (15a), the second *to* becomes possible:

(15) a. Što   **(to)** i   kome   **(to)** Jan predaje?
         what$_{ACC}$ TO and whom$_{DAT}$ TO Jan lectures
         'What and to whom does Jan lecture?'
     b. Što   **(to)** Jan predaje i   kome   **(to)** Jan predaje?
         what$_{ACC}$ TO   Jan lectures and whom$_{DAT}$ TO   Jan lectures
         'What does Jan lecture and to whom does Jan lecture?'

In sluicing that does not involve coordination, *to* can appear in a single sluice (16a), but is banned from multiple sluices (16b).[6]

(16) a. Netko   zove Jana ali ne znam **tko**   **to**.
         someone   calls Jan but not know who$_{NOM}$ TO
         'Someone is calling Jan, but I don't know who.'
      b. Netko   je nekoga   pozvao. Pitam se **tko**   **(*to)**
         someone   has someone invited wonder REFL who$_{NOM}$ TO
         koga   **(*to)**.
         who$_{ACC}$ TO
   'Someone has invited someone. I wonder who (invited) whom.'

The ban on even a single *to* in the (presumably mono-clausal) multiple sluice in (16b) remains somewhat mysterious to us. But, crucially, in coordinated sluices, *to* can appear following the first, second, or *both* wh-phrases, as shown in (17).

---

[6] The appearance of *to* in sluicing violates Merchant's (2001) generalization that non-operator material cannot appear in COMP under sluicing (see also Marušič et al. 2015).

(17) Netko   je nekoga   pozvao.   Pitam   se
       someone has someone invited   wonder   REFL
       tko   (to) i   koga   (to).
       who_{NOM} TO   and who_{ACC} TO
       'Someone invited someone. I wonder who whom.'

Thus, the distribution of the particle *to* in Croatian shows that the mono-clausal structure in (12) cannot be the right structure for coordinated wh-sluicing. The alternative, which we turn to now, is a bi-clausal structure. There are two such bi-clausal structures to consider. One is the bi-clausal multi-dominant structure in (18a), analogous to the structure for CWHs in (9a), and the other one is the bi-clausal structure given in (18b), in which ellipsis applies in both clauses.

(18)   a.
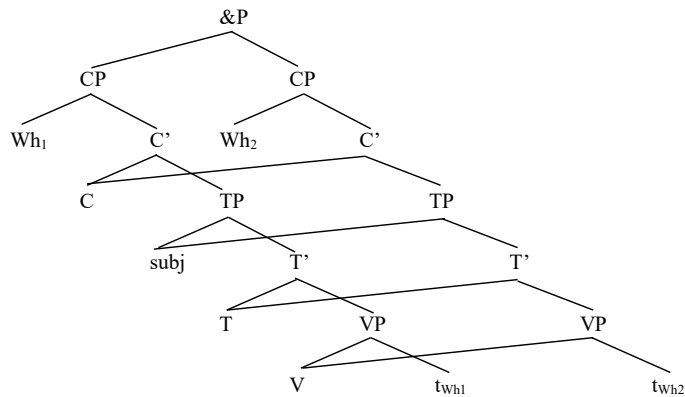
      b. $[_{\&P} [_{CP} \textbf{wh}_1 [_{TP} \ldots t_1 \ldots]] \& [_{CP} \textbf{wh}_2 [_{TP} \ldots t_2 \ldots]]]$

If the multi-dominant structure in (18a) is the correct structure for coordinated sluicing, coordinated wh-sluices should be subject to same restrictions as bi-clausal CWHs. However, this is not the case. The contrast between the bi-clausal CWH in (19a) and the corresponding coordinated sluice in (19b) suggests that (18a) cannot be the right bi-clausal source for coordinated sluicing. While the CWH in (19a), which

contains an obligatorily transitive verb, cannot contain two instances of *to*, the coordinated sluice in (19b) can.

(19) a. **Što   (to)** i   **kada (*to)** Jan očekuje?
           whatACC TO and when   TO Jan expects
           Lit: 'What and when is Jan expecting?'
      b. Jan očekuje   nešto   važno   u sljedećih dan-dva.
           Jan expects   something important in next   day-two
           Zanima   me **što   (to)   i   kada (to).**
           interests me whatACC   TO   and when TO
           'Jan expects something important in the next couple of days. I
           am interested in what and when.'

4 Bi-Clausal Ellipsis Account

Instead, we propose that coordinated wh-sluicing is derived from a bi-clausal structure involving coordination of two interrogative CPs, each containing only one wh-phrase, with TP ellipsis in each conjunct. The structure is given in (20b).

(20) a. Netko   je nekoga   pozvao na ples.   Reci mi
           someone aux someone invited on dance tell   me
           tko   i   koga.
           whoNOM and whomACC
           'Someone invited someone to a dance. Tell me who and whom.'

     b. . . .
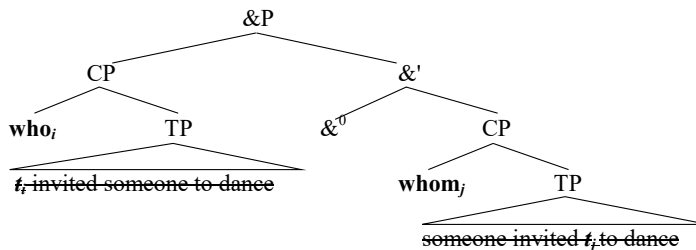
However, this structure yields an incorrect interpretation; (21b) is not an accurate paraphrase of (21a).[7]

(21) a. Someone saw something but I can't remember **who or what.**
     b. Someone saw something but I can't remember **who saw something or what someone saw.**

The correct interpretation can be derived if we replace *someone* in the second conjunct by an anaphoric element (i.e., a pronoun co-indexed with the wh-pronoun in the first conjunct), as shown in (22a), which is can be paraphrased as (22b).[8]

(22) a. Someone saw something but I can't remember [$_{CP}$ **who**$_i$ [$_{TP}$ ~~t_i saw something~~] or [$_{CP}$ **what**$_j$ [$_{TP}$ ~~he/she$_i$/they$_i$ saw t_j~~].
     b. Someone saw something but I can't remember **who**$_i$ saw something or **what** it was that he$_i$/she$_i$/they$_i$ saw.

An analogous sluicing analysis, illustrated in (23b), has been proposed for CWHs like the one in (23a) (Browne 1972, Giannakidou & Merchant 1998, Whitman 2002, Tomaszewicz 2011, among others).

(23) a. **Kto i kakoj gorod** zaxvatil?   *Russian*
        who and which city   conquered
        'Who conquered which city?'
     b. Kto$_i$ [t_i ~~zaxvatil~~ **~~pro~~**$_j$] i **kakoj gorod**$_j$ [pro$_i$ zaxvatil t_j]?

(Kazenin 2001: 7)

This analysis, however, has been discounted for CWHs on the grounds that it requires a cataphoric dependency, generally unavailable in Russian

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[7] The alternative in (i), involving clausal coordination of multiple wh-questions, also yields an incorrect interpretation; (i) should be interpreted as a disjunction of multiple wh-questions with pair list readings.
(i) Tell me [$_{CP}$ **who**$_i$ [$_{TP}$ ~~t_i invited~~ **~~whom~~** ~~to dance~~] or [$_{CP}$ **whom**$_i$ [$_{TP}$ ~~who invited t_i to dance~~].
[8] One of the reviewers points out that the meaning of the coordinated wh-sluice might be captured more accurately if the first CP is 'who saw it', rather than 'who saw something'. However, as the reviewer also points out, the alternative would involve an illicit cataphoric dependency, similar to the one in (23b).

(Kazenin 2001). This is not a problem in (22a) because there is no cataphoric dependency between *what* and *something*.[9]

5   Consequences

The bi-clausal analysis proposed above explains the fact that in Croatian and Polish, coordinated wh-sluices do not exhibit superiority effects, as shown in (24b)/(25b), while comparable multiple sluices without coordination do, as shown in (24c)/(25c).[10]

(24) a. Netko   je   nekad   ovdje sakrio blago.   *Croatian*
          someone AUX some-time here   hidden treasure
          'Somebody hid the treasure here at some point in the past.'
      b. **Tko   i   kad**?/**Kad i   tko**?
          who_NOM and when/when and   who_NOM
      c. **Tko   kad?**/***Kad   tko**?
          who_NOM   when/when   who_NOM   (Stjepanović 2003)

(25) a. Ktoś   kiedyś   tutaj ukrył skarb.   *Polish*
          someone sometime here hid   treasure
          'Somebody hid the treasure here at some point in the past.'
      b. **Kto   i   kiedy**?/**Kiedy i   kto**?
          who_NOM and   when /when   and who
      c. **Kto   kiedy?**/***Kiedy kto**?
          who_NOM when/when   who_NOM

The bi-clausal analysis also explains why coordinated multiple sluices differ from non-coordinated multiple sluices with respect to the so-called Clausemate Condition (Abels & Dayal 2017). The Clausemate Condition requires wh-phrases in multiple sluicing to originate from within the same (finite) clause (see Takahashi 1994, Nishigauchi 1998, Merchant 2001, Marušič & Žaucer 2013, Lasnik 2014, Citko in press), which explains the ungrammaticality of examples (26a-c).

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[9] Although both (22b) and (23b) involve a bi-clausal source, the two are different because (22a) involves forward and (23b) backward sluicing. We thank Vera Gribanova for bringing this difference to our attention.

[10] The presence of superiority effects in matrix multiple sluicing was noted by Stjepanović (2003).

(26)   a. *Some linguist was upset because Harry spoke to some
          philosopher but Bill doesn't know **which linguist to which
          philosopher**.   (Abels & Dayal 2017: 25)
       b. *Ktoś   wie,   że   Jan   coś   przeczytał, *Polish*
          someone knows that Jan   something read
          ale   nie pamiętam, **kto   co**.
           but   not remember   who_NOM what_ACC
          'Someone knows that Jan read something but I don't
          remember who (knows that Jan read) what.'
       c. *Neki   student tvrdi   da   je   neki profesor *Croatian*
          some   student claims that   AUX some professor
          dao   otkaz.   Reci mi **koji student koji   profesor**.
          gave resignation tell me which student which   professor
          'Some student claims that some professor resigned. Tell me
          which student and which professor.'

The grammaticality of the coordinated wh-sluices in (27a-c), on the other
hand, shows that they are not subject to the Clausemate Condition.

(27)   a. Some linguist was upset because Harry spoke to some
          philosopher but Bill doesn't know **which linguist and to which
          philosopher**.   (Abels & Dayal 2017: 25)
       b. Ktoś   wie,   że   Jan coś   przeczytał, *Polish*
          someone knows that Jan something   read
          ale   nie pamiętam, **kto   i   co.**
          but   not remember who_NOM and what_ACC
          'Someone knows that Jan read something but I don't remember
          who (knows that Jan read) what.'
       c. Neki student tvrdi   da je   neki profesor dao *Croatian*
          some student claims that AUX some professor gave
          otkaz.   Reci mi **koji   student i   koji   profesor**.
          resignation tell me which   student and which   professor
          'Some student claims that some professor resigned. Tell me
          which student and which professor.'

On our analysis, since coordinated sluicing does not involve a multiple
sluicing configuration, the Clausemate Condition does not apply. The

difference between multiple sluicing and coordinated sluicing is schematized in (28a-b).

(28)   a.   [$_{CP}$ **who**$_i$ [$_{CP}$ **what**$_j$ [$_{TP}$ … t_i …. [$_{CP}$ **that** [[$_{TP}$ …t_j ….]]]]]]]
       multiple sluicing
       b.   [$_{\&P}$[$_{CP}$ **who**$_i$ [$_{TP}$ … t_i ….] and [$_{CP}$ **what**$_j$ [[$_{TP}$ …t_j ….]]]
       coordinated sluicing

The bi-clausal analysis also explains why in English coordinated sluicing has a wider distribution than multiple sluicing. Lasnik (2014: 8), citing Richards (1997), notes that the second wh-phrase in multiple sluicing "strongly prefers to be a PP":

(29)   a.$^?$Someone talked about something, but I can't remember **who about what**.
       b.$^{?/}$*Someone saw something, but I can't remember **who what**.
       (Lasnik 2014: 8)

Based on this preference, Lasnik (2014) argues that the second wh-phrase in multiple sluicing undergoes rightward movement, as shown in (30). The contrast in (31) shows that extraposition of the lower wh-phrase (marked by its position relative to the adverbial *yesterday*) is easier for PPs than for DPs:

(30)   Someone gave a book to someone but I don't know [$_{CP}$ **who**$_i$ [$_{TP}$ ~~t_i gave a book t_j~~] [**to whom**$_j$]]

(31)   a. Who was talking t_i *yesterday* **to who**$_i$?
       b.$^{?/}$*Who bought t_i *yesterday* **what**$_i$?
       (adapted from Lasnik 2014: 9)

Whatever the correct analysis of multiple sluicing is in English, our analysis of coordinated sluicing explains why illicit examples of multiple sluicing improve if the wh-phrases are "coordinated", as shown in (32) – they do not involve a multiple sluicing configuration.

(32)   a.$^{?/}$*Someone saw something, but I can't remember **who what**.

b.   Someone saw something, but I can't remember **who or what**.

Finally, our analysis captures the observation that coordinated sluices have Single Pair (SP) readings, as noted by Abels and Dayal (2017) for English and by Gribanova (2009) for Russian, and contrast in this respect with multiple (non-coordinated) sluices, which have Pair List (PL) readings.[11] This is shown in (33a-b) for Russian; Croatian and Polish behave similarly in this respect.

(33) a.   Každyj   priglasil   kogo-to   na   tanec,   *Russian*
            everyone invited   someone   to   dance
            no ja   ne   pomnju, **kto   kogo**.
            but I   NEG   remember who   whom
            'Everyone invited someone to a dance, but I don't remember
            who (invited) whom.' **PL**   (Grebenyova 2007: 54)
      b.   Kto-to   priglasil   kogo-to   na   tanec,   no   ja   ne
            someone   invited   someone   to   dance   but I   NEG
            pomnju, **kto   i   kogo**.
            remember   who   and   whom
            'Someone invited someone to a dance, but I don't remember
            who (invited) whom.' **SP**   (Gribanova 2009: 141-142)

6 Conclusion

To conclude briefly, we have shown in this paper that coordinated wh-sluicing is not contingent on the availability of multiple wh-fronting in a language. We have also shown that the structure of coordinated wh-sluicing does not necessarily parallel the structure of CWQs, and that coordinated wh-sluicing involves coordination of interrogative CPs, each containing a single wh-phrase, with TP-ellipsis in each conjunct. We have argued for such a bi-clausal structure even for languages like Croatian or Polish, which allow a mono-clausal structure for CWQs.

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[11] Gribanova (2009) builds on Grebenyova's work on multiple sluicing.

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Linking Agreement and Anticausality:
Semantic Effects of Agreement on Exclusives in Serbian[*]

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In this paper, we discuss morphosemantic differences between the standard focus operator *samo* 'only' in Serbian and its agreeing counterpart *sam(-a/o)* 'alone, by himself/herself'.[1,2] Examples of these are shown in (1) and (2) below.

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[*] We would like to thank graduate students in the Spring 2018 Syntax Seminar at Cornell. The authors' names are listed in alphabetical order, which is in no way intended to indicate primacy of authorship.

[1] To the best of our knowledge, everything we discuss here regarding Serbian also holds for Bosnian, Croatian, Montenegrin, and other varieties of the area.

[2] We do not discuss the Serbian emphatic particle *sam* (Progovac 1998, Despić 2013), which also exhibits agreement and is clearly morphologically related to the exclusives we discuss in this paper. It certainly appears that this use should ultimately be included in the discussion of exclusivity and agreement in Serbian, especially given the similarity to English emphatic reflexives and the presence of the English paraphrase 'by it/him/herself' we see with agreeing *sam-a/o*. See Despić and Wiegand (in preparation) and Wiegand (forthcoming), for some discussion of how to merge accounts of emphatic *sam* (and English emphatic reflexives) with this account.

(1) *Standard focus operator (non-agreeing):*
    Ana je   juče   samo   plivala.
    Ana is   yesterday   only   swam
    'Ana only swam yesterday.' or
    'Only Ana swam yesterday.'

(2) *Agreeing operator:*
    Ana je   juče   sama   plivala.
    Ana is   yesterday   sam$_{N.S.F}$ swam
    'Ana swam yesterday alone/(all) by herself.'

We argue that both operators can be captured with a common semantic entry, and that their difference in interpretation is attributable to a different semantic scope. We argue that the agreement in (2) indicates a restricted semantic domain of quantification for *sam-a/o* to individuals and events that introduce those individuals. This then accounts for its different interpretation and distribution when compared to the non-agreeing *samo*.

A similar account has been proposed for English adjective *mere* in comparison with *only*, where the former takes scope only over the noun it modifies, while the latter takes sentential scope (Coppock & Beaver 2011). Our account differs in that it ties this behavior to the agreement mechanism and connects exclusivity with anticausality.

We show that the agreeing *sam(-a/o)* is an exclusive operator which does not associate with a prosodically focused element in the prejacent, unlike *only/samo*. It is in this sense similar to the 'unexplanatory' *just* (Wiegand 2017, 2018), which also exhibits anticausality. We also argue that agreement indicates low scope of the exclusive operator, which restricts its domain of quantification to individuals and events.

1 Exclusives in Serbian: Main Facts and Generalizations

1.1 Samo and Sam-a/o in Serbian
The non-agreeing *samo* 'only' behaves as a standard exclusive operator and associates with a prosodically focused element in the sentence it modifies, much like *only* in English. As discussed in the standard

literature on focus, this gives rise to alternatives for the focused constituent (Rooth 1985, 1992). Likewise, depending on the locus of the focus prosody, the alternative set will vary. In (1), repeated below as (3a), focus on *Ana* provides alternatives for the subject position, resulting in the quantificational meaning 'Only Ana swam yesterday, no one else did'. Focus on the verb *plivala* provides alternatives to the denotation of the verb itself, which results in a different set of denied alternatives, shown in (3b).

(3) a. [Ana]F   je juče   ***samo*** plivala.
        Ana is yesterday   only swam.'
        'Only [Ana]F swam yesterday (and no one else swam yesterday).'
    b. Ana je juče   ***samo***   [plivala]F.
        Ana is yesterday   only   swam.'
        'Ana only [swam]F yesterday (and Ana did not do anything else yesterday)'

However, the agreeing *sam(-a/o)* can only be interpreted as 'alone, by herself/himself', i.e., as a quantifier ranging over individuals. In (2), repeated below as (4), *sam(-a/o)* agrees with the subject *Ana* in case, number, and gender. In this case, it cannot be interpreted as in (3a). Rather, here the interpretation is not that Ana was the only person swimming, but rather that Ana swam 'by herself'.

(4) Ana je juče   ***sama***   plivala.
    Ana is yesterday   sam_{N.S.F}   swam
    'Ana swam yesterday alone/(all) by herself.'

There are actually three different specific interpretations available for (4): one where Ana's swimming was unaccompanied (alone), one where her swimming was unassisted, and another where her swimming was uncaused/unprompted. We discuss the three possible interpretations of (4) in more detail in the following section.

1.2 Three Readings of the Agreeing Sam-a/o
We identify three independent readings of the agreeing *sam-a/o*: the **no-company (A) reading**, the **no-help (B) reading**, and the **no-other-cause**

(C) reading. Consider the following example in (5) with the agentive verb *jesti* 'eat'.

(5) Ana je počela da   jede **sama**.
    Ana is started that eats sam$_{N.S.F}$
    'Ana started to eat by herself.'

1.2.1 No-Company Reading. The first and generally most obvious of the three readings for agreeing *sam-o/a* is what we call the no-company reading, or the A reading. Here, (5) is interpreted as 'Ana started eating alone'; Ana is performing the activity of eating without anyone's company. Importantly, this doesn't seem to be limited to other eaters. Rather, it indicates the absence of some general company at the time and place of the eating event.

Note that when this version of *sam-a/o* is the main predicate, it displays some interesting animacy restrictions, as demonstrated in the contrast between the animate subject in (6) and inanimate subject in (7).

(6) Ana je **sama**.
    Ana is sam$_{N.S.F}$
    'Ana is alone/by herself.'

(7) #Lampa je **sama**.
    lamp is sam$_{N.S.F}$
    'The lamp is alone/by itself.'

As discussed in the next section, *sam-a/o* is an exclusive operator, which in some sense singles out an individual. When it is the main predicate, it essentially says that the subject is "without company". Although this reading is not the main focus of this paper, it is possible that *sam-a/o* is restricted to animate individuals here, since only sentient beings may have "company". It is in this sense similar to *lonely*.

However, it should be noted that when *sam* modifies another (verbal) predicate (i.e., when it is an adjunct), this restriction does not apply – only the restrictions of the main predicate apply. This is demonstrated below in (8), where the no-company reading is perfectly felicitous with

the inanimate subject *slika* 'picture' when it modifies the verb *visila* 'hang'.

(8) Slika   je   na zidu visila   **sama**.
     picture is   on   wall   hanged $\text{sam}_{\text{N.S.F}}$
     'The picture was hanging on the wall by itself.'

1.2.2 No-Help Reading (Agentive Reading). The second reading we identify for agreeing *sam-o/a* is the no-help/agentive reading, or the B reading. Under this reading, (5) is interpreted as 'Ana started to eat without anyone's help'. For example, consider a context where Ana is four years old, so she has just started to be able to use utensils on her own without anyone's help. On this reading, Ana is executing or carrying out the act/activity of eating all by herself, without any assistance. In other words, she is the single agent of eating within the eating event.

1.2.3 No-Other-Cause Reading (Causal Reading). The third and final reading we have identified for agreeing *sam-o/a* is the no-other-cause/causal reading, or the C reading. Here, (5) is interpreted as 'Ana needs no convincing' or 'Ana's eating has no cause external to Ana'. In other words, she initiates the activity of eating by herself. A naturally occurring example exemplifying this reading is shown below:

(9) *Context*: A mother is complaining on a blog that her son is too skinny and he never wants to eat. Another blogger replies:
     Težina tvog sina je zdrava. Nemoj   toliko   da   se
     weight your son is healthy do.not   that.much that   REFL
     opterećuješ   vagom, on će   početi   da   jede **sam**   **od**
     worry   scale   he will start   that   eat $\text{sam}_{\text{N.S.M}}$ from
     sebe jednog dana.
     self   one   day
     'The weight of your son is fine. Do not worry about the scale (about weighing him) that much, one day he will start eating by himself.'
     (http://www.serbiancafe.com/lat/diskusije/mesg/140/16131993/
     bucmasto-ili-zdravo-dete.html?6)

Note that when *sam-a/o* is extended with *od sebe* 'from self', only the C reading is available. That is, *sam-a/o od sebe* unambiguously has the C

reading. According to (9) then, the boy will one day become the only initiator/cause of the event of eating.

Another naturally occurring example of the no-other-cause reading is given below in (10) (Selimović 1970: 16). Here again, *od sebe* is utilized; however, note that it is not necessary to get this reading.

(10) Jer   nije   kontrolor došao **sam**   **od**   **sebe**, to   je
       Because didn't   inspector come   sam$_{N.S.M}$ from self that is
       neko   prijavio pa   su ga   poslali iz direkcije.
       someone reported then   are him   sent   out main.office
       'Because the inspector didn't come by himself. Someone must
       have reported him and then he was sent from the main office.'

(10) says that an inspector did not initiate the event of inspecting. Rather, this is usually caused externally (e.g., he was sent from the main office). This contrasts with the A and B readings, as this neither says that the inspector was alone when he came nor that he came unassisted.

This C reading is very similar to the interpretation of English *just* in the 'unexplanatory' use (Wiegand 2017, 2018). An example of this is given below in (11).

(11)   I was sitting there and the lamp just broke! (All by itself!)

Here, *just* expresses that the lamp broke with no apparent cause. Interestingly, just like the Serbian follow-up *od sebe*, the unexplanatory use of *just* is made more salient with the optional follow up *by itself* or *all by itself*. In fact, the examples of the C reading of agreeing *sam-o/a* shown above could be paraphrased in English with unexplanatory *just*. An English near-equivalent of (10) is given below in (12).

(12)   The inspector didn't just show up. Someone must have sent him
        from the main office.

The syntax and distribution of *just* in English is quite different from agreeing *sam-a/o*. However, the fact that both are exclusive markers and

are able to target cause events indicates strongly that causation is a visible semantic object for quantification. It is further evidence that we should be looking at agreeing *sam-o/a* as an extension of ordinary non-agreeing *samo*, as clearly other exclusives can quantify over these finer-grained event structures like causation.

The C reading is in fact the only reading we have with the so-called "anti-causative" verbs in Serbian (Dowty 1979, Levin & Rappaport Hovav 1995, Pesetsky 1995, Reinhart 2003, Kratzer 2005, Alexiadou & Schäfer 2006). This is shown below in (13a-b), neither of which allow the B reading or A reading.[3]

(13) a. Lampa se   razbila **sam-a (od   sebe)**.
          lamp   REFL broke   sam$_{N.S.F}$ from self
          'The lamp broke by itself.'
      b. Led   se   istopio **sam   (od   sebe)**
          ice   REFL melted   sam$_{N.S.M}$ from self
          'The ice melted by itself.'

Additionally, unaccusatives, like *umreti* 'die' or *pasti* 'fall', also seem to lack the B reading. In (14), for example, the salient reading is the A reading, where the president died alone/unaccompanied.

(14) Bivši predsednik je umro   **sam**
      former president   is died   sam$_{N.S.M}$
      'The former president died by himself.'

This is likewise the intended interpretation for (15), where a woman fell in the bathroom when she was alone.

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[3] The question of whether these actually do have the A reading is an open one. According to native speakers, both (13a) and (13b) are pragmatically odd, likely due to the animacy effects discussed earlier. However, those animacy effects do seem to be cancellable: in a context where the lamp or the ice was anthropomorphized in some way, these would be better. Importantly, though, the B reading is completely unavailable even in the hypothetical anthropomorphic lamp case.

(15) Juče   je pala **sama**   u   kupatilu.
     yesterday is fell sam~N.S.F~   in bathroom
     'Yesterday she fell by herself in the bathroom.' (she was alone)
     (https://www.doktor.rs/forum/kardiologija/aritmija-t22517-
     840.html)

Unaccusatives also have access to the C reading, as demonstrated in
(16)-(18) below.

(16) *Context from an online newspaper*: A disabled convict died in
     prison, and someone is making the following comment:
     A   sada kažu kao čovek umro **sam   od   sebe**,
     and now say like man   died sam~N.S.M~ from self
     nije   umro **sam   od   sebe** – nije   mogao sam
     didn't   die sam~N.S.M~ from self   didn't   could sam~N.S.M~
     da   uzima hranu i   vodu potrebna mu   je bila osoba
     that take food and water needed   him is was   person
     koja bi   se   brinula o   njemu.
     which would REFL take.care about him
     'And now they say that the guy died by himself, he didn't die by
     himself, he couldn't take food and water, he needed a person that
     would take care of him'
                    (http://jugmedia.rs/preminuo-nepokretni-osudenik/)

(17) *Context: an online newspaper headline*
     Kakav amater: Drogba **pao sam   od   sebe** pa
     what amateur Drogba fell sam~N.S.M~ from self   then
     virio   na jedno oko.
     peeked on one   eye
     'What an amateur: Drogba fell by himself and then he peeked with
     one eye.'
          (http://forum.source.ba/clanak/Fudbal/282309/Kakav-amater--
                    Drogba-pao-sam-od-sebe-pa-virio-na-jedno-oko)

(18) Bandera je pala **sama   od   sebe**.
     pole   is fell sam~N.S.F~ from self
     'The pole fell by itself.'

The question remains why the B reading is unavailable with *fall* or *die*. On the B reading, *sam-o/a* says that someone is not helped in carrying out an activity, i.e., that she is the only agent who executes/carries out an activity. But, dying or falling is not something that people actively carry out and where they can have the help of other agent - these things happen to people. On the other hand, people can have no company when these events occur (the A reading), or there might not be an identifiable external cause for these events (the C reading).[4]

In the next section, we provide an analysis explaining the core meaning difference between the non-agreeing *samo* 'only' and its agreeing counterpart *sam-a/o* 'alone, by itself', accounting for the variation in the availability of different meanings of *sam-a/o* among different types of verbs.

2 Our Analysis: Exclusives, Agreement, and Argument Structure

We argue that the agreeing *sam(-a/o)* is semantically an exclusive operator and syntactically an adverb (ExclusiveP) adjoined within the verbal layers. ExclusiveP agrees with the closest argument, which is the agent in the case of verbs that include the agent-introducing projection (e.g., VoiceP; Kratzer 1996). The general syntactic structure of agreeing *sam(-a/o)* is provided below in (19).

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[4] A reviewer wonders if all verbs that allow modification by *sam od sebe* contain CAUSE, even a verb like *spavati* 'to sleep'. Although in an out-of-the-blue context it might be odd to modify this verb with *sam od sebe*, in a context in which it is not unusual to have external causes of sleep (e.g., a small baby) such examples are perfectly fine. A naturally occurring example of this type is given in (i) below:

(i) Rekoše sestri u   jaslama   da polako krene da smanjuje
     told   nurse in nursery.school that slowly starts that reduce
     te   rituale pred spavanje, da   se   nauči da **spava sam**
     those rituals before sleeping   that REFL   learn that sleep sam$_{N.S.M}$
     od   sebe.
     from   self
     'They told the nurse in the nursery school to slowly cut down on those pre-sleep rituals, so that he can learn to **sleep by himself**.'
                              (https://www.ana.rs/forum/index.php?topic=74551.2175)

(19)   Syntax of agreeing *sam-a/o*
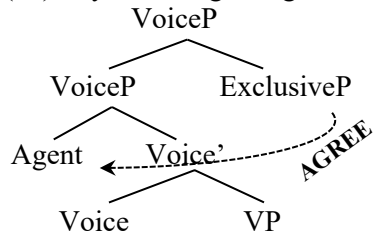
Non-agreeing *samo* 'only' presumably adjoins higher in the tree, outside the verbal complex. The exact syntactic position of the non-agreeing form is not important for the purposes of the present inquiry. Any adjunction position above VoiceP would be consistent with our analysis.

We argue that agreement between *sam* and an argument originating within the verbal projection indicates that the exclusive must take low scope with respect to the event denoted by the verb. As a result, the semantic domain of quantification is restricted to (i) individuals, i.e., event participants who stand in the thematic relation to the eventuality denoted by the verb, and (ii) events involving those individuals.

2.1 Samo 'Only' vs. Sam-a/o 'Alone, by Itself'
Essentially, our claim is that agreement is tied to semantic scope, which in turn accounts for the different behavior between agreeing and non-agreeing *sam*. We argue that the agreement operation requires that the exclusive operator take scope within the event denoted by the predicate. That is, the locality of the Agree operation that this operator participates in also restricts its scope. On the other hand, the lack of agreement with ordinary *samo* 'only' indicates that the exclusive operator *samo* scopes over the entire proposition, with alternatives derived via Roothian association with focus.

Consider again the contrast between (1) and (2), repeated below as (20) and (21):

(20) Ana je   juče   **samo** plivala.
      Ana is   yesterday only   swam
      'Only Ana swam yesterday.'

(21) Ana je   juče   **sama**   plivala.
      Ana is   yesterday sam$_{N.S.F}$ swam
      'Ana swam yesterday alone/(all) by herself.'

One useful way of conceptualizing the scopal interactions of these examples is utilizing a neo-Davidsonian event semantics that introduces events via existential quantification. Given such a framework, for the agreeing *sam(-a/o)* in (21), the interpretation (for the B reading) would be 'there is an event e of swimming such that Ana is the only agent x of e', as given in (22) below. (22a) shows the relative scope of the exclusive, while the equivalent (22b) translates this into a quantification over individuals.

(22) a. $\exists e[\text{swim}(e) \wedge \text{only}(\text{agent}(e, a))]$
      b. $\exists e[\text{swim}(e) \wedge \forall x[\text{agent}(e, x) \rightarrow x = a]]$

Note that this formulization is compatible with there being separate swimming events involving individuals other than Ana. Therefore, (21) only states that Ana was the only agent in her swimming, not that she was the only person who swam.

Compare this to the non-agreeing form in (20), which in the case that it associates with an individual, results in the equivalent of the exclusive quantification occurring outside the scope of the event quantifier. The interpretation here is 'Ana is the only individual x such that there is an event e of swimming such that the agent of e is x', shown below in (23). As above, (23a) shows that the exclusive scopes over the event quantifier, while (23b) translates this in the case that there is focus on an individual (rather than, e.g., a VP).

(23) a. $\text{only}(\exists e[\text{swim}(e) \wedge \text{agent}(e, [a]_F)])$
      b. $\forall x[(\exists e[\text{swim}(e) \wedge \text{agent}(e, x))] \rightarrow x = a]$

Unlike (22), the interpretation for (23) is incompatible with a situation where multiple people were swimming, resulting in the typical exclusive interpretation of 'only' for non-agreeing *samo*.

We argue that the agreement relationship is an indicator of the structural properties of agreeing *sam(-a/o)* keeping it from scoping out of the event quantifier and restricting the domain of quantification to individuals. However, in order to account for the differences between the three readings discussed in the last section for agreeing *sam(-o/a)*, we need to introduce some finer-grained distinctions.

2.2 Sam-a/o and Variation in Meaning

What factors govern the variation in meaning of *sam-a/o* we see with different verb types? Recall that the example in (5), repeated as (24), has three different readings, summarized below.[5]

(24) Ana je počela da jede **sama**.
     Ana is started that eats sam$_{N.S.F}$
     'Ana started to eat by herself.'
    a. ***No-company reading***: Ana started eating alone (i.e., without anyone's company). (We ignore this reading here)
    b. ***No-help reading (agentive reading)***: Ana started to eat without anyone's help (e.g., she's four years old now, so she can use utensils without anyone's help). Here, Ana is the single agent of eating.
    c. ***No-other-cause reading (causal reading)***: Ana needs no convincing; she initiates the activity of eating by herself.

First, we adopt the bieventive view of causative structures like *John melted the ice* from Pylkkänen (2002), which we believe is particularly

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[5] As pointed out by a reviewer, these readings are somewhat similar to different readings of "sociative causation", which involves a causer who does not only make the causee do an action, but also participates in it (e.g., Shibatani & Pardeshi 2002, Tatevosov 2018, etc.). This is in a way similar to our agentive reading (e.g., when a mother helps a child eat), but the help-provider in our examples is in no way required to be a causer. Also, the languages with "sociative causation" usually involve multiple cause heads/projections, which is different from Slavic/Serbian. We leave exploring the connection with "sociative causation" to future work.
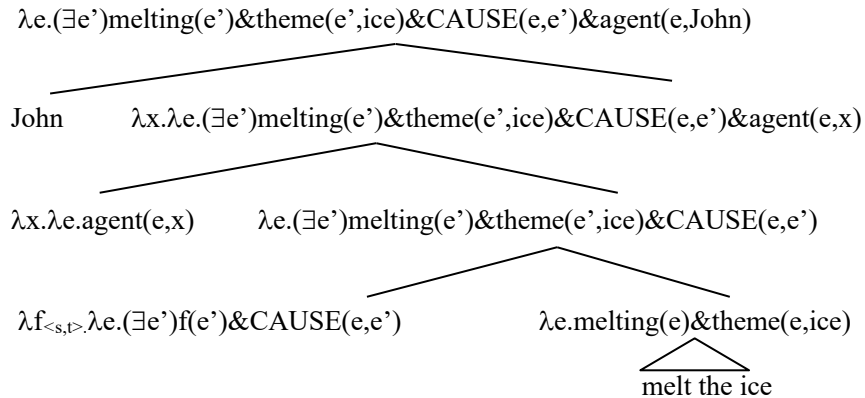
useful for our purposes. On this view, a sentence like *John melted the ice* has two relations that the corresponding non-causative (*the ice melted*) does not have: a causation relation relating the causing event to the caused event, and a thematic relation between the causing event and the individual expressed as the external argument.

Assuming that external arguments are introduced by Voice (Kratzer 1996), we get the syntactic tree (25b) (Pylkkänen 2002: 88), where the predicate Cause first merges with the VP describing the caused event and where Voice then relates an agent to the event introduced by Cause. The semantic contribution of the Cause head is given in (25a), the bare syntax in (25b), and the semantic composition tree in (25c).

(25) a. *Cause*: $\lambda f_{<s,t>}.\ \lambda e(\exists e')f(e')\&CAUSE(e,e')$

      b. *Syntactic Structure:*

$$
\begin{array}{c}
\textbf{VoiceP} \\
\diagdown \\
\textbf{John} \quad \textbf{Voice'} \\
\diagdown \\
\textbf{Voice} \quad \textbf{CauseP} \\
\diagdown \\
\textbf{Cause} \quad \textbf{VP} \\
\triangle \\
\text{melt the ice}
\end{array}
$$
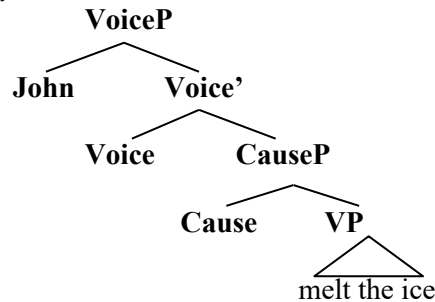
      c. *Compositional Semantics*

$\lambda e.(\exists e')melting(e')\&theme(e',ice)\&CAUSE(e,e')\&agent(e,John)$

John $\lambda x.\lambda e.(\exists e')melting(e')\&theme(e',ice)\&CAUSE(e,e')\&agent(e,x)$

$\lambda x.\lambda e.agent(e,x)$ $\lambda e.(\exists e')melting(e')\&theme(e',ice)\&CAUSE(e,e')$

$\lambda f_{<s,t>}.\lambda e.(\exists e')f(e')\&CAUSE(e,e')$ $\lambda e.melting(e)\&theme(e,ice)$

melt the ice

This structure allows us to account for the differing availability of the B and C readings, ignoring for the moment the A reading. This applies fairly straightforwardly in the case of agentive verbs.

2.2.1 Agentive Verbs: Both B and C Readings. If we apply this to a verb like *jesti* 'eat' (as in *Ana started to eat by herself*), we have two events: (a) the event of eating and (b) the event that causes this event of eating, which plausibly is the event of the agent deciding to perform some action. This would be true for all agentive verbs.

Thus, when *sam-a/o* agrees with the agent Ana, there are two options. First, its domain of quantification may be individuals, which gives us the B reading (agentive reading). On this reading, Ana is the only agent of the event of eating – she is the only individual that executes the event of eating. This is formally represented in (26) below for the intransitive verb *swim*.

(26)   a. $\lambda x.\lambda e.\ \exists e'[\text{swim}(e') \wedge \text{CAUSE}(e,e') \wedge \text{only}(\text{agent}(e,x))]$
       b. $\lambda x.\lambda e.\ \exists e'[\text{swim}(e') \wedge \text{CAUSE}(e,e') \wedge \forall y[\text{agent}(e, y) \rightarrow y = x]]$

Second, its domain of quantification may be events, which gives us the C reading. This reading says that the decision-making event e, which introduces the agent Ana with which *sam-a/o* agrees, is the only event that causes the event of eating e. This is formally represented in (27).

(27)   a. $\lambda x.\lambda e.\ \exists e'[\text{swim}(e') \wedge \text{only}(\text{CAUSE}(e,e')) \wedge \text{agent}(e,x)]$
       b. $\lambda x.\lambda e.\exists e'[\text{swim}(e') \wedge \forall e''[\text{CAUSE}(e'',e') \rightarrow e'' = e] \wedge \text{agent}(e,x)]$

2.2.2 Anticausative and Unaccusative Verbs: B Reading Only. Recall that anticausative verbs only have access to the C reading (causative reading) and lack the B reading (agentive reading).

(28)   a.   Lampa   se   razbila **sam-a (od   sebe)**.
            lamp   REFL   broke   sam$_{N.S.F}$ from   self
            'The lamp broke by itself.'

    b. Led   se   istopio **sam** **(od**   **sebe)**
         ice   REFL melted sam$_{\text{N.S.M}}$ from   self
         'The ice melted by itself.'

We follow Alexiadou and Schäfer (2006) and Levin and Rappaport Hovav (1995) in assuming that anticausatives are inherently causative. That is, a sentence like (29a) has the structure in (29b).

(29) a.   The door opens.
      b.   v-CAUSE [the door √OPEN]

Alexiadou and Schäfer (2006), for instance, motivate the presence of a causative event in anticausatives by the observation that cross-linguistically anticausatives license causer PPs (but not agent PPs). One such causer PP, *durch den starken Wind* 'through/from the strong wind' is shown in the German example (30) below.

(30) Das Segel zerriss (durch   den   starken Wind).
      the   sail   tore   through the   strong wind
      'The sail tore from the strong wind.' (Copley & Martin 2014: 224)

So, under these assumptions, anticausatives have a similar structure to the one proposed for agentive verbs in that they have a CauseP projection in their syntactic structure. However, the B reading is excluded with these verbs because they lack the agent-introducing projection VoiceP.

    The C reading, on the other hand, derives in a parallel manner to that for agentive verbs. In (28a), for example, *sam-a/o* agrees with the theme *lampa* 'lamp' and quantifies over events, shown below in (31).

(31) a.λe. $\exists$e'[break(e') $\wedge$ theme(e',lamp) $\wedge$ only (CAUSE(e,e'))]
     b.λe. $\exists$e'[break(e') $\wedge$ theme(e',lamp) $\wedge$ $\forall$e''[CAUSE(e'',e') $\rightarrow$ e''
       = e]

As a result, we have the interpretation that there is only the event of breaking, which introduces the theme with which *sam* agrees and no other (causer) events. That is, the meaning that we get essentially is that the causer event is missing.

This is again very similar to the unexplanatory *just*. Wiegand (2017, 2018) argues for a covert cause morpheme to account for unexplanatory readings of *just*. The account presented here predicts the presence of exactly such an element in the form of the functional layer CauseP. As such, despite the different syntactic behavior of Serbian agreeing *sam(-o/a)* and English *just*, it should be the case that the unexplanatory use of *just* also makes use of the semantic contribution of the syntactic projection CauseP.

The same logic discussed here for anticausatives extends to unaccusative verbs, like *umreti* 'die' or *pasti* 'fall', and explains why they also lack the B reading, as they also lack VoiceP (see Alexiadou et al. 2015 and references therein).

3 Further Considerations: *Sam*(-*a/o*) and Focus

Unlike *samo* 'only', the agreeing *sam(-a/o)* does not associate with a prosodically focused element.[6] For instance, *samo* 'only' cannot associate with pro-dropped arguments, because such arguments necessarily lack prosodic prominence and thus cannot be focused. While in (32a), where the subject is overt, alternatives can be individuals (*Only Ana swims, not John or Mary*), this is impossible in (32b). Here we only have alternatives to the denotation of the verb itself (*She only swims, she doesn't run or exercise*).

(32) a. **Samo** Ana pliva.
        Only   Ana swims
        'Only Ana swims.'
    b. **Samo** pliva.
        Only   swims
        'She only swims.'

There is no such restriction in (33), where the semantic domain of quantification of the agreeing *sam(-a/o)* is restricted to individuals

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[6] This is also consistent with the behavior of *just* in English (e.g., Wiegand 2017, 2018).

denoted by the subject, regardless of whether the subject is overt, as in (33a), or covert, as in (33b):

(33) a. Ana   pliva   **sam-a**.
          Ana   swims   sam$_{N.S.F}$
          'Ana swims by herself.'
      b. Pliva   **sam-a**.
          swims   sam$_{N.S.F}$
          'She swims by herself.'

This indicates further that the exclusive quantification provided by the agreeing form is distinct from the traditional focus-sensitivity of non-agreeing *samo*. While their underlying semantic contribution follows the same general schema, the way the alternatives are derived is not identical. More research is needed to determine how these unfocused syntactic elements like the Cause head can yield semantic alternatives.

4 Conclusions

In this paper, we discussed the morphosemantic differences between the standard focus operator *samo* 'only' in Serbian and its agreeing counterpart *sam(-a/o)* 'alone, by himself/herself'. We proposed that agreement on the latter restricts its semantic domain of quantification to individuals and events that introduce those individuals, which accounts for its different interpretation/distribution.

In the case of the agreeing *sam-a/o* the agreement operation requires that the exclusive operator take scope within the event denoted by the predicate in question, while in the case of *samo* 'only' the exclusive operator scopes over the entire proposition. We discussed different readings of *sam-a/o* and argued that their availability depends on the argument structure of the verb that *sam-a/o* combines with (e.g., whether the verb in question has VoiceP and CauseP, or just the latter). In particular, the differences between the B (no-agent) and C (no-other-cause) readings lies in where in the verbal projection layer agreeing *sam(-a/o)* takes scope: either at the VoiceP level or the CauseP level.

We did not formally discuss the derivation of the A (no-company) reading in this paper. There are several routes for analysis that could account for it. For example, we could posit an additional functional layer below CauseP that introduces states (presumably present with all nominals and stative predicates). This would explain why the A reading is available in such a wide variety of contexts, as well as why it is available for both subject and object agreement. Another similar option is to argue that in object agreement cases, we have a small clause structure involving the predicate *to be*, following the subject agreement pattern for quantification only over that small clause event/state. There are likely other options as well, all of which will need to take into account the animacy restrictions observed earlier. We leave this to future research.

Overall, this analysis provides support for bieventive analyses of causative structures, as arguments introduced by both VoiceP and CauseP are available for quantification by exclusives. This required modifying the bieventive analysis to include a CauseP projection even when the verb in question is an anticausative.

Finally, we showed that *sam(-a/o)* is an exclusive operator that does not associate with a prosodically focused element in the prejacent (unlike *only/samo*), and is in this sense similar to the 'unexplanatory' *just* (Wiegand 2017, 2018). Future work should be devoted to applying this syntactically-driven explanation to the English data, as previous accounts have been purely semantic.

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EXCEED Comparison and A/B Numeral Modifiers in Czech[*]

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1 Introduction

The research on comparatives is vast (e.g., von Stechow 1984, Heim 2000, Kennedy and McNally 2005, Pancheva 2006, Schwarzschild 2008, Rett 2008, Solt 2015), and yet, a class of constructions involving so-called EXCEED comparison still remains somewhat understudied (notable exceptions include, e.g., Stassen 1985, Beck et al. 2009, Howell 2013, Bochnak 2018), and is virtually neglected in the context of Slavic linguistics. In this paper, we intend to contribute to filling this gap by investigating semantic properties of two classes of Czech EXCEED verbs

formed with the prefix *pře-* 'across, over' (approximate literal meaning), such as *převyšovat* 'to exceed (in height)', lit. 'to over-heighten' and *překračovat* 'to exceed', lit. 'over-step'. To this goal, we draw on two largely independent strands of research: the formal semantic treatment of Slavic prefixes and prepositions as expressions that are lexically associated with scales (e.g., Filip 2008, Kagan 2013), on the one hand, and an approach to numeral modifiers as degree quantifiers, on the other. Numeral modifiers can be divided into two types, as proposed by Nouwen (2010, 2015): (i) class A modifiers which are comparative modifiers that compare two definite cardinalities, e.g., *more/fewer than 100; under/over 100*, and (ii) class B modifiers which are maxima and minima indicators that relate a range of values to a certain boundary, e.g., *at least/at most/minimally/maximally/up to 100*.

Against this background, we propose that the prefix *pře-* 'across, over' which forms EXCEED verbs in Czech should be assimilated to the class A of comparative modifiers. We also argue that the properties of such EXCEED verbs in Czech point to a particular way in which comparatives are linked to numerical expressions, thus suggesting a promising research venue that has not so far received much attention in the semantic literature (but see, e.g., Kennedy 2013, Dočekal & Wągiel 2018, Gobeski & Morzycki 2018 for some insights). Finally, our results promise to shed new light on the interaction between comparison, modality, and quantification.[1]

The outline of this paper is as follows. First, in Section 2 we discuss the EXCEED comparison in general, and then in Section 3 Czech EXCEED comparatives in particular, as expressed by verbs prefixed with *pře-* 'across, over'. Next, in Section 4 we examine the distinction between class A/B numeral modifiers, and in Section 5 we present novel data

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[1] Nouwen's (2010, 2015) work on class A/B modifiers induced some interesting responses, e.g., from Cohen and Krifka (2014) and Schwarz, Buccola and Hamilton (2012), among others. In this paper, we follow Nouwen's seminal framing of the distinction, since it is easier to capture scope interactions with modals than it is in, e.g., Cohen and Krifka's approach. This is because it is not trivial to obtain the low scope of superlative modifiers with respect to other logical operators in a sentence in their framework. A proper discussion of certain consequences of the data we bring with respect to other frameworks lies beyond the scope of the present study.

indicating its role in the semantic analysis of the relevant EXCEED verbs in Czech. In Section 6, we revise a standard semantic account relating Slavic verb prefixes and scalarity. In Section 7, we propose an analysis based on the idea that Czech EXCEED verbs have a built-in class A modifier. In Section 8, we discuss consequences of our approach with respect to degree arguments and the compatibility of scale orientation. Finally, Section 9 concludes the paper.

2 EXCEED Comparison

The EXCEED comparatives of interest here are constructions in which the standard of comparison is expressed by the DO of a transitive verb typically meaning something like 'to exceed' or 'to surpass' (Stassen 1985). Similar to standard comparatives, such verbs compare degrees related to certain entities with respect to some dimension. Examples are attested in a number of languages, including Thai, Vietnamese, Swahili, Hausa, and Luganda (e.g., Beck et al. 2009, Howell 2013, Bochnak 2018). For instance, Mandarin and Yoruba use an EXCEED verb as the main predicate of a comparative sentence; see (1) and (2), respectively (Kennedy 2005).[2]

(1) Ta bi   ni gau. (Mandarin)   (2) O   tobi ju   u. (Yoruba)
    he exceed you tall   he big exceed him
    'He is taller than you.'   'He is bigger than him.'

Importantly, EXCEED comparatives can co-exist with other linguistic strategies for indicating comparison in a given language. For instance, English allows for both standard THAN comparatives and EXCEED comparisons expressed by a transitive verb, see (3).

(3) a.   John is taller than Mary.
    b.   John's height exceeds Mary's height.

These two strategies are also available in Czech, as is illustrated in (4a) and (4b).

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[2] Other types of EXCEED comparatives involve serial verb constructions and subordinate nominalized forms.

(4) a.   Katedrála   je   vyšší   než   radnice   o   20 m.
          cathedral   is   higher   than   town.hall   by   20 m
          'The cathedral is higher than the town hall by 20 m.'
     b.   Katedrála   pře-vyšuje   radnici   o   20 m.
          cathedral   over-heighten.3SG   town-hall   by   20 m
          'The cathedral exceeds the town-hall in height by 20 m.'

Notice that the comparative nature of the Czech EXCEED verb in (4b) is corroborated by the fact that it is compatible with a differential. The EXCEED meaning component is here contributed by the prefix *pře-* 'across, over', which is added to the base derived from the root 'high'.

  In the next section, we examine basic morphological properties of two types of such verbs in Czech.

3 Czech EXCEED Comparatives

From a descriptive perspective, Czech EXCEED verbs fall into two classes: namely expressions that seem to lexically encode a dimension of measurement, such as *převyšovat* (lit. 'over-heighten', as in (5a), and verbs that lack this property, such as *překračovat* lit. 'over-step', as in (5b). We refer to the first as 'dimensional EXCEED verbs', whereas the latter are called 'non-dimensional EXCEED verbs'. We assume that dimensional EXCEED verbs are derived from stems of gradable expressions and we contribute some morphosyntactic evidence below.

(5) a.   vys-oký   ⇒   pře-vyš-ovat
          high-ADJ   over-heighten-IPF
          'high'   'to exceed/be taller/higher (than)'
     b.   (krok   ⇒) kráč-et   ⇒   pře-krač-ovat
          (step_N)   step-IPF   over-step-IPF
          ('step')   'to step'   ⇒   'to exceed/overstep/transgress'

Morphophonological evidence indicates that Czech dimensional EXCEED verbs are derived either from comparative forms of gradable adjectives or from nominalizations naming gradable properties. This is manifested in the occurrence of specific consonantal alternations. In particular, as we see in (6a), the alveolar fricative *s* in the positive form alternates with the

post-alveolar *š* in the comparative form. Nevertheless, here, we will gloss the verb *převyšovat* as 'over-heighten', rather than as 'over-higher' for the sake of simplicity and comprehension, even if the *-vyš-* stem is arguably related to the comparative form *vyšší* 'higher, taller' of the positive form *vysoký* 'high, tall'.

(6) a.   vy**s**-oký   ∼   vy**š**-ší
            high-ADJ   high-er
    b. *p̌re-vy**s**-ovat   ∼   p̌re-vy**š**-ovat
            over-high-IPF   over-heighten-IPF

(6b) shows that the root of the EXCEED verb, formed with the prefix *p̌re-* 'across, over', contains the sibilant *š*, while the presence of *s* leads to an unattested form (ungrammaticality). Notice, however, that the same fricative is also found in nominal forms such as *výše* and *výška* (both 'height' which might suggest a denominal origin of the discussed EXCEED verbs. In any case, what is crucial is that such expressions are derived from forms lexically encoding a dimension of measurement.

Furthermore, the prefix *p̌re-* 'across, over' in EXCEED verbs appears to be an obligatory part of the derivation. As far as we can tell, all Czech dimensional EXCEED verbs are prefixed and, more importantly, primary unprefixed perfectives and imperfectives turn out to be ungrammatical, as we see in (7).

(7) a. *výš-it   ∼   p̌re-výš-it
            higher-PFV   over-heighten- PFV
    b. *vyš-ovat   ∼   p̌re-vyš-ovat
            higher-IPF   over-heighten-IPF

Turning to non-dimensional EXCEED verbs, as in (5b) above, they are typically derived from verbs of motion, i.e., expressions that do not encode lexically any dimension of measurement. In this case, the prefix *p̌re-* 'across, over' is applied to a primary imperfective. Notice also that the resulting verb *p̌rekračovat* is ambiguous between a motion verb meaning of approximately 'to step over', 'to cross' and a comparative verb meaning of 'to exceed'. These two meanings could also be viewed as polysemous, the latter derived by a metaphoric extension.

In the next section, we will turn our attention to the distinction between class A/B numeral modifiers, a phenomenon seemingly unrelated to Czech EXCEED verbs under consideration here, but which in fact proves highly useful for capturing their meaning, as we show.

4 Class A/B Numeral Modifiers

The distinction between A/B numeral modifiers is now well-established (Nouwen 2010, 2015; see also, e.g., Brasoveanu 2012, Cohen & Krifka 2014). In a nutshell, class A consists of comparative modifiers that compare two definite cardinalities, whereas class B modifiers are maxima and minima indicators that relate a range of values to a certain boundary. As shown in Table 1, this distinction covers a number of expressions, including (i) class A modifiers, such as comparative modifiers and locative prepositions, and (ii) class B modifiers, such as superlative modifiers, directional prepositions, and adverbs like *maximally*.

Class A	Class B
more than n	at least n
less than n	at most n
fewer than n	up to n
over n	minimally n
under n	maximally n
between n and m	from n to m

Table 1: Class A and B modifiers

Although the class A/B distinction is robust, and supported by cross-linguistic data, it is still not entirely clear how to explain it theoretically. While here we follow the semantic approach of Nouwen (2010), we acknowledge that other, more pragmatic stances have also been suggested, e.g., by Mayr (2013) and Nouwen (2015). Be that as it may, there is a consensus in the literature regarding certain core properties of modifiers justifying the distinction presented in Table 1.

According to Nouwen (2010), the key diagnostic motivating the distinction between class A/B modifiers comes from contrasts such as those in (8) an (9).

(8) a.   A hexagon has fewer than 11 sides.
     b.   A hexagon has more than 3 sides.

(9) a.   #A hexagon has at most 10 sides.
     b.   #A hexagon has at least 3 sides.

In a context where the speaker knows that a hexagon has exactly 6 sides, the sentences in (8a) and (8b) are perfectly felicitous despite not being very informative. On the other hand, in the very same context the sentences in (9a) and (9b) are simply awkward. In other words, class A modifiers can relate definite cardinalities and assert extremely weak propositions, whereas class B modifiers cannot express relations to definite amounts (except when embedded under an existential modal).

Another property that characterizes the class A/B distinction is sensitivity to so-called ignorance effects (Nouwen 2015). In particular, class A modifiers are compatible with epistemic competence, whereas class B modifiers are not, and thus license ignorance inferences. For instance, from the utterance of (10a) we cannot infer that the speaker does not know how many children the speaker has, which is what the speaker implies by uttering (10b). Consequently, (10b) would be felicitous only if the speaker were a very irresponsible person or maybe a sperm donor.

(10) a.   I have more than 2 children.
      b.   I have at least 3 children.

Similarly, the contrast between (11a) and (11b) shows the incompatibility of class B modifiers with epistemic competence. Specifically, the oddity of the second clause in (11b) shows that only class A modifiers can be used felicitously when the speaker has full knowledge of the numerical value in question.

(11) a. There were exactly 62 errors in the paper, so that's more than 50.

b. There were exactly 62 errors in the paper, #so that's at least 50.

To conclude, class A consists of comparative modifies that compare two definite cardinalities, whereas class B modifiers are maxima and minima indicators that relate a range of values to a certain boundary. In the next section, we demonstrate the relevance of the class A/B distinction for the discussed Czech EXCEED verbs.

5 Czech EXCEED Verbs and the Class A/B Distinction

Let us now apply the diagnostics introduced in the previous section to EXCEED verbs in Czech. The core observation of this paper is that both dimensional and non-dimensional EXCEED verbs pattern with class A modifiers. Consider a situation in which the speaker knows that a hexagon has exactly 6 sides. In such a context, there is a clear contrast between (12a) and (12b) on the one hand and (12c) on the other. What is crucial is that EXCEED verbs display the same behavior as standard class A comparative modifiers, which contrasts sharply with the infelicity of class B modifiers in an environment associated with epistemic competence.

(12) a. Počet   stran   šestiúhelníku pře-kračuje/pře-vyšuje 3.
        number sidesGEN hexagonGEN   over-step/over-heighten 3
        'The number of sides of a hexagon exceeds 3.'
     b. Počet   stran   šestiúhelníku je víc   než   3.
        number sidesGEN hexagonGEN   is more than 3
        'The number of sides of a hexagon is more than 3.'
     c. #Počet   stran   šestiúhelníku je aspoň/přinejmenším 3.
        number sidesGEN hexagonGEN   is   at.least/at.least   3

(12a) contains an EXCEED comparative verb taking a numeric value as its direct object argument and the whole sentence is perfectly natural and acceptable. The EXCEED verb here expresses a relation to definite cardinalities, as is expected on the assumption that it patterns with class A modifiers, and the whole sentence is used to assert a weak proposition similar to that in (12b). In contrast, in (12c) the occurrence of a class B modifier is infelicitous.

Another contrast corroborating the class A nature of Czech EXCEED verbs concerns ignorance inferences. Unlike class B modifiers, verbs such as *překročit* and *převýšit* do not show any ignorance effects, as demonstrated in (13). Specifically, similarly to class A modifiers, EXCEED verbs are compatible with epistemic competence, whereas class B modifiers (though referentially determined) imply epistemic uncertainty, and thus lead to the inference that the speaker is ignorant with respect to the numerical value in question.

(13)　a.　Cena　　toho　　bytu　byla　120.000 €,
　　　　　　price　　this_GEN　flat　　was　　120.000 €
　　　　　　takže　　pře-kročila　　　100.000 €.
　　　　　　so　　　　over-stepped_PFV　100.000 €
　　　　　　'The price of this flat was 120.000 €, so it exceeded 100.000 €.'
　　　　b.　Cena　　toho　　bytu　byla　120.000 €,
　　　　　　price　　this_GEN　flat　　was　　120.000 €
　　　　#takže　　byla　aspoň　　100.000 €.
　　　　　　so　　　　was　　at.least　100.000 €

For instance, as witnessed by the felicity of (13a), the EXCEED verb *překročit* 'to exceed'; lit. 'to overstep' can occur in a context in which the speaker knows the exact price of the relevant flat and compares it with the value denoted by the direct object of the verb in the second clause. This behavior is on par with the effect observed in (11a). On the other hand, as demonstrated in (13b), Czech class B modifiers are odd in a context that is similar to the corresponding English sentence in (11b).

Given the evidence presented above, we conclude that Czech EXCEED verbs are in fact class A modifiers which differ from class B such as superlative expressions and directional prepositions in that they compare definite values and are always compatible with the epistemic competence of the speaker. Before we move on to our proposal, in the next section we will briefly summarize the treatment of Slavic verb prefixes as expressions inherently associated with scales.

6 Slavic Verb Prefixes and Scalarity

Our proposed analysis of EXCEED verbs in Czech, which are formed with the prefix *pře-* 'across, over' is predicated on the assumption that they can be assimilated to the class A of comparative modifiers, and as such share the core semantics with comparative numeral modifiers, which can be analyzed by means of the device of a scale. A scalar-based approach to the semantic analysis of Slavic verbal prefixes is now well-established in event semantics, and specifically related to grammatical aspect.

Filip (1992, 2004, 2005) argues that Slavic verbal prefixes as a whole class cannot be analyzed as morphological exponents of the semantic perfective operator, which is characterized in terms of notions such as telicity, completion/culmination, and the like. The main reason for this is that adding prefixes to verb bases does not uniformly yield verbs denoting telic predicates or predicates of completed/culminated events, and prefixes also form imperfective verbs that denote atelic predicates. What is of main interest here is that many Slavic verbal prefixes developed from prepositions and adverbs used for the expression of directed path structures in space and time, and it is one of their common functions to add spatial/directional meanings to verbs they form (Filip 2004). Other meanings commonly lexicalized by verbal prefixes are related to cardinality and measures. Directed path structures, cardinality, and measurement notions are precisely the type of meaning components that introduce ordering relations, which, on independent grounds, are also commonly represented by means of scales.

Filip (1992, 2004, 2005) proposes that Slavic verbal prefixes are best analyzed as derivational morphemes that semantically function as modifiers of eventuality types expressed by "aspectless" base predicates. Their common semantic core can be reduced to an ordering on a set of entities (alternately a scale), be they time points/intervals, path segments, or ordinary individuals, all of which are structured by the algebraic device of a join-complete semi-lattice, following Krifka (1989, 1990).

Also inspired by Krifka, Filip takes as fundamental the insight that there are complex predicates and grammatical constructions that rely on systematic correspondences (structure-preserving mappings or

homomorphisms) between the ontological structure of eventualities and entities of various types bearing a relation to eventualities. This in turn motivates a general phenomenon that can be characterized as the extension of ordering relations from one domain to another.

Set against this background is the idea that a part of the meaning of Slavic verbal prefixes can be characterized in terms of orderings on eventualities (denoted by predicates to which prefixes are applied), which are induced by orderings on objects (bearing a relation to such eventualities). So rather than being "markers" of telicity or perfectivity, Slavic prefixes provide a prerequisite for the application of the maximalization operator MAX$_E$, as Filip and Rothstein (2005) and Filip (2008) argue. MAX$_E$ is at the intersection of the semantics of perfectivity in Slavic languages and the semantics of telicity in Germanic languages. MAX$_E$ is a monadic operator, such that MAX$_E$ ($\mathcal{E}$) $\subset$ $\mathcal{E}$. It maps sets of eventualities $\mathcal{E}$, (partially) ordered by an ordering criterion for objects on a scale, onto sets of maximal eventualities. In Germanic languages, MAX$_E$ applies at the level of VP (or V') denotations. In Slavic languages, it applies at the level of V denotations, and if V is formed with a prefix, what counts as 'one' maximal eventuality in the denotation of a MAX$_E$(P) will be calculated based on an ordering on eventualities in the denotation of P induced by that prefix.

When it comes to the Czech prefix *pře-,* which is of main interest here, we observe that it has a number of contextually related meanings, which can be related by metonymic and metaphoric extensions to its basic spatial meaning of 'across/over, from one side x to the other side y of some area', as in (14):

(14)   plavat^I $\Rightarrow$ pře-plavat^P (přes)   řeku
        swim   across-swim (across) river
        'to (be) swim(ming)'   'to cross the/a river by swimming'

In (14), *pře-* is attached to the simple imperfective (I) intransitive verb *plavat* 'to (be) swim(ming)', a verb of manner of motion, and derives the perfective (P) verb *přeplavat*, a two-place predicate, where the non-subject argument must be realized either as the DO 'to cross X by swimming' or as an obligatory PP 'to swim across X'. The denotation of

the imperfective base *plavat* 'to (be) swim(ming)' consists of overlapping eventualities of swimming of various sizes; i.e., *plavat* is cumulative. The prefix *pře-* denotes a function from such an overlapping set to a set of disjoint eventualities of swimming, each of which to the 'amount of one crossing of X'. Applied to this set, MAX$_E$ yields a quantized predicate, because it picks the largest culminated eventuality-unit of swimming that is true of an individual at a given context, and what it is in (14) is determined with respect to moving from one side of the river to the other.

Extending the basic spatial meaning of the prefix *pře-* of roughly 'across/over, from one side *x* to the other side *y* of some area', to non-spatial meanings, it is easy to see that moving from one boundary point to another and exceeding it can naturally be extended to the scalar domains like comparison, as in *pře-kroč-it* pf. 'to exceed/overstep/ transgress', *pře-krač-ovat* ipf. 'to (be) exceed(ing)/overstep(ping)/ transgress(ing)' (see (5b) above) or excess, as in *pře-jíst se* pf. 'to overeat', *pře-jídat se* ipf. 'to tend to overeat; to overeat as a rule, sporadically, frequently'. Arguably, *pře-* in all its uses introduces a relation between two variables *x* and *y*, which in the case of comparison/excess is instantiated as the 'higher than' relation between two degrees on a scale, where the standard of comparison may be implicit and contextually provided. A detailed scalar approach to Russian prefixes is offered in Kagan (2013, and references therein).

7 Proposal

7.1 Assumptions
In this section, we introduce the theoretical tools we employ to account for the meaning of EXCEED verbs. The core of our proposal is the following. On the basis of the evidence presented in Section 5, we posit that EXCEED verbs are in fact class A expressions and as such share a core semantics with comparative numeral modifiers. We argue that this novel perspective allows us not only to explain the data we have already presented but it also has some additional advantageous consequences.

We assume an ontology with degrees, i.e., objects of a primitive type *d* ordered on a scale. We take the scale to be a triple $\langle D, >, \text{DIM} \rangle$ where *D*

is a set of degrees, > represents an ordering relation on *D*, and DIM is a dimension of measurement, e.g., height, temperature, and the like. Second, we adopt an interval-based approach to degrees (e.g., Kennedy 2001, Schwarzschild & Wilkinson 2002) and assume that in gradable adjectives individuals are associated with scales via measure functions (e.g., Solt 2015). Third, we assume standard comparative semantics involving the > relation as a relation between degrees corresponding to the standard and correlate of comparison (e.g., von Stechow 1984, Heim 2000, Schwarzschild 2008).

Furthermore, we posit degree predicates labeled as *M*. For instance, *M* can be a predicate, such as *being a degree d such that Mary is tall to degree d*. Notice also that we embrace here a degree treatment of numerals, an assumption which is empirically motivated by the fact that standard comparatives can take numbers as their arguments (cf. Kennedy 2013). Thus, *M* can be also filled with something like *being a number n such that n people visited Mary*. Following Nouwen (2010), we write $M(d)$ and $M(n)$ to indicate an internal degree variable.

Next, we presuppose a maximization operation MAX, which yields a maximal degree from a set it is applied to. Its workings are utilized, e.g., in the semantics of the comparative, as presented in (15). The minimization operation MIN does the opposite, i.e., returns the minimal degree from a set.

(15) $[\![\text{-er than } d]\!] = \lambda M.\text{MAX}(M(d')) > d$

Finally, in order to account for comparative quantifiers such as *more than 100*, we assume a phonologically null quantifier MANY, i.e., a generalized-quantifier style expression of type $\langle d, \langle\langle e, t\rangle, \langle\langle e, t\rangle, t\rangle\rangle\rangle$, as defined in (16) (Hackl 2001).

(16) $[\![\text{MANY}]\!] = \lambda n\lambda P\lambda Q.\exists x[\#(x) = n \wedge P(x) \wedge Q(x)]$

With these tools in place, we now proceed to the analysis.

7.2 Implementation

Let us now explain in more detail our key idea that EXCEED verbs are essentially class A comparative modifiers. In effect, this amounts to the claim that, despite different lexical material and compositional properties, sentences such as (17a) and (17b), have the same truth conditions.

(17) a. Počet lidí   na tom koncertě převýšil   1000.
        number people at this   concert   over.heightened 1000
        'The number of people at the concert exceeded 1000.'
    b. Na tom   koncertě bylo více než   1000 lidí.
        on this   concert   was more than 1000 people
        'There were more than 1000 people at the concert.'

Intuitively, both (17a) and (17b) are true only if the value corresponding to the cardinality of the people who visited the concert is greater than 1000. In order to capture this intuition and render the desired truth conditions, we follow Nouwen's analysis of class A modifiers. Since they often involve comparative morphology, they are analyzed as standard comparative expressions involving either the maximization operator MAX or the minimization operator MIN and the ordering relation >. As already indicated in Section 7.1, we assume here the phonologically null quantifier MANY and that cardinalities can be modeled as degrees of sort.

The formal representation of (17b) is given in (18). Notice that the comparative is analyzed as taking two arguments, i.e., a number (a type of degree), in our case 1000, and a property, which results from λ-abstraction over the cardinality of visitors in (18a). In the resulting truth-conditions in (18c), the MAX operator is applied to a predicate (such as *being a number n such that n people visited the concert*) and requires the cardinality of that property to exceed 1000.

(18) a. [[more than 1000] [λn [[n MANY] people] visited the-concert]]]
    b. [λM.MAX($M(n)$) > 1000]($\lambda n.\exists! x[\#(x) = n \wedge$ PERSON(x) $\wedge$ VISITED(x, THE-CONCERT)])
    c. MAX($\lambda n.\exists! x[\#(x) = n \wedge$ PERSON(x) $\wedge$ VISITED(x, THE-CONCERT)]) > 1000

In (18a), the modified numeral is assumed to be an argument of MANY. However, since it is treated as a degree quantifier, due to its type, it has to raise, leaving a degree trace. As a result of λ-abstraction, a degree property is generated to which the degree quantifier is applied, see (18b). Finally, an interpretable result of the composition is obtained in (18c), which states that the maximal number of the visitors at the concert was greater than 1000. Notice that following Nouwen (2010) in (18), we use ∃!x, which stands for 'there is exactly one group'. Thus, the maximal group is assigned to x, since no smaller group would be unique. It might seem that such an elaborate derivation is rather superfluous, but the motivation behind the mechanism described above has to do with the scopal behavior of class A modifiers (for details, see Nouwen 2010).

Now, we are ready to propose the semantics for Czech EXCEED verbs. We assume that the core semantic component of such expressions is the suffix *pře-* 'across, over', which, as we propose, is a subtype of class A modifier, specifically a comparative degree quantifier with a built-in MAX operator, as we see in (19). Hence, the prefix takes two arguments, i.e., a degree d, e.g., 1000 in (18), and a property M, and requires that property to exceed the degree d on a supplied dimension, e.g., cardinality in (18). Notice that MAX applies to the predicate M in a way that is parallel to a standard comparative construction.

(19)   ⟦*pře-*⟧ = $\lambda d \lambda M.\text{MAX}(M(n)) > d$

In dimensional EXCEED verbs such as *převyšovat*, *pře-* combines with a gradable stem, which contributes a dimension of measurement DIM, such as height, weight, temperature, and the like. The comparative form introduces the MAX operator in order to yield a definite description of a maximal degree as well as the > relation. On the other hand, in the case of non-dimensional EXCEED verbs, such as *překračovat*, DIM needs to be supplied by an additional element in the sentence, e.g., a degree nominal. We assume that the MAX operator introduced by the prefix *pře-* operates "on top of" the comparative semantics, so to speak.

Let us now consider the semantics of a sentence such as (20a), i.e., a simple example of an EXCEED comparative construction. Intuitively, the

EXCEED verb simply compares the values corresponding to the heights of the cathedral and the town hall. The semantic composition of (20a) proceeds similarly as in (17). In particular, in (20b), the variable abstracted over comes from the degree associated with the object NP and the gradable stem provides the dimension of height. After β-reduction in (20c), we obtain the following truth conditions. (20a) is true only if the maximal degree corresponding to the height of the cathedral exceeds the maximal degree corresponding to the height of the town hall. Notice that a proper syntactic implementation would require the constituency of the prefix with the object slot, which does not appear to us as a controversial assumption (e.g., Ramchand 2008 for Russian prefixes).

(20) a. Katedrála   pře-vyš-uje   radnici.
          cathedral   over-heighten-s town.hall
          'The cathedral exceeds the town hall in height.'
      b. $[\lambda M.\text{MAX}(M(d)) > \text{MAX}(\lambda d'.\text{HEIGHT}(\text{TOWN HALL}, d'))]$
          $(\lambda d.\text{MAX}(\lambda d''.\text{HEIGHT}(\text{CATHEDRAL}, d'')))$
      c. $\text{MAX}(\lambda d.\text{MAX}(\lambda d''.\text{HEIGHT}(\text{CATHEDRAL}, d''))) >$
          $\text{MAX}(\lambda d'.\text{HEIGHT}(\text{TOWN HALL}, d'))$

Recall that one of the empirical arguments supporting our analysis of EXCEED verbs as expressions of class A modifiers is their compatibility with differentials, as already illustrated in (4b), repeated here as (21a). In order to account for differential comparatives, we assume an additional degree argument in such cases, as well as the ≥ relation instead of standard > (cf. von Stechow 1984, Beck 2011; see also Dočekal & Wągiel 2018 , Gobeski & Morzycki 2018 for similar treatments of different types of factor phrases). In particular, we posit that the additional degree indicates the gap between the maxima corresponding to the standard of comparison and the correlate. Despite this slight extension, in principle nothing changes with respect to the semantic composition compared to (20). As a result, (21c) delivers the following truth conditions. (21a) is true only if the maximal degree to which the cathedral is tall is greater or equal to the maximal degree to which the town hall is tall plus 20 meters. Notice that the ≥ relation in (21c) can be further pragmatically strengthened to the equality relation =. Intuitively, the result seems to be what we expect.

(21) a. Katedrála   pře-vyšuje   radnici   o   20 m.
          cathedral   over-heighten.3SG   town.hall by   20 m
          'The cathedral exceeds the town hall in height by 20 m.'
      b. [λM.MAX(M(d)) ≥ MAX(λd'.HEIGHT(TOWN HALL, d')) + 20 M]
          (λd.MAX(λd''.HEIGHT(CATHEDRAL, d''))
      c. MAX(λd.MAX(λd''.HEIGHT(CATHEDRAL, d'')) ≥
          MAX(λd'.HEIGHT(TOWN HALL, d')) + 20 M

For class B modifiers, realized as prepositions and prefixes with inherent directional semantics, we follow again Nouwen (2010) in treating them as minima/maxima indicators. The formulae in (22) with some additional assumptions, such as the range requirement on the set of modified degrees, can then explain the speaker's ignorance inferences and the defining property of class B modifiers being that they do not express relations to definite amounts/degrees.

(22) a. ⟦*minimally*⟧ = λdλM.MIN$_n$(M(n)) = d
      b. ⟦*maximally*⟧ = λdλM.MAX$_n$(M(n)) = d

A broader discussion of the properties of class B modifiers lies beyond the scope of this paper (for more details, see Nouwen 2010 and the relevant references therein). However, we provide the denotations of class B modifiers to delimit EXCEED verbs and explicitly demonstrate that they are subsumed under class A modifiers.

In the next section, we discuss some welcome predictions of our analysis of EXCEED verbs.

8 Consequences

8.1 EXCEED Verbs and Degree Arguments
One straightforward prediction concerns the arguments of EXCEED verbs. The semantics of class A modifiers requires a value on a scale to be ordered by the > relation. In the cases like those in (23), where the subject (a degree-denoting NP) supplies the scale/dimension, both dimensional and non-dimensional verbs are acceptable.

(23) a. Teplota   pře-vyš-uje   20°C.
          temperature   over-heighten-s 20°C
          'The temperature exceeds 20°C.'
      b. Teplota   pře-krač-uje   20°C.
          temperature   over-step-s   20°C
          'The temperature exceeds 20°C.'

However, in cases such as those in (24), where the subject is a common noun, only dimensional EXCEED verbs yield grammatical sentences. This follows naturally from the morphological composition of EXCEED verbs. While dimensional EXCEED verbs have an inherent degree semantics and can supply degree/dimension on their own, non-dimensional EXCEED verbs do not, which eventually leads to ungrammaticality, as in (24b).

(24) a. Katedrála   pře-vyš-uje   radnici.
          cathedral   over-heighten-s town.hall
          'The cathedral exceeds the town hall in height.'
      b. *Katedrála pře-krač-uje   radnici.
          cathedral   over-step-s   town.hall

    A variation on this is presented in (25), where a degree nominal (see Morzycki 2009) is in object position. In such cases, even non-dimensional EXCEED verbs are grammatical since the dimension of measurement required by the semantics of the prefix is supplied by the semantics of the degree nominal. Unlike (24b), where the dimension is missing since the stem does not contribute any, which in turn leads to ungrammaticality, (25a) and (25b) are normal Czech sentences.

(25) a. To pře-krač-uje   moje očekávání.
          this over-step-s   my   expectations
          'This exceeds my expectations.'
      b. To pře-krač-uje   všechny   meze.
          this over-step-s   all   limits
          'This exceeds all limits.'

To conclude, an important advantage of the proposed treatment is that it explains the otherwise mysterious behavior of dimensional and non-dimensional EXCEED verbs reported above.

8.2   *Compatibility of Orientation*

Another welcome consequence of our approach is that we correctly predict that there should not be EXCEED verbs with negative class A prefixes. As the ungrammaticality of the verbs in (26) shows, a prefix such as *pod-* 'under' cannot combine with a gradable stem in order to form an EXCEED verb.

(26)   *pod-výš-it   ~   *pod-vyš-ovat
          under-heighten-PFV   under-heighten-IPV

This follows from our account in a straightforward way. The comparative element *vyš-* encodes the ordering relation >. However, the prefix *pod-* reverses the scale by introducing the < relation, which conflicts with the semantics of the gradable stem. This leads to a contradiction, and hence to the oddity of the forms in (26) (see also Gajewski 2002).

The discussed evidence supports our claim and suggests that the generalization is robust. We conclude that the class A treatment of Czech EXCEED verbs explains several seemingly unrelated aspects of their behavior, including different distributions of dimensional and non-dimensional EXCEED verbs.

9 Conclusions

In this paper, we provided novel data concerning the typology of the grammar of comparison. In particular, we focused on the understudied phenomenon of EXCEED comparison in Slavic. Based on the evidence from Czech, we distinguished between two classes of EXCEED verbs formed with the prefix *pře-* 'across, over': namely, dimensional and non-dimensional. We showed that both classes pattern with class A numeral modifiers in that they can relate to definite cardinalities and do not give rise to ignorance effects. The data presented here provide further empirical support for the cross-linguistic validity of the class A/B distinction.

Based on the analogy with numeral modifiers, we have proposed that the Czech prefix *pře-* found in EXCEED verbs is best subsumed under class A; i.e., it is a degree quantifier with a comparative meaning. Such a treatment has several welcome consequences. First, we showed that the observed contrasts between the semantics of the two classes of EXCEED verbs can be predicted from different interactions between the prefix *pře-* on the one hand and stems that either lexically encode a dimension of measurement or not on the other. Second, we argued that the proposed approach explains the non-existence of EXCEED verbs involving negative class A prefixes. We believe that both the novel data and the proposed analysis provide a new exciting perspective on the nature of comparison and numeral modification. Further research will test the cross-linguistic validity of our claims both within and outside Slavic.

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Binding by Polish Experiencer Datives and the Anaphor Agreement Effect[*]

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This paper focuses on the Polish Experiencer-Theme (Exp-Th) structure, which licenses a dative experiencer (Exp$_{DAT}$) and either a nominative Theme (Th$_{NOM}$) or a non-nominative one (Th$_{nonNOM}$), as in (1) and (2).

(1) Markowi   podoba   się   Warszawa.[1]
    Marek$_{DAT.M}$ appeal$_{3.SG.F}$ REFL Warszawa$_{NOM.F}$
    'Marek likes Warsaw.'

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[1] We use the following abbreviations throughout the paper: AAE–Anaphor Agreement Effect, AGR–agreement, DAT–dative, Exp–experiencer, F–feminine, GEN–genitive, IO–indirect object, M–masculine, N–neuter, nonNOM–non-nominative, NOM–nominative, SG–singular, REFL–reflexive marker *się,* Th–theme.

(2) Markowi   (było)   żal   dziewczynki.
    Marek$_{DAT.M}$ was$_{3.SG.N}$ sorrow girl$_{GEN.F}$
    'Marek feels sorry for the girl.'

We focus particularly on the experiencer argument. The main aim of our study is to establish the binding potential of Exp$_{DAT}$; more specifically, whether it can bind anaphors, and if so, whether such anaphor binding is limited in any ways.

We take the binding possibilities of Exp$_{DAT}$ to be indicative of the merge position of this argument. We assume that a) Exp$_{DAT}$'s ability to bind anaphors corresponds to its high projection, SpecvP and b) Exp$_{DAT}$'s inability to bind anaphors corresponds to its low projection, SpecVP. This association between the ability to bind reflexives and the high projection of an argument follows from the subject-orientation of anaphors in Polish and other Slavic languages. Namely, anaphors can be bound by arguments in the subject position but not by objects (object binding is discussed in Section 2).

In our study, we adopt the analysis of binding and subject orientation proposed in Safir (2004, 2014) and Nikolaeva (2014) (based on Hestvik 1992) in which reflexives/pronouns are merged into the structure as dependent elements (D-bounds/indices) with no morphological form. In order to be lexicalized, the dependent element must rise via head movement to a position where its defective features can be compensated for, namely v^0 or T^0. This movement is akin to overt clitic movement (Béjar & Rezac 2003, Franks 2017) driven by [unvalued person] feature sharing between v/T and the clitic/weak pronoun. We assume that identical feature sharing holds between v/T and the D-bound/index. Therefore, it follows that only the arguments in SpecvP and SpecTP can function as antecedents to reflexive elements.[2] A similar assumption concerning the movement of (some form of) the reflexive element to v/T is adopted in Chomsky (1986), Pica (1991), Avrutin (1994), and

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[2] Throughout the article, we use the familiar term 'binding' to refer to the antecedent relationship that holds between the Exp$_{DAT}$ argument and the dependent element (reflexive/pronoun), which, however, is not in line with the traditional definition of binding.

Antonenko (2012).[3]

The discussion is organised as follows. Section 1 briefly discusses Exp$_{DAT}$s as binders. We show that the views as to whether Exp$_{DAT}$ can bind anaphors vary from account to account. Section 2 presents our two earlier experiments a) on binding of possessive reflexive/pronoun by Exp$_{DAT}$ in *podobać się* 'to appeal' (Exp1) reported in Gogłoza and Łęska (2018) and b) on possessive reflexive/pronoun binding by indirect objects in double object constructions (Exp2) (Gogłoza et al. to appear). Both experiments serve as a baseline for the study in focus. In Section 3, we discuss the aims, hypotheses, and design of the main experiment (Exp3), which tests anaphor binding by Exp$_{DAT}$ into Th$_{NOM}$ vs. Th$_{nonNOM}$. By comparing binding into Th$_{NOM}$ vs. Th$_{nonNOM}$, we test the Anaphor Agreement Effect (AAE) (Rizzi 1990, Woolford 1999) as a potential factor disrupting the ability of Exp$_{DAT}$ to bind anaphors. We discuss selected results, indicating that the AAE plays a significant role in binding by Exp$_{DAT}$. Section 4 presents a theoretical account of the experimental data in terms of the extended definition of AAE. Section 5 concludes the discussion.

1 Binding by Exp$_{DAT}$ – Data from the Literature

Many have examined the Polish Exp$_{DAT}$ in Exp-Th proposing various accounts. In general, we can divide these analyses into those that propose

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[3] In the movement theories of binding that we assume (e.g., Nikolaeva 2014), the position of Exp$_{DAT}$s in SpecvP, which is lower than the subject SpecTP position, is motivated by the fact that, unlike nominative subjects, Exp$_{DAT}$s can function as antecedents for possessive pronouns. This effect arises if the dependent element moves to T^0 and is therefore not c-commanded by its dative antecedent in SpecvP. Importantly, we do not assume that Exp$_{DAT}$s in either (3) or (4) move to SpecTP, since from this position they would not be able to act as antecedents for pronominal possessives, just like nominative subjects in SpecTP. Although in this study we focus mainly on possessive anaphor binding, we expect that if Exp$_{DAT}$s are merged in SpecvP, they should be able to antecede pronominal anaphors as well. This is indeed the case for Ex-Th$_{nonNOM}$ structures, as can be seen in (4), but not for the ones with nominative themes, since Polish lacks the nominative form of the pronominal anaphor *siebie*. We attribute this difference to the AAE, which we discuss in Section 4.

a high projection of the Exp$_{DAT}$, typically SpecvP (Miechowicz-Mathiasen 2005, Bondaruk & Szymanek 2007, Bondaruk 2017, Bondaruk & Rozwadowska 2018, a.o.), and those that propose a low projection of the Exp$_{DAT}$, typically SpecVP (e.g., Miechowicz-Mathiasen & Scheffler 2008, Jiménez-Fernández & Rozwadowska 2016).

Distinctively, binding is often taken to be one of the main arguments for the low vs. high projection of Exp$_{DAT}$. Those who analyse Exp$_{DAT}$ as projected in SpecvP argue that it can bind anaphors, while those who analyse Exp$_{DAT}$ as projected in SpecVP argue that it can only bind pronouns, never anaphors. Therefore, varying grammaticality judgements are reported in the literature, as illustrated in (3) for Exp-Th$_{NOM}$ and (4) for Exp-Th$_{nonNOM}$.

(3) a. **Janowi$_1$** znudziła się **swoja$_1$**/**jego$_{1/2}$** żona.
   Jan$_{DAT}$ bore   REFL self /his   wife$_{NOM}$
   'Jan got bored with his wife.' (Miechowicz-Mathiasen 2005: 12)

 b. ***Marysi$_1$**   spodobały się **swoje$_1$** siostry.
   Marysia$_{DAT}$ likes   REFL self's   sisters$_{NOM}$
   'Mary liked her own sisters.' (Tajsner 2008: 412)

 c. **Dzieciom$_1$** podobają się **ich$_1$**/***swoje$_1$** zabawki.
   children   appeal   REFL their/self's toys$_{NOM}$
   'Their toys appeal to the children.' (Bondaruk 2017: 2)

(4) a. **Janowi$_1$** było/jest żal **siebie$_1$** i   **swojej$_1$** rodziny.
   Jan$_{DAT}$ was/is   sorry self   and self's   family$_{GEN}$
   'Jan feels sorry for himself and his family.'
                                        (Miechowicz-Mathiasen 2005)

 b. Brakuje **mi$_1$**   czasu   dla **siebie$_1$**.
   Lacks$_{3SG}$ me$_{DAT}$ time$_{GEN}$ for self
   'I don't have enough time for myself.'   (Dziwirek 1994: 136)

 c. **Marii$_1$**   jest żal **siebie$_1$**/***jej$_1$**.
   Maria$_{DAT}$ feels pity herself$_{GEN}$/her$_{GEN}$
   'Maria feels pity for herself.'   (Bondaruk 2017: 4)

Exp$_{DAT}$s binding Th$_{NOM}$s are taken to be able to only bind pronouns, as in (3b-c), or either pronouns or anaphors, as in (3a). For Exp$_{DAT}$s binding Th$_{nonNOM}$s, there is general agreement that anaphors are preferred. It

seems therefore that anaphor binding by Exp_{DAT} is more accepted with predicates licensing Th_{nonNOM}, as in (4), and less accepted with predicates licensing Th_{NOM}, as in (3).[4]

2 Binding by Exp_{DAT} and IO_{DAT} – Experimental Data

Because there are conflicting grammaticality judgements as to whether Exp_{DAT}s in Exp-Th can bind anaphors, we designed an experiment testing possessive reflexive/pronoun binding by Exp_{DAT}s in the Polish psychological predicate *podobać się* 'to appeal' (Gogłoza & Łęska 2018). In order to test our predictions, we compared preverbal Exp_{DAT}s and preverbal Th_{NOM}s as binders of anaphors/pronouns licensed in the position of the other argument. We predicted that if the preverbal Exp_{DAT} is merged high (vP/TP, depending on the analysis) there should be no difference between Exp_{DAT}s and preverbal Th_{NOM}s as binders. This assumes that the preverbal Th_{NOM} is moved from VP to SpecTP, where it becomes a licit anaphor binder. However, if the preverbal Exp_{DAT} is merged low, in SpecVP, it should not be able to bind anaphors that are merged in a lower, complement to V position – only pronoun binding should be possible in such configurations.

The results of Exp1 indicated that preverbally merged Exp_{DAT}s of *podobać się* 'to appeal' can only bind pronominal possessives. In contrast, preverbal Th_{NOM}s of the same predicate can only bind reflexive possessives, as in (5).

(5) a. **Markowi**₁ podobały się ***swoje**₁/**jego**₁ koleżanki.
  Marek_DAT appeal REFL self's/his friends_NOM
  'Marek liked his (female) friends.'

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[4] Note that while this paper focuses on possessive binding by Exp_{DAT}, as in (3) and (4a), the examples in (4b-c) illustrate the reflexive pronoun *siebie*_ACC/GEN 'self'. At first sight, the two do not seem comparable; nevertheless the licensing of the reflexive pronoun *siebie* 'self' in Exp-Th is restricted in the same way as possessive anaphor licensing in the same context (as also pointed out by one of the anonymous reviewers). In what follows, we focus only on possessive binding; however, additional details as to the licensing of the reflexive pronoun *siebie* 'self' are provided in fn 6.

b. **Marek**[1]   podobał się **swoim**[1]/***jego**[1]   koleżankom.
Marek[NOM]   appeal REFL self's/his   friends[DAT]
'His (female) friends liked Marek.'

Assuming that the antecedent's inability to bind anaphors corresponds to its low projection, the results of the experiment suggest that the Exp[DAT] of *podobać się* 'to appeal' is merged in SpecVP. Not being able to bind anaphors, Exp[DAT] cannot be projected high in vP/TP.

This conclusion seems to be, indirectly, further supported by results of our earlier grammaticality judgement task on dative indirect objects as binders (Exp2). This experiment focused on possessive reflexive/pronominal binding by objects in double object constructions (DOCs) (Gogłoza et al. to appear). We examined indirect objects (IO[DAT]) and direct objects (DO[ACC]) as binders in a position c-commanding the other object. As we found out, IO[DAT]s can only bind pronouns, never anaphors – just like in the case of Exp[DAT]s of *podobać się* 'to appeal'. The results for IO[DAT] are illustrated in (6).

(6) a. Babcia   pokazała   **wnukowi**[1]   ***swoją**[1]/**jego**[1] **siostrę**.
grandma   showed   grandson[DAT]   self's/his   sister
'The grandmother showed the grandson his sister.'

b. Babcia   pokazała   **wnuka**[1]   ***swojej**[1]/**jego**[1] **siostrze**.
grandma   showed   grandson[ACC] self's/his   sister
'The grandmother showed the grandson to his sister.'

Crucially for the problem of Exp[DAT]'s position, IO[DAT] as anaphor binder in Exp2 was rated equally bad as Exp[DAT] as anaphor binder in Exp1. Therefore, these similar results might further indicate that, at least with regard to binding, Exp[DAT] is merged in the same syntactic position as IO[DAT], i.e. SpecVP.

However, this conclusion is unexpected considering the alleged possibility of Exp[DAT]s to bind anaphors in Exp-Th structures, particularly those with Th[nonNOM], as in (4). Therefore, we believe that it is necessary to examine whether the observed lack of anaphor binding by Exp[DAT] in psych predicates like *podobać się* 'to appeal' is due to something other

than the position of Exp$_{DAT}$. It could be the case that Exp$_{DAT}$s are projected high, allowing for anaphor binding, but there is an independent factor blocking the binding of anaphors in some Exp-Th contexts.

Since, in general, anaphor binding by Exp$_{DAT}$ is more acceptable with Th$_{nonNOM}$ (Exp-Th$_{nonNOM}$) than with Th$_{NOM}$ (Exp-Th$_{NOM}$), a possible candidate for the factor blocking anaphor binding by Exp$_{DAT}$s might be the so-called AAE (Rizzi 1990, Woolford 1999), as already suggested for Polish in Bondaruk (2017). The experiment, which is the main focus of this paper (Exp3), tests precisely that: i.e., the possible effect of the AAE on binding by Exp$_{DAT}$s in the Polish Exp-Th construction. However, before we provide more detail about the experiment itself, a few words of introduction to the notion of the AAE are in order.

The AAE was proposed by Rizzi (1990: 32-33), who observed that in Italian, Exp$_{DAT}$ can bind anaphors as long as the anaphor is not marked as nominative. Therefore, an anaphor in the genitive-marked theme of *importare* 'matter' can be bound (7a), while an anaphor in the nominative theme of *interessare* 'matter' cannot (7b):

(7) a. A loro   importa solo **di** se **stessi.**
         to them$_{DAT}$ matters   only of   themselves$_{GEN}$
         'They matter only to themselves.'
    b. *A loro   interessano solo se **stessi**.
         to them$_{DAT}$ interest   only themselves$_{NOM}$
         'They have interest only in themselves.' (Rizzi 1990: 33)

Rizzi (1990, p. 26) generalises this observation as the AAE, noting that: "anaphors do not occur in syntactic positions construed with agreement".

While the AAE in itself is just a generalisation from empirical data, Rizzi (1990) also proposes a possible theoretical explanation for the effect observed, assuming after Chomsky (1981) that the agreement expression on Infl or T (depending on the theory) is pronominal. If Agree is comparable to pronoun binding, it should follow a referential autonomy hierarchy of R-expressions, pronouns, and anaphors, as in (8).

(8) **Referential Autonomy Hierarchy:**
    R-expressions > pronouns > anaphors

R-expressions always are referentially autonomous, pronouns can be referentially autonomous, and anaphors are never referentially autonomous (Rizzi 1990: 36). Following (8), if agreement is a pronominal element and therefore forms a chain with the element it is construed with, the contentful element of the chain (the argument of the chain) must be more referentially autonomous than the agreement/pronoun (the non-argument of the chain). This means that a chain cannot contain a non-argument that is more referentially autonomous than an argument of the same chain (Rizzi 1990: 37).[5] However, in contexts with the AAE, this is precisely the case: i.e., the non-argument (agreement/pronoun) is more referentially autonomous than the argument (the anaphor), hence the ungrammaticality.

If the AAE is applicable to the Polish Ex-Th construction, then the acceptability of anaphor binding in Exp-Th$_{nonNOM}$ and the unacceptability of anaphor binding in Exp-Th$_{NOM}$ in Polish is expected.[6] Assuming that Exp$_{DATS}$ are projected in SpecvP, if AAE is at play, it should prevent anaphor binding in Exp-Th$_{NOM}$ and allow for anaphor binding in Exp-Th$_{nonNOM}$. We test this prediction in Exp3, discussed in Section 3.

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[5] Recall that pronominal AGR is co-indexed with the subject. Therefore, if AGR and the pronoun in the object position were to carry the same index, a principle B violation would ensue, caused by the illicit relationship between the subject and the object. AGR itself in the system of Chomsky (1981, 1986) is not a legitimate binder.

[6] In Polish, NP-verb agreement is determined by nominative case, rather than by grammatical function. Therefore, in Exp-Th$_{NOM}$, the verb agrees with Th$_{NOM}$, while in Exp-Th$_{nonNOM}$, the verb is marked with default values: third singular neuter.

(i) a. Markowi   **spodobała** się   **nowa   koleżanka**.
        Marek$_{3SG.M.DAT}$ like$_{3SG.F}$ REFL new$_{3SG.F.NOM}$ friend$_{3SG.F.NOM}$
        'A new (female) colleague appealed to Marek.'
    b. Markowi   **było** żal   **nowej   koleżanki**.
        Marek$_{3SG.M.DAT}$ be$_{3SG}$ sorrow new$_{3SG.F.GEN}$ friend$_{3SG.F.GEN}$
        'Marek felt sorry for his new (female) colleague.'

3 Binding by Exp_{DAT} and the AAE – Empirical Data

3.1 Aims and Predictions

The aim of Exp3 was to test if the anaphor binding, more specifically reflexive possessive binding, in Exp_{DAT}-$Th_{(non)NOM}$ falls under the general observation that anaphors are banned in positions construed with agreement. If this were the case, the result would indicate that Exp_{DAT}s should not be excluded as proper binders for anaphors. To verify this prediction, our experimental items were comprised of sentences including psychological predicates that take either a Th_{NOM} or Th_{nonNOM}. We used three predicates with Th_{NOM} (*podobać się* 'to appeal', *zaimponować* 'to impress', *przypomnieć się* 'to recall') and three predicates with Th_{nonNOM}, more specifically genitive themes ((*być) żal* 'to be sorrow', (*być) szkoda* 'to be sorry' and *brakować* 'to miss'). We illustrate Exp-Th_{NOM} in (9) and Exp-Th_{nonNOM} in (10).

(9) **Koleżance₁** przypomniał się [**swój₁/jej₁**
    friend₃SG.F.DAT recalled₃SG.M REFL [self's_NOM/her_GEN
    pierwszy chłopak]
    first   boyfriend₃SG.M.NOM]
    'My friend recalled her first boyfriend.'

(10) **Dyrektorowi₁**   brakowało [**swojej₁/jego₁** asystentki].
     principal₃SG.M.DAT missed₃SG.N [self's_GEN/his_GEN assistant₃SG.F.GEN]
     'The principal missed his assistant.'

If lack of anaphor binding in (9) is attributed to the AAE, we should find a consistent difference in anaphor binding by Exp_{DAT}s into Th_{NOM} and Th_{nonNOM}. Statistically, there should be a significant effect of the case of bindee (hence bindee.case), namely NOM vs. nonNOM, and of the type of bindee (hence bindee.type), i.e., reflexive possessive vs. pronominal possessive. We also expect a significant interaction between these two variables. Therefore, our hypothesis is that Exp_{DAT} can bind reflexive possessives in Th_{nonNOM} (non-φ-agreeing themes) but not in Th_{NOM} (φ-agreeing themes).

However, a juxtaposition of bindees embedded in Th_{NOM} and

Th_{nonNOM} is not sufficient to prove that $Exp_{DAT}s$ can in fact act as binders, assuming that their inability to bind anaphors is due to the AAE. Therefore, we used an additional variable: namely, embedding of the bindee in a complement NP (hence embedding), as shown in (11) and (12) for Th_{NOM} and Th_{nonNOM} respectively.

(11) **Kuzynce₁** przypomniał się   dziadek
      cousin_DAT   recalled_3SG.M REFL grandfather_NOM.M
      swojej₁/jej₁   przyjaciółki.
      self's_GEN.F/her_GEN.F friend_GEN.F
      'My cousin recalled the grandfather of her friend.'

(12**)** **Górnikowi₁** było szkoda żony   **swojego₁/jego₁**
      miner_DAT   was sorry   wife_GEN self's_GEN/his_GEN
      zmarłego kolegi.
      deceased friend_GEN
      'The miner felt sorry for the wife of his deceased friend.'

If the extent to which this kind of embedding improves binding by Exp_{DAT} is greater for reflexives embedded in complement NP to Th_{NOM} (11) than the ones in Th_{nonNOM} (12), it will suggest that the AAE is responsible for the unacceptability of otherwise acceptable anaphor binding in non-embedded contexts, as in (9). We expect there to be a significant statistical effect of embedding coupled with a significant interaction between embedding and bindee.case, and embedding and bindee.type, as well as a three-way interaction between all these variables.

3.2 Participants, Materials and Procedure
3.2.1 Participants. Ninety-five Polish students of higher education (81 women and 14 men, M_{age}=22.71, SD=2.85) took part, unaware of the linguistic purposes of the survey.

3.2.2 Materials and Design. The questionnaire consisted of 24 experimental items and 24 unrelated fillers, 12 grammatical and 12 ungrammatical, presented in random order. Each target sentence was followed by the intended interpretation indicating the binding relation between Exp_{DAT} and the pronoun/reflexive, as in (13).

(13) Dziewczynce brakowało swojej   przyjaciółki.
      girl$_{DAT}$ missed   self's$_{GEN}$ friend$_{GEN}$
      (to   przyjaciółka dziewczynki)
      this   friend$_{NOM}$ girl$_{GEN}$
      'A girl missed her friend.' (this is the girl's friend)

The experimental items were built around the variables listed in (14) and illustrated in the examples in (9-12) above.

(14) a) **bindee.case**: Th$_{NOM}$ bindee vs. Th$_{nonNOM}$
       b) **bindee.type**: reflexive possessives vs. possessive pronouns
       c) **embedding**: compares contexts with possessive reflexive /pronoun in SpecNP (no embedding) to the ones in which the NP containing the bindee is a complement to another NP (embedding).

3.2.3 Procedure. The questionnaire was designed using an online tool ('Survey Builder', currently samplify.com) and was distributed online. There was no time limit for completing the survey and it took approximately 12 minutes. The participants were asked to rate the acceptability of sentences using a 7-point Likert scale, ranging from 1 – fully unacceptable to 7 – fully acceptable. The sentence and intended interpretation were presented together. The items were randomized for every participant. Each participant saw each condition three times (three items per condition).

3.3 Results and Discussion
Descriptive results of the experiment are presented in Table 1. In general, all of the contexts, except the ones in which Exp$_{DAT}$ binds a possessive anaphor (reflexive possessive) in a Th$_{NOM}$ (both embedded and non-embedded), were rated as acceptable, with considerable variation.

Condition	Mean	Standard Deviation
NOM bindee, Anaphor, no Embedding (=16a)	3.2702	1.42196
NOM bindee, Anaphor, Embedding (=16c)	3.7614	1.44453
NOM bindee, Pronoun, no Embedding (=16b)	6.8070	.31727
NOM bindee, Pronoun, Embedding (=16d)	6.4596	.68964
Non-NOM bindee, Anaphor, no Embedding (=17a)	5.3860	1.11440
Non-NOM bindee, Anaphor, Embedding (=17c)	5.5860	.89087
Non-NOM bindee, Pronoun, no Embedding (=17b)	6.1123	.90912
Non-NOM bindee, Pronoun, Embedding (=17d)	6.4175	.75005

Table 1. Descriptive results: Mean and SD for all condition sentences.

3.3.1 Data Analysis and Discussion. The data were evaluated in a repeated measures ANOVA (2x2x2 design) for which IBM SPSS Statistics was used. ANOVA was computed on the mean scores generated for each condition. The test yielded significant main effects of bindee.case: $F(1,94)=240,704$, $p<.001$, bindee.type: $F(1,94)=372,011$, $p<.001$, and embedding: $F(1,94)=6,542$, $p=.012$. We also found significant interactions between bindee.case*bindee.type: $F(1.94)=303,716$, $p<.001$, bindee.type*embedding: $F(1,94)=8,323$, $p=.005$, and bindee.case*bindee.type*embedding: $F(1,94)=21,008$, $p<.001$. The predicted interaction between bindee.case*embedding was close to significant ($F(1,94)=3,398$, $p=.068$).

(15) **Interpretation of the results: main effects**
    a) a bindee in Th_{nonNOM} was rated significantly higher than the one in Th_{NOM} (Th_{nonNOM}: 5.88 > Th_{NOM}: 5.07),
    b) a pronominal possessive was rated significantly higher than a reflexive possessive (PRN:6.45>REFL:4.50),
    c) bindees embedded under another NP were rated significantly higher than bindees embedded only in their containing NP (EMB:5.56>non-EMB:5.39).

The two-way interactions can be interpreted as follows. The correlation between binder case and bindee type showed that, while reflexives in Th_{nonNOM} were rated significantly higher than the ones in

Th_{NOM} (5.49 vs. 3.52, p<.001), pronominals were rated significantly higher when in Th_{NOM} than in Th_{nonNOM} (6.63 vs. 6.27, p<.001). As for the correlation between bindee type and embedding, embedded reflexives were rated significantly higher than non-embedded ones (4.67 vs. 4.33, p=.001), while embedded and non-embedded pronouns were rated on par (6,44 vs. 6.46, p=.773). The weak interaction between binder case and embedding revealed that embedded bindees were rated significantly higher when in Th_{nonNOM} than in Th_{NOM} (6.00 vs. 5.11, p<.001). Likewise, non-embedded bindees were rated significantly higher when in Th_{nonNOM} than in Th_{NOM} (5.75 vs. 5.04, p<.001). The three-way interaction between all variables further showed that embedded pronominal bindees in Th_{nonNOM} were rated significantly higher than non-embedded ones (6.42 vs. 6.11, p=.009), whereas embedded reflexive bindees in Th_{nonNOM} were rated on par with non-embedded ones (5.59 vs. 5.39, p=.070). Also, non-embedded pronominal bindees in Th_{NOM} were rated significantly higher than embedded ones (6.81 vs. 6.46, p<.001), while embedded reflexive bindees in Th_{NOM} were rated significantly higher than non-embedded ones (3.76 vs. 3.27, p=.002).

Exp3's findings can be translated into grammaticality judgements as shown in examples (16) and (17), based on the means for each condition item (Table 1). While reflexives in (16a,c) are both unacceptable, different marking '*' vs. '*?' indicates a statistically significant difference between (16a) and (16c). Likewise, there is a statistical difference in the grammatical examples in (17a,c) vs. (17b,d), indicated by '?' vs. no marking. These judgements shown on a scale are as follows: unacceptable: $^* < {}^{*?}\ldots < {}^? <$ no marking: acceptable.

(16) a. **Koleżance₁** przypomniał się ***swój₁** pierwszy chłopak.
     friend$_{DAT}$ recalled REFL self's$_{NOM}$ first boyfriend$_{NOM}$
   b. **Koleżance₁** przypomniał się **jej₁** pierwszy chłopak.
     friend$_{DAT}$ recalled REFL her$_{GEN}$ first boyfriend$_{NOM}$
   c. **Kuzynce₁** przypomniał się dziadek **?*swojej₁**
     cousin$_{DAT}$ recalled REFL grandfather$_{NOM}$ self's$_{GEN}$
     przyjaciółki.
     friend$_{GEN}$

d. **Kuzynce$_1$** przypomniał się dziadek **jej$_1$**
   cousin$_{DAT}$ recalled REFL grandfather$_{NOM}$ her$_{GEN}$
   przyjaciółki.
   friend$_{GEN}$

(17) a. **Dyrektorowi$_1$** brakowało **ˀswojej$_1$** asystentki.
     principal$_{DAT}$ missed self's$_{GEN}$ assistant
   b. **Dyrektorowi$_1$** brakowało **jego$_1$** asystentki.
     principal$_{DAT}$ missed his$_{GEN}$ assistant

   c. **Górnikowi$_1$** było szkoda żony **ˀswojego$_1$** zmarłego
     miner$_{DAT}$ was pity wife self's$_{GEN}$ deceased
     kolegi.
     friend$_{GEN}$
   d. **Górnikowi$_1$** było szkoda żony **jego$_1$** zmarłego kolegi.
     miner$_{DAT}$ was pity wife his$_{GEN}$ deceased friend$_{GEN}$

In general, reflexives embedded in Th$_{NOM}$ are significantly degraded as compared to reflexives embedded in Th$_{nonNOM}$. Also, embedding in the complement NP significantly improved the acceptability of reflexives embedded in Th$_{NOM}$, but not in Th$_{nonNOM}$. Since these two results confirm our predictions, we are prompted to accept our hypothesis and conclude that the AAE is a real factor negatively influencing the acceptability of binding in Exp$_{DAT}$-Th$_{NOM}$ structures. This conclusion, in turn, suggests that the Exp$_{DAT}$ can act as a proper binder and is therefore merged high enough in the structure to bind anaphors in Ex-Th.[7] This conclusion can

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[7] Although this paper focuses only on possessive binding by Exp$_{DAT}$, in fn 3 we mentioned that the licensing of possessive reflexives in Exp-Th is similar to that of the reflexive pronoun *siebie* 'self' in the same context. Thus, while *siebie* 'self' is ungrammatical in Th$_{NOM}$ (in fact *siebie* 'self' lacks a nominative form and it is therefore impossible to provide an example with *siebie* 'self' in Th$_{NOM}$), its licensing in non-nominative positions is allowed, as in (i), provided by an anonymous reviewer.

(i) Markowi spodobały się artykuły w prasie o sobie.
    Marek$_{DAT}$ appeal REFL articles in papers about self
    'The articles about himself appealed to Marek.'

This serves as extra support for the SpecvP position of Exp$_{DAT}$s advanced in this paper.

be additionally supported by the results regarding embedding obtained in
Exp1 and Exp2, to which we turn in the next section.

3.4 A Note on the Effect of Embedding – Additional Support

The variable used to check if Exp_{DAT}s can be considered as proper
binders for reflexives was embedding in a complement NP. Our
prediction that this variable should produce a significant effect for
reflexives in Th_{NOM}, but not those in Th_{nonNOM}, which do not agree with
T, was borne out in Exp3. We used the same variable in our two previous
experiments described briefly in Section 2. Since embedding improves
binding only in the contexts in which the AAE is responsible for the
unacceptability of otherwise licit binding, we should obtain the following
result. For the experiment on binding by Exp_{DAT} in *podobać się* 'to
appeal', structures which take Th_{NOM} arguments, (18), there should be a
significant effect of embedding on reflexive binding, just as in the case
of the contexts with Th_{NOM} in Exp3 (20). In the case of binding by
IO_{DAT}s, (19), there should be no improvement of the reflexive binding
due to embedding. This is because the AAE does not affect binding in
this context; i.e., the lower object containing the reflexive is not
construed with agreement with T, just like the Th_{nonNOM} in (21). This is
exactly what we found in Exp1 and Exp2:

(18) **Exp1** – binding by Exp_{DAT} into Th_{NOM} in *podobać się* 'to appeal'
   a. **Tomkowi₁** podoba się   [***swoja/jego siostra]**.
       Tomek$_{DAT}$ like   REFL   self/his$_{GEN}$ sister$_{NOM}$
   b. **Tomkowi₁** podoba się   [koleżanka [$^{?*}$**swojej/jego**
       Tomek$_{DAT}$ like   REFL friend$_{NOM}$ self/his$_{GEN}$
       siostry]].
       sister$_{GEN}$

(19) **Exp2** – binding by IO_{DAT} into DO_{ACC}
   a. Babcia   pokazała **wnukowi₁** [***swoją₁/jego₁** siostrę].
       grandma showed   grandson$_{DAT}$ self's/his$_{GEN}$ sister$_{ACC}$
   b. Babcia   pokazała **wnukowi₁** [koleżankę [***swojej₁/jego₁**
       grandma showed   grandson$_{DAT}$ friend$_{ACC}$ self's/his$_{GEN}$
       siostry]].
       sister$_{GEN}$

(20) **Exp3** – binding by Exp_{DAT} into Th_{NOM} vs. Th_{nonNOM}
  a. **Kuzynce$_1$** przypomniała się   [***swoja$_1$/jej$_1$**
      cousin$_{DAT}$ recalled   REFL   self's/her$_{GEN}$
      przyjaciółka]].
      friend$_{NOM}$
  b. **Kuzynce$_1$** przypomniał się   [dziadek   [$^{?*}$**swojej$_1$/jej$_1$**
      cousin$_{DAT}$ recalled   REFL   grandfather$_{NOM}$ self's/her$_{GEN}$
      przyjaciółki]].
      friend$_{GEN}$
(21) **Exp3** – binding by Exp_{DAT} into Th_{NOM} vs. Th_{nonNOM}
  a. **Górnikowi$_1$** było szkoda [$^?$**swojego$_1$/jego$_1$** zmarłego
      miner$_{DAT}$ was sorry   self's/his$_{GEN}$ deceased
      kolegi].
      friend$_{GEN}$
  b. **Górnikowi$_1$** było szkoda [żony   [$^?$**swojego$_1$/jego$_1$** zmarłego
      miner$_{DAT}$ was sorry wife$_{GEN}$ self's/his$_{GEN}$ deceased
      kolegi]].
      friend$_{GEN}$

The fact that there was no effect of embedding in (19) and (21) in which the bindee is not construed with agreement suggests that the effect of embedding cannot be a processing effect. The cross-experiment comparison indicates that this effect holds only of contexts in which embedding alleviates the AAE; i.e., the NP containing the reflexive is no longer in agreement with T due to embedding. Therefore, we take these findings to validate the AAE as a possible explanation for the degraded status of $Exp_{DAT}s$ as binders in Exp_{DAT}-Th_{NOM} contexts.

It is not clear, however, how the AAE should apply to contexts with possessive anaphors, which we tested in our experiments. These anaphors are not construed with agreement with T directly, only modifying agreeing NPs, and so they do not fall under the original definition of the AAE as proposed in Rizzi (1990). In what follows, we provide a theoretical account of these contexts by extending the notion of the AAE.

4 Theoretical Analysis - the Extended Anaphor Agreement Effect

Assuming, based on our results, that the position of Exp_{DAT} is high enough to bind anaphors, presumably SpecvP, the question arises as to why is it that, for many speakers, Exp_{DAT} cannot bind a reflexive possessive embedded in a Th_{NOM}, as in (20a), or embedded in a complement NP of the Th_{NOM}, as in (20b). After all, possessive reflexives are never in agreement with the verb and only modify the agreeing NPs.

We would like to propose that an NP with a possessive reflexive is also subject to the AAE, which is due to two factors. First, the possessive reflexive, although it bears the φ-features of its antecedent, also agrees in case and φ-features (concord features – it is morphologically like an adjective and receives its φ-features via feature sharing) with the NP it modifies, and thus itself bears nominative case. Second, following the structure proposed for Serbo-Croatian NPs in Despić (2011, 2013, 2015), we assume that the possessive in Polish is an adjunct, with the structure in (22).

(22) [$_{NP}$ swój [$_{NP}$ chłopak]]
       self's   boyfriend

Being an adjunct, the possessive and the NP it modifies are equidistant to T. These two properties make the NP with the reflexive possessive ambiguous when the AAE applies, in that either the NP or the possessive reflexive can enter into agreement with T.

The mechanism that we would like to propose for illustration is what we call a subscript/indexical extension. More specifically, we assume that the possessive reflexive can force its referential subscript to represent the subscript of the entire NP, which is represented in (23).

(23) $T_{AGR,1/2}$ … [$_{NP}$ self's$_{2\ (NOM)}$ [$_{NP}$ boyfriend$_{1\ (NOM)}$]]$_{1/2}$

When the NP bears the subscript of a reflexive in addition to its own subscript, the reflexive can indirectly enter into agree with T. When this happens, the anaphor is a part of the chain with pronominal agreement,

which causes a clash with regard to Principles A and B; i.e., the reflexive must be bound and the pronominal agreement must be free. Alternatively, as explained in Section 2, the reason for the AAE could be that the chain contains an argument, the reflexive, which is less referentially autonomous than pronominal agreement (non-argument).

The idea of subscript extension is based on a corresponding notion of logophoric extension in Obligatory Control structures, proposed in Landau (2000: 109-111), shown in (24). Here, the controller itself is in SpecDP, which c-commands PRO.

(24)   It would help Bill's$_1$ development [PRO$_1$ to behave himself$_1$ in public]

This kind of local subscript extension, parallel to local logophoric extension, could account for the unacceptability of examples like (20a), in which the possessive modifies an agreeing NP.

However, it is not clear how this mechanism should produce the AAE in the case of (20b). In this context, the reflexive possessive modifies a complement NP, which is no longer in agreement with T. Therefore, for the AAE to apply, the referential subscript of the reflexive should extend non-locally to the complex NP that is in agreement with T. The results of our experiment showed that this context, although significantly more acceptable than (20a), is still not felicitous for many speakers. It therefore seems that the AAE could also block binding in this case.

In fact, if we look at Landau's logophoric extension in Obligatory Control, it turns out that this mechanism can also apply less locally, as shown in (25). Here, the pronoun propagates its subscript to the maximal NP. Likewise, we assume that, for the purpose of binding, the extension of the subscript may be less local and the possessive need not be close to the edge of the higher NP to propagate its referential subscript to the whole complex NP. This is illustrated in (26). Such a non-local subscript extension could account for the unacceptability of reflexive binding in examples like (20b).

(25)   ?It considerably helped [$_{NP1}$ first stages of [$_{NP2}$ her$_1$ music career]]
        [PRO$_1$ to have an uncle in a record company]

(26) T$_{AGR2/3}$…[$_{NP2}$ grandfather$_{3\ (NOM)}$ [$_{NP1}$ self's$_{2\ (GEN)}$ [$_{NP1}$ friend$_{1\ (GEN)}$]]]$_{2/3}$

    We would like to propose that the two options of referential subscript
extension, local and non-local, can be subsumed under the following
definition of the Extended AAE:

(27)   **Extended Anaphor Agreement Effect:** Anaphors do not occur in
        syntactic positions construed with agreement directly, (i), or
        indirectly, (ii):
        i.   *antecedent$_i$ … [$_{AgrP}$ agreement$_i$ anaphor$_i$ …]
        ii. *antecedent$_i$ … [$_{AgrP}$ agreement$_i$ [self's$_i$ [NP]]$_i$…]

The indirect construal is possible via indexical extension, which can
apply locally, (28), or non-locally, (29). More specifically, we assume
that for the purpose of binding, an indexical extension [X's NP], (28), or
[Y [X's NP]], (29), is non-distinct from X:

(28)   [$_{NP}$ self's$_{2\ (NOM)}$ [$_{NP}$ N$_{1\ (NOM)}$]]$_1$ → [$_{NP}$ self's$_{2\ (NOM)}$ [$_{NP}$ N$_{1\ (NOM)}$]]$_{1/2}$

(29)   [$_{NP2}$ N$_{3\ (NOM)}$ [$_{NP1}$ self's$_{2\ (GEN)}$ [$_{NP1}$ N$_{1\ (GEN)}$]]]$_3$ →

       → [$_{NP2}$ N$_{3\ (NOM)}$ [$_{NP1}$ self's$_{2\ (GEN)}$ [$_{NP}$ N$_{1\ (GEN)}$]]]$_{2/3}$

Since the acceptability of examples like (20a) and (20b) varies among
speakers, we assume that when the Extended AAE applies indirectly, its
application is optional and subject to speaker variation; i.e., it depends on
the rules of the individual grammars of the speakers. That is, if one's
grammar allows for subscript extension, as in (28), they will not accept
the binding of reflexives, as in (20a), as a result of the Extended AAE.

5 Conclusions

In this study, we tested the binding potential of Exp$_{DAT}$ in Exp$_{DAT}$-
Th$_{(non)NOM}$ constructions. Through looking at the acceptability of binding

in these contexts, we aimed to establish the position of Exp_{DAT} in the structure, namely whether it is merged high, in SpecvP, or low, in SpecVP. For this purpose, we investigated the possible influence of the AAE on binding in Exp_{DAT}-Th_{NOM} constructions to see if it is a factor negatively affecting binding by Exp_{DAT} into Th_{NOM} and therefore disturbing the otherwise uniform behaviour of an Exp_{DAT} as binder. The results of Exp3 confirmed that the lack of binding into Th_{NOM} might be due to the AAE. We found that only reflexives in Th_{nonNOM} can be bound, and never in Th_{NOM}. Additionally, two-degree embedding improved binding in Exp_{DAT}-Th_{NOM} contexts but not in Exp_{DAT}-Th_{nonNOM}, confirming our conclusions. A cross-experiment comparison of the effect of embedding further supports the claim that it is the AAE that hinders binding in Exp_{DAT}-Th_{NOM} and that Exp_{DAT} is a proper anaphor binder in the absence of the AAE. To account for the indirect application of the AAE in the case of possessive anaphors, we assumed that the referential subscript of the possessive represents the entire NP, an option that we defined as the Extended AAE. Finally, assuming that the lack of binding is attributed to the Extended AAE, our results suggest that the position of Exp_{DAT} in both Exp-Th_{NOM} and Exp-Th_{nonNOM} is the same: namely, SpecvP.

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Intentionality Effect in Imperatives[1][*]

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This paper discusses a well-known restriction in Slavic languages that affects negative imperatives. In Slavic languages, positive imperatives are well-formed in either the perfective or imperfective aspect, whereas negative imperatives are acceptable only in the imperfective. This restriction is lifted when the action expressed by the verb is interpreted as non-intentional. In such exceptional cases, the perfective becomes available. I argue for a semantic/pragmatic account of this restriction and exceptions to it, building on previous informal analyses, e.g., Rappaport (1985). I also show that a purely syntactic analysis (e.g., Despić 2016, to appear) is inadequate.

1 The old puzzle

Across Slavic languages, positive imperatives can take either imperfective (I) or perfective (P) verbs with minimal interpretative differences; see (1).[2] Negative imperatives, on the other hand, are well-

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[2] The interpretative differences between the perfective and imperfective aspect in imperatives have been studied in traditional literature (e.g., Šatunovskij 2002 and references therein). An anonymous reviewer suggests that in formal

formed only in the imperfective; see (2). This Aspectual Restriction on imperatives has been previously noticed and discussed in the literature, for instance, in Forsyth (1970), Bogusławski (1985), Zaliznjak (2006), Paducheva (2013), a.o.

(1) *Positive imperatives*[3]
　　RU　a.　Otkryvaj/otkroj okno!
　　　　　　 open$_{\text{I.IMP/-P.IMP}}$　window
　　　　　　 'Open the window!'
　　PL　b.　Jedz/zjedz　tego jabłka!
　　　　　　 eat$_{\text{I.IMP/-P.IMP}}$ that　apple
　　　　　　 'Eat that apple!'
　　BCS　c.　Jedi/pojedi tu　　jabuku!
　　　　　　 eat$_{\text{I.IMP/-P.IMP}}$ that　apple
　　　　　　 'Eat that apple!'　　　　　　　　　　　(Despić 2016, ex.5)

(2) *Negative imperatives*
　　RU　a.　Ne otkryvaj/*otkroj　okno!
　　　　　　 not open$_{\text{I.IMP/-P.IMP}}$　　window
　　　　　　 'Don't open the window!'
　　PL　b.　Nie jedz/*zjedz tego　jabłka!
　　　　　　 not eat$_{\text{I.IMP/-P.IMP}}$ that　apple
　　　　　　 'Don't eat that apple!'
　　BCS　c.　Ne jedi/*pojedi　tu　　jabuku!
　　　　　　 not eat$_{\text{I.IMP/-P.IMP}}$　that　apple
　　　　　　 'Don't eat that apple!'　　　　　　　(Despić 2016, ex.5)

An interesting property of the Aspectual Restriction is that it is lifted when the action expressed by the verb is interpreted as non-intentional (e.g., Bogusławski 1985). Non-intentionality can be part of the lexical

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semantics/pragmatics, such differences can be captured using the system in Grønn (2003).

[3] Language abbreviations: BCS – Bosnian/Croatian/Serbian, PL – Polish, RU – Russian. Glosses: AUX – auxiliary, I – imperfective, IMP – imperative, INF – infinitive, NEG – negation, P – perfective. Other abbreviations: *Alt* – alternatives, *deon* – deontic, EP – end-point, *imp* – imperative, *int* – intentionality operator, *Psp* – presupposition, S – start, SI – scalar implicature.

meaning of a verb. This is the case with unaccusatives and psych-verbs, as in (3). These verbs are low on the agentivity scale (e.g., Dowty 1991) and, thus, normally do not express intentional actions.

(3) *Lexically non-intentional verbs*
    RU   a.   Ostorožno! Ne upadi!
                careful   not fall$_{P.IMP}$
                'Be careful! Don't fall down!'
    PL   b.   Nie zgub   tego   klucza!
                not lose$_{P.IMP}$ that   key
                'Don't lose that key!'   (Despić 2016, ex.8)
    BCS   c.   Ne zaboravite   ključeve!
                not forget$_{P.IMP}$ keys
                'Do not forget the keys!'   (Despić 2016, ex.10)

The non-intentional interpretation can also be triggered by the context, as in (4). Note that in (4), a regular transitive agentive verb is used and de-intentionalizing adverbials like *przypadkiem* 'accidentally' are optional.[4]

(4) *Contextually non-intentional interpretation*
    Context: You let your love-bird out of the cage and leaving the
    room warn your friend who is staying in the room:
    RU a.   Smotri! (Slučajno) ne   otkroj   okno!
             look   by.chance   not open$_{P.IMP}$ window
             'Be careful! By accident, don't open the window!'
    PL b.   (Przypadkiem) nie otworz   okna!
             accidentally   not open$_{P.IMP}$ window
             'By accident, don't open the window!'

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[4] According to an anonymous reviewer, *slučajno* in the Russian example in (4a) is necessary for the sentence to be acceptable. I have consulted with five Russian speakers about this particular issue. According to their judgments (which align with my own intuitions), *slučajno* can be omitted in (4a). It is true that (4a) is more natural when there are cues signaling that the action is interpreted as non-intentional. The strength of such cues and whether there is speaker variation in the acceptability of (4a) without *slučajno* are empirical questions that I leave for future research.

(5) BCS a. In the context of (4):
       ??Ni slučajno   ne otvorite prozor!
       not by.chance not open$_{\text{P.IMP}}$ window
       'By accident, don't open the window!'
    b. Ni slučajno   joj ne recite   da   samtu!
       not by.chance her not tell$_{\text{P.IMP}}$ that am.here
       'Don't tell her I'm here under any circumstances!'

The second strategy (contextual de-intentionalization) is more restrictive. For example, in BCS in the context of (4), the imperfective is still judged unacceptable; see (5a).[5] However, BCS allows similar examples with other transitive agentive verbs like 'tell'; see (5b). I leave the investigation of this variation for future research, concluding for the purposes of this paper that the contextual strategy is (to some extent) available across Slavic languages.

In this paper, I argue that the Aspectual Restriction (i.e., the contrast between (1) and (2)) and its obviation with non-intentional actions (the acceptability of (3) and (4)) should be captured in terms of semantics/pragmatics. The account proposed here formalizes a previously expressed intuition that the competition between perfective and imperfective aspect leads to a pragmatically unjustified command in negative imperatives, e.g., Rappaport (1985). For example, a command to not open the window with the perfective forbids the addressee to succeed in opening the window leaving it open whether an attempt to open the window can be made. The use of imperfective makes a stronger prohibition against attempting to open the window. Thus, the imperfective is preferred. Unlike previous analyses, I assume the relevant

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[5] (5a) can be expressed using an analytic imperative as in (i), see also Despić (2016, to appear). Unlike Despić (to appear), I do not take the existence of analytic imperatives to be strong evidence against a semantic/pragmatic account of the Aspectual Restriction and exceptions to it. Analytic imperatives are formed with a "defective verb" which, in principle, can be analyzed as blocking one of the inferences responsible for unacceptability of the perfective in negative imperatives according to the semantic/pragmatic analysis proposed in this paper.

   (i) BCS   Ni   slučajno nemojte otvoriti prozor!
              not   chance$_{\text{NEG.IMP}}$ open$_{\text{P.INF}}$ window
              'By accident, don't open the window!'

inference of the perfective to be a Scalar Implicature (SI) rather than a presupposition, following Zinova and Filip (2014). I also make crucial use of the intentionality operator, which allows us to explain the exceptions to the Aspectual Restriction. In previous semantic/pragmatic analyses, these exceptions have been mentioned, but not explained. My proposal is given in Section 2. In Section 3, I briefly present and argue against the purely syntactic analysis of the Aspectual Restriction and exceptions to it recently proposed in Despić (2016, to appear). I show that, unlike the semantic/pragmatic account, a purely syntactic account (i) has to make undesirable stipulations about cases in which the Aspectual Restriction is obviated by the context, such as (4), and (ii) cannot be extended to explain the Aspectual Restriction with negated strong deontic modals in Russian, which show identical behavior to negative imperatives. In other words, the syntactic account in Despić (2016) appears to seriously under-generate. In section 4, I conclude by discussing the Aspectual Restriction from a cross-Slavic perspective. The puzzling observation is that, whereas the Aspectual Restriction in imperatives is active in all Slavic languages, the Aspectual Restriction in deontic modals is observed only in a subset of Slavic languages. I show a possible way to address this puzzle, leaving details for future research.

2 Formalizing a semantic/pragmatic account

The intuition that the Aspectual Restriction in negative imperatives in Slavic should receive a semantic/pragmatic explanation has been widely discussed in the literature (Bogusławski 1985, Rappaport 1985, Levinson 2006, Zaliznjak 2006, Partee 2008, Paducheva 2013, a.o.). However, to the best of my knowledge, there is no formal account of the Aspectual Restriction or exceptions to it. To proceed with the formalization, we need some basic assumptions about the interpretation of aspect and imperatives (spelled out in Section 2.1). We also need some notion of intentionality (discussed in Section 2.2). We then put these ingredients together in Section 2.3 to explain the Aspectual Restriction. Section 2.4 shows how the exceptions to the Aspectual Restriction are derived.[6]

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[6] As an anonymous reviewer correctly points out the formalization proposed in this paper directly depends on the assumptions made in Section 2.1. Different assumptions about the interpretation of imperatives and aspect will require a

2.1 Assumptions

2.1.1 Aspect. Following Zinova and Filip (2014), who build their analysis on Grønn (2003), I assume that perfective aspect in Russian (and Slavic in general) asserts that the action has achieved its endpoint and has an inference that the action has started. Moreover, this inference is generated as a Scalar Implicature (SI) (6).[7] Imperfective aspect asserts that the action has started and generates no SI (7). For expository purposes, I abbreviate aspectual inferences as in (8), where EP = endpoint and S = start.[8]

(6) a.   Ivan ne pročital etu knigu.   RU
          Ivan not read$_P$ this book
          'Ivan didn't read this book completely through.'
     b.   *Assertion:* Ivan did not finish reading this book
     c.   *Inference:* Ivan started reading/read a part of this book

(7) a.   Ivan ne čital etu knigu.
          Ivan not read$_I$ this book
          'Ivan didn't read (any part of) this book.'
     b.   *Assertion:* Ivan didn't start reading/read any part of this book
     c.   (no relevant inference)

---

different formalization. The main purpose of this paper is to argue that the phenomena in question should receive a semantic/pragmatic account (as opposed to a purely syntactic one) and to show one instantiation of such an account. A comparison between different ways of formalizing the Aspectual Restriction and exceptions to it goes beyond the scope of this paper.

[7] Much previous work on Slavic aspect erroneously claimed that the inference found with P is a presupposition (e.g., Bogusławski 1985, Rappaport 1985, a.o.).

[8] Aspect, and especially Slavic aspect, is a vast area of research. It is not my goal here to contribute to this field by either surveying the literature or assessing different approaches to aspect. However, I would like to mention recent semantic/pragmatic approaches, such as Altshuler (2016) and Gyarmathy and Altshuler (2018), which might be useful for constructing an alternative formalization of the Aspectual Restriction and exceptions to it. I thank an anonymous reviewer for reminding me about these works and raising a question about their applicability to the phenomena I am interested in.

(8) a. Perfective, (6):   b. Imperfective, (7):
         Assert.: ¬ Ivan-read-book EP   *Assert.*: ¬ Ivan-read-book S
         SI: Ivan-read-book S   (no SI)

Zinova and Filip (2014) argue that evidence for treating the start-inference of the perfective, (6c), as an SI rather than a presupposition comes from two observations. First, this inference is cancelable (9):

(9) Ivan ne pročital etu knigu. On daže ne otkryl ee.
    Ivan not read_P   this book   he even not opened it
    'Ivan didn't read this book. He even didn't open it.'
                                        (Zinova & Filip 2014: 391)

    Second, the start-inference, (6c), shows the projective behavior characteristic of SIs rather than presuppositions. Chemla (2009) shows that SIs project existentially under negative universal quantifiers, (10a), whereas presuppositions project universally in the same configuration, (10b). Zinova and Filip (2014) conducted an informal survey that showed that most Russian speakers prefer the existential inference of the perfective, (11b), to the universal one, (11c). The numbers in square brackets show mean acceptability judgments. These results suggest that the start-inference of the perfective is an SI.

(10) a. No student read all the books.
          ↝ (At least) one student read some of the books   (SI)
      b. No student knows that he is lucky.
          ↝ Each student is lucky   (Psp)

(11) a. Nikto   iz nas ne pročital   učebnik.
          nobody of us not read_P   textbook
          'None of us read the textbook.'
      b. ↝ Some of us read at least a part of the textbook   [3.11/4]
      c. ↝ All of us read at least a part of the textbook   [1.65/4]
                                        (Zinova & Filip 2014: 396-398)

2.1.2 Imperatives. For concreteness, I assume a simplified denotation of imperatives from Kaufmann 2012, given in (12). According to (12), an

imperative is true iff in all (ordered) worlds of the modal base the prejacent is true. The modal base is formulated as all facts known to the speaker.[9] Some support for such a modal base comes from examples like (13). The discourse in (13) is infelicitous because the command is inconsistent with speaker's knowledge.

(12) $imp(f,g,p,w) = 1$ iff
$\forall w' \in (\leq_{g(w)}(\cap f(w)))[p(w')]$
where $f(w)$ is a modal base that contains all the facts known to
the speaker and $\leq_{g(w)}$ is an ordering source that contains
obligations issued by the speaker (Kratzer 1991)

(13) #Eat this fish! But you won't.   (Roberts 1989, Han 1999, ex.42)

To see how the denotation in (12) derives truth-conditions for positive imperatives, consider the Russian example in (14). Positive imperatives in Russian (and other Slavic languages) are well-formed in both imperfective and perfective aspect. This is demonstrated in (15) and (16).

(14) RU   Otkryvaj/otkroj   okno!
          open$_{I.IMP/P.IMP}$ window
          'Open the window!'

(15) a. $imp(f,g, ⟦you open-I window⟧ ,w) = 1$ iff
           $\forall w' \in (\leq_{g(w)}(\cap f(w)))[you open window S in w']$
      b.   In prose: 'Open-I window!' is true iff all the
           (g(w)-best) worlds in the modal base are such that
           you start opening the window in these worlds
      c.   abbrev.: $\square_{imp}$ you-open-window S[10]

---

[9] The analysis proposed in this paper is compatible with any *semantic* analysis of imperatives, e.g., Han (1999), Condoravdi and Lauer (2012), Kaufmann (2012), but less so with a *pragmatic/dynamic* approach to imperatives, e.g., Portner (2007), von Fintel and Iatridou (2017).

[10] Here and below, $\square_{imp}$ stands for a modal base before the ordering source is applied, $\square_{imp}$ represents universal quantification, and $\Diamond_{imp}$ represents existential quantification.

(16) a. *imp*(f,g, ⟦you open-P window⟧ ,w) = 1 iff
           ∀w′ ∈ (≤$_{g(w)}$(∩f(w)))[you open window EP in w′]
      b. In prose: 'Open-P window!' is true iff all the (g(w)-best)
          worlds in the modal base are such that your opening the
          window achieves the end-point in these worlds
      c. abbrev.: ☐$_{imp}$ you-open-window EP

2.2 Intentionality
By combining our assumptions about aspect and imperatives in Section
2.1, we will not be able to derive the Aspectual Restriction. To see this,
we start with looking at how an SI is generated in a simple perfective
sentence like (17a). The assertion of (17a) using the abbreviations
introduced in (8) is shown in (17b). Suppose that (17a) competes (for
informativity) with a corresponding imperfective statement, whose
meaning is given in (17c) as an alternative to (17a). This imperfective
alternative, (17c), is stronger than the original perfective statement,
(17a), as shown by the asymmetric entailment relation in (17d).
Therefore, the use of (17a) is justified if the speaker supposes that the
stronger alternative is not true. This derives the desired SI that Ivan
started to leave, as shown in (17e).[11]

(17) a. Ivan   ne ušel.
          Ivan   not leave$_P$
          'Ivan didn't leave.'
      b. *Assertion*: ¬ Ivan-leave EP
      c. *Alt*: ¬ Ivan-leave S (= imperfective)
      d. *Asymmetric entailment*:
          ¬ Ivan-leave S ⇒ ¬ Ivan-leave EP
          ¬ Ivan-leave S ⇐/= ¬ Ivan-leave EP
      e. *SI:* ¬ ¬ Ivan-leave S ≡ Ivan-leave S

---

[11] The description of SI generation is deliberately vague. As far as I can tell, both
Neo-Gricean and grammatical approaches to SIs are compatible with the proposal in
this paper, with some adjustments. A terminological note is in place here. A set of
alternatives in the grammatical approach to SI also includes the sentence itself. In
this paper, I list only those alternatives that are different from the original sentence.

In a negative imperative with P, as in (18a), with the meaning schematized in (18b), the generated SI is as shown in (18e).

(18) a. *Ne otkroj   okno!
           not open$_P$ window
      b. *Assertion*: $\square_{imp}$ ¬ you-open-window EP
      c. *Alt*: $\square_{imp}$ ¬ you-open-window S (= imperfective)
      d. *Asymmetric entailment*:
           $\square_{imp}$ ¬you-open-window S $\Rightarrow$ $\square_{imp}$ ¬ you-open-window EP
           $\square_{imp}$ ¬ you-open-window S $\Leftarrow/=$ $\square_{imp}$ ¬ you-open-window EP
      e. *SI*: ¬ $\square_{imp}$ ¬ you-open-window S $\equiv$ $\Diamond_{imp}$ you-open-window S

The asymmetric entailment in (18d) captures the intuition discussed in Section 1 that the use of the perfective in the negative imperatives is pragmatically unjustified. However, it is important to note that the derivation of the implicature in (18e) by itself does not explain the Aspectual Restriction. Combined together, the assertion in (18b) and the SI in (18e) give rise to the following interpretation: it is prohibited that you finish opening the window, but you are allowed to start opening the window. (18a) does not have this reading; rather, the sentence is ungrammatical. Therefore, we need to strengthen the account to derive the Aspectual Restriction.

To achieve this, I propose to include an additional ingredient, namely an intentionality operator. In philosophy, intentions and intentional actions have been a topic of a lot of research (Davidson 1980, Bratman 1987, Raz 2011, a.o.). One central conceptualization of intentionality is in terms of knowledge. For example, Gorr and Horgan (1982: 255) define intentional actions as follows: "P's A-ing at t is intentional under the description 'A-ing' if and only if (i) this event is an act and (ii) P knows, at t, of this act, that it is an A-ing by him."[12] Linguistic support

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[12] The specification "under the description 'A-ing'" is added in order to address the long-standing issue of defining intentional actions. Namely, an action may be intentional under one description, but unintentional under another. For example, suppose that John, while playing a part in a theatre, injures Mary because his gun is loaded with real bullets (unbeknownst to him) instead of blanks, as usual. In this

for the notion of intentionality along these lines comes from the deviance of (19). This is important, because intentionality will be accommodated into the modal base of imperatives, which is knowledge-based.

(19) #John intends to fly to the moon, even though he knows this is
     impossible.   (Grano 2017)

Another prominent property of intentions is that they are conduct-controlling, in the sense that they guide the action until the endpoint is reached (e.g., Raz 2011). This property is important for the interaction between aspect and intentional actions. I model the controlling component of intentionality (with reference to aspect) as follows: if an intentional action starts, it reaches the endpoint, i.e., the action is guided throughout the process and up to the point when the result is reached. Therefore, I propose an intentional operator *int*, as in (20), which is present when the action is interpreted as intentional. This operator, defined as an identity function, contributes (at least) a conditional presupposition.[13] R in (20) can be viewed as an event predicate of type $<v,t>$. As we will see shortly, this conditional presupposition is responsible for the Aspectual Restriction.

(20)   *Intentionality operator w.r.t. aspect* (simplification)
       $int(R_{v,t}) = \lambda R$: if the action described by R starts $\rightarrow$ the action
       described by R reaches the endpoint.R

In our window-opening example, *int* has the following presupposition: 'you-open-window S $\rightarrow$ you-open-window EP'. This presupposition is locally accommodated into the modal base of the imperative.

An anonymous reviewer asks about the position and scopal properties of the *int*-operator. In this paper, I assume that *int* like its overt brother the manner adverb *intentionally* is a VP-modifier (see, for example, Ernst 2004 on the semantics of manner adverbs). With respect

case, John's action is intentional under the description "John squeezed the trigger", but it is unintentional under the description "John injured Mary".

[13] The contribution of *int* is most probably more complex. But the formulation in (20) is sufficient for the purposes of this paper.

to scopal properties of *int*, the picture cannot be determined based on the phenomena we are interested in here. (20) defines *int* as an identity function, which means *int* does not interact scopally. This seems to be sufficient for the present purposes, as *int* does not interact with either the negation or modal above it (for instance, *Don't open the window!* cannot mean *Open the window unintentionally!*). However, as mentioned in fn 13, this picture is overly simplistic. There are cases in which the intentionality of the verb affects a VP-internal quantifier. For example, Szabolcsi (2010) discusses cases like *I don't want to call/offend someone*. She claims that with intentional verbs like *call*, the positive polarity item *someone* cannot scope below negation in the configuration above. By contrast, non-intentional *offend* allows *someone* to scope below negation. The same data have been replicated in Russian and Polish (see Szabolcsi 2010). A tempting conjecture might be that *int* scopally interacts only with the material within VP and not beyond the VP edge. However, I think such a conclusion is premature. More research is called for in this area.

2.3 Accounting for the aspectual restriction
(21) repeats the relevant Russian example that illustrates the Aspectual Restriction in negative imperatives in Slavic. The Aspectual Restriction is derived as shown in (22). It is derived as a contradiction when conjoining the assertive meaning of the imperative, (22b), the SI of the perfective, (22d), and the presupposition of *int*, (22e). This account assumes that there are situations in which implicatures are not easily cancelable; see, for example, Magri (2009, 2011). Following Gajewski (2002), I assume that contradiction results in ungrammaticality. (23) shows that the contradiction does not arise when the imperfective is used.[14]

(21)   RU Ne otkryvaj/*otkroj   okno!
            not open$_{\text{I.IMP}}$ /$_{\text{P.IMP}}$ window
            'Don't open the window!'

(22)   a.   *'not *int* open-P window!'

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[14] Note that for positive imperatives, as in (15) and (16), adding *int* does not result in a contradiction. The computation is straightforward and so I leave it to the reader.

    b. *Assert:* □$_{imp}$ ¬ you-open-window EP
    c. *Alt:* □$_{imp}$ ¬ you-open-window S (= imperfective)
    d. *SI:* ¬ □$_{imp}$ ¬ you-open-window S ≡ ◊$_{imp}$ you-open-window S
    e. *Psp:* □$_{imp}$(you-open-window S → you-open-window EP)
    f. b&d&e = □¬EP & ◊S & □(S→EP) = ⊥

(23) a. 'not *int* open-I window!'
    b. *Assert:* □$_{imp}$¬ you-open-window S
    c. *Alt:* no stronger alternative
    d. *SI:* no relevant SI
    e. *Psp:* □$_{imp}$(you-open-window S → you-open-window EP)
    f. b&d&e = □¬ S & □(S→EP) = consistent

2.4 Obviation of the Aspectual Restriction and (Non-)Intentionality

Verbs like 'fall' and 'forget' can be viewed as lexically marked for non-intentionality. Thus, they are incompatible with *int* and the Aspectual Restriction is never observed with such verbs. With other verbs, like 'open' and 'tell', *int* is present only if it is compatible with the context (see below). (24) shows that the contradiction responsible for the Aspectual Restriction does not arise when *int* is absent.

(24) a. 'not open-P window!'
    b. *Assert:* □$_{imp}$ ¬ you-open-window EP
    c. *Alt:* □$_{imp}$ ¬ you-open-window S (= imperfective)
    d. *SI:* ¬ □$_{imp}$ ¬ you-open-window S ≡ ◊$_{imp}$ you-open-window S
    e. No *int*
    f. b&d&e = □¬EP & ◊S = consistent

An anonymous reviewer asks an important question about how the conversational context determines the presence/absence of the *int*-operator with verbs like 'open' and 'tell'. I don't have a fully worked-out answer to this question. What follows is a promissory note. Recall from the previous section that *int* carries the presupposition that the agent controls the action from the start until the endpoint (this presupposition is responsible for the Aspectual Restriction). I postulated that in contexts that entail this presupposition, *int* is present, whereas in contexts that do

not entail the presupposition, *int* is absent. This situation is reminiscent of the Maximize Presupposition principle, which classically explains (among other things) the infelicity of the indefinite article in *I interviewed the/#a father of the victim* (Heim 1992). What I would like to propose is that cases in which the context satisfies the presupposition(s) of *int* but where *int* is absent are ruled out by Maximize Presupposition. On the other hand, cases in which the context does not entail the presupposition(s) of *int*, but *int* is present, suffer from a presupposition failure.[15] As desired, we are left with two possibilities: 'intentional' contexts with *int* and 'non-intentional' contexts with no *int*. It is important to underscore here that the Maximize Presupposition solution does not beg the question, as it might seem, given the fact that *int* in (20) is defined as an identity function with only one presupposition. As mentioned in fn 13 and further discussed at the end of Section 2.2, the contribution of *int* is complex. Taking *int* as a covert counterpart of *intentionally*, this point can be illustrated by the following observation: *intentional(ly)* is a multi-dimensional modifier that, in addition to the controllability of the action (captured in (20)), includes a pro-attitude toward the outcome of the action and the ability to foresee this outcome (see Egre 2014 and references cited therein).

One objection to the Maximize Presupposition solution may be that it is usually applied to cases of lexical competition (e.g., *the* vs. *a*) or with some controversy, lexical-null element competition (e.g., *too* vs. ∅). In the case of *int*, the competition seems to be between a covert operator and ∅. I can envisage two ways of replying to this objection. First of all, we can say that verbs like 'open' are ambiguous between '*int*-open' and '∅-open'. This ambiguity is manifested in pairs like *listen-hear, watch-see, murder-kill,* etc. The second (and probably more interesting) reply would be to redefine Maximize Presupposition in terms of scalar implicatures (e.g., Marty 2018) and invoke Gricean maxims. The observation that manner adverbs (including *intentionally/accidentally*) are scalar items goes back at least to Horn (1972). Assuming that *int* is a covert counterpart of *intentionally,* we can extend the scalar mechanism

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[15] Put differently, the meaning of a sentence in such cases will be undefined, if, following Heim (1992), we take the meaning as a partial function, i.e., a function defined only for contexts that entail the presuppositions of a given sentence.

responsible for contrasts like in (25) to the distribution of *int* and its interaction with *accidentally*. I leave the development of these ideas for future research, as they require a separate article.

(25)   a.   John spilled his coffee #intentionally/accidentally, if (he did it) at all.
       b.   John didn't spill his coffee intentionally/#accidentally, if (he did it) at all.

Finally, before finishing this section, I would like to highlight one important advantage of the account of the obviation of the Aspectual Restriction sketched here: this account straightforwardly derives the 'warning' inference in cases like (4)/(24). As observed by Bogusławski (1985) (among others), imperatives like in (4)/(24) – 'not open$_P$ window!' – give rise to an inference that the speaker considers it possible that the addressee will (accidentally) open the window. In other words, (24) is uttered as a warning. This warning inference is calculated as a scalar implicature, (24d), which says that there is a world among the speaker's epistemic possibilities where you start opening the window.

3 An Argument Against a (Purely) Syntactic Account

3.1 Despić (2016, to appear)

Despić (2016, to appear) puts forward a purely syntactic account of the Aspectual Restriction and exceptions to it with non-intentional actions. His account uses the following assumptions. First, there is an Agree-relation between the imperative (*imp*) and the inflection on the verb (in Asp). Second, the imperfective aspect is located above *v*P, whereas the perfective aspect is below *v*P (e.g., Svenonius 2004). Third, *imp* cannot scope below negation (Han 1999, Zeijlstra 2006). Fourth, the Phase Impenetrability Condition (PIC) is as defined in Chomsky (2001), i.e., the (complement of the) lower phase becomes unavailable for syntactic operations as soon as the higher phase head is merged.

Provided these assumptions, the derivation of positive imperatives are as in (26), where *imp* can Agree with both Asp1 and Asp2.

(26)   *Positive imperatives*
    a.   Otkryvaj okno! 'open$_{I.IMP}$ window' (RU)
       [$_{TP}$ *imp* [$_{AspP1}$ Asp1-I [$_{vP}$ *v* [$_{VP}$ ...]]]]]
       ------------^
    b.   Otkroj okno! 'open$_{P.IMP}$ window' (RU)
       [$_{TP}$ *imp* [$_{vP}$ *v* [$_{AspP2}$ Asp2-P [$_{VP}$ ...]]]]
       --------------------^

In negative imperatives, on the other hand, only the imperfective can Agree with *imp* (27a). This is because NegP is merged and *imp* is required to move to CP (the next phase up) to out-scope negation. As soon as C is merged, the complement of *v*P (including perfective aspect Asp2) is unavailable for Agree (27b).

(27)   *Negative imperatives*
    a.   Ne otkryvaj okno! 'not open$_{I.IMP}$ window' (RU)
       [$_{CP}$ *imp* [$_{NegP}$ Neg [$_{TP}$ T [$_{AspP1}$ Asp1-I [$_{vP}$ *v* [$_{VP}$ ...]]]]]]]
       -------------------------------^
    b.   *Ne otkroj okno! 'not open$_{P.IMP}$ window' (RU)
       [$_{CP}$ *imp* [$_{NegP}$ Neg [$_{TP}$ T [$_{vP}$ *v* [$_{AspP2}$ Asp2-P [$_{VP}$ ...]]]]]]]
       ---------------------*-----------------^

According to this system, the obviation effect with non-intentional actions is explained as follows: in non-intentional configurations, *v*P is a weak phase (or a non-phase) and thus PIC does not preclude Agree between *imp* and Asp2-P. This is schematized in (28):

(28)   Ne upadi! 'not fall.down$_{P.IMP}$' (RU)
    [$_{CP}$ *imp* [$_{NegP}$ Neg [$_{TP}$ T [$_{vP}$ *v*-weak [$_{AspP2}$ Asp2-P [$_{VP}$ ...]]]]]]]
    --^

3.2 Arguments Against a Purely Syntactic Account
One immediate problem with the system sketched in Section 3.1 is that it can only account for the exceptions to the Aspectual Restriction with lexically non-intentional verbs like 'fall' and 'forget' (3). It is plausible to claim that, in constructions with verbs that are low on the agentivity scale, like unaccusatives or psych-verbs, *v*P is a weak phase (or a non-

phase). It is much less plausible to claim the same thing for transitive agentive verbs like 'open' and 'tell' when they are used in de-intentionalizing contexts like (4). But we saw that in (4) the Aspectual Restriction is circumvented as well. Despić (2016, to appear) cannot explain cases like (4) without making undesirable stipulations about the dependence of *v* on the context.

A more fundamental problem is that, in addition to negative imperatives, other constructions show the same Aspectual Restriction, at least in Russian. This is illustrated for negated strong deontic modals in (29a). Interestingly, PL and BCS do not exhibit the Aspectual Restriction with strong deontic modals, (29b-c). I return to this cross-Slavic variation in Section 4.

(29)   *Strong deontic modals under negation*
    RU   a.   Ivan ne   dolžen uxodit'/*ujti.
               Ivan not   obliged leave$_{I.INF/-P.INF}$
               'Ivan doesn't have to leave.'
    PL   b.   Ivan nie musi iść/wyjść.
               Ivan not must leave$_{I.INF/-P.INF}$
               'Ivan doesn't have to leave.'
    BCS c.   Ivan nije   dužan odlaziti/otići   kući.
               Ivan not$_{AUX}$ obliged go$_{I.INF/-P.INF}$ home
               'Ivan doesn't have to go home.'

Extending the syntactic analysis of the Aspectual Restriction to deontics derives the correct results for PL and BCS, but not RU, as schematically shown in (30). This is because the syntactic analysis crucially depends on *imp* moving above negation to CP (for scopal reasons). No such movement is necessary for deontic modals, which in Slavic scope below negation. In this objection, I put aside the question why deontics need to Agree with Asp in the first place. For imperatives, Agree can be morphologically motivated, as the same morpheme spells out *imp* and Asp. In deontic constructions, however, Asp is spelled out on the lexical verb, not the deontic modal.

(30)   *A purely syntactic account predicts no Aspectual Restriction with*
    deontic modals (correct for PL/BCS; wrong for RU)

a.   [$_{CP}$ C [$_{NegP}$ Neg [$_{TP}$ have-to [$_{AspP1}$ Asp1-I [$_{vP}$ v [$_{VP}$ ...]]]]]]
         ------ ----------^

b.   [$_{CP}$ C [$_{NegP}$ Neg [$_{TP}$ have-to [$_{vP}$ v [$_{AspP2}$ Asp2-P [$_{VP}$ ...]]]]]]
                ------------------------^

3.3 Does the semantic/pragmatic account score better?
We saw above that, on the semantic/pragmatic account, lexical and contextual exceptions to the Aspectual Restriction are explained uniformly by the absence of the *int* operator. Therefore, the semantic/pragmatic account is not subject to the first objection.

What about the second objection? Under the semantic/pragmatic account, the Aspectual Restriction with strong deontics in Russian receives the same analysis as with imperatives, with one additional assumption: namely, that the deontic flavor is compatible only with the intentional interpretation of the action (e.g., Knobe & Szabó 2013).[16]

The derivation of the Aspectual Restriction with strong deontic modals is shown in (31).[17] It is easy to see that its explanation is parallel to that of the Aspectual Restriction for negative imperatives (22). I leave it to the readers to convince themselves that the use of the imperfective with a negated strong deontic modal does not result in contradiction (parallel to (23)).[18]

(31)   a.   *'Ivan not obliged.to *int* leave-P'

---

[16] A qualification is needed here: the intentionality of the action with deontics holds only when obligations are relativized to the agent of the action, which is not the case in examples like (i). I thank Hedde Zeijlstra for bringing up this point.
   (i)   (A parent to a babysitter:) The children must be in bed by 8 o'clock.

[17] I show the computations only for the '¬☐$_{deon}$' parse. The '☐$_{deon}$ ¬' parse is identical to the imperatives discussed in (22).

[18] An immediate prediction here is that weak/existential deontic/root modals are allowed with both I and P in Russian. This prediction is borne out; see (i) and Rappaport (1985), Hudin (1994), de Haan (2002), etc.
   (i)   (According to the prison regulations...)
            RU   Ivan ne možet   ottuda   zvonit'/pozvonit'.
                  Ivan not possible from.there call$_{I.INF/P.INF}$
                  'Ivan is not allowed to call from there.'

b.   *Assert:* ¬ ☐_{deon} Ivan-leave EP

c.   *Alt:* ¬ ☐_{deon} Ivan-leave S

d.   *SI:* ¬ ¬ ☐_{deon} Ivan-leave S ≡
    ☐_{deon} Ivan-leave S

e.   *Psp of int:* ☐_{deon} (Ivan-leave S → Ivan-leave EP)

f.   b&d&e = ◊ ¬EP & ☐S & ☐(S→EP) = ⊥

4   In Lieu of a Conclusion

This paper discussed the Aspectual Restriction and exceptions to it in negative imperatives in Slavic. Building on the intuitions outlined in previous work, I proposed a formalization of the Aspectual Restriction in terms of semantics/pragmatics. I also showed that a purely syntactic account of the phenomena in question cannot be successful.

One strong argument against a purely syntactic account comes from the observation that in some Slavic languages the Aspectual Restriction is also observed with strong deontic modals. The parallel behavior of strong deontics and imperatives is not unexpected. In many accounts, deontics and imperatives receive similar treatment (e.g. Han 1999, Ninan 2005, Kaufmann 2012). The challenge is to explain why some Slavic languages (like Russian, (2a) and (28a)) show the Aspectual Restriction with both strong deontic modals and imperatives, whereas other Slavic languages (like Polish and Bosnian/Croatian/Serbian, (2b-c) and (29b-c)) show the Aspectual Restriction only with imperatives. In the remainder of the conclusion, I briefly outline how the challenge presented by this cross-Slavic variation can be addressed.

In particular, I would like to suggest that the observed difference between Slavic languages is due to the differences in their aspectual systems. Slavic aspect is a complex topic and I will not be able to do justice to the vast literature on this subject. However, I would like to point out that there are accounts that try to systematize aspectual phenomena across Slavic languages. One such account is the so-called East-West Theory of Slavic aspect. According to this theory, there is a systematic difference between Eastern Slavic languages (Russian, Ukrainian, Belarus) and Western Slavic languages (Serbian, Czech,

Slovenian, etc.), with some mixed cases (Polish, Bulgarian, Macedonian); see Fortuin and Kamphuis (2015) for a recent review. The difference can be summarized as follows: **In the Eastern group,** "… the meaning of the pfv is made up of three 'layers': (a) the event expressed by the predicate is terminative; (b) the event is seen as a totality [...] such that there is a change of situation; (c) the event expressed by the pfv verb is sequentially connected to a following and/or preceding situation." (Fortuin & Kamphuis 2015: 165) In the Western group, perfective only needs to satisfy (a) and (b).

I would like to suggest that the difference between Russian, on the one hand, and Polish and Bosnian/Croatian/Serbian, on the other hand, with respect to the Aspectual Restriction in deontic and imperative constructions is due to the (c)-condition on the use of the perfective. In imperatives (by their nature), the sequential connection to a following situation (the (c)-condition) is present in both Eastern and Western Slavic languages (Bogusławski 1985, Han 1999, a.o.). This makes Western Slavic languages look superficially like Eastern Slavic languages with regard to imperatives. Deontics, on the other hand, do not require sequential connection, which creates a difference between Eastern and Western Slavic languages in negated deontic constructions. Suppose that the sequential connection to the following situation goes hand-in-hand with SI generation in the aspectual system. Recall that in this paper I argued that SI of the perfective is responsible for the Aspectual Restriction. This line of reasoning will correctly account for the fact that the Aspectual Restriction with imperatives exists in both Eastern and Western Slavic groups, whereas the Aspectual Restriction with strong deontics is only active in the Eastern group. I leave further investigation of this line of reasoning for future research.

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On Adverbial Mirative Clauses in Polish[*]

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The core aim of this article is to examine adverbial infinitive clauses in Modern Polish headed by the complementizer *żeby*. The main focus is on purpose and mirative clauses. Essentially, I argue that, although these clause types do not differ on the surface, they exhibit two distinct A-bar dependencies with respect to the matrix clause. Main evidence for this claim comes from movement to the left periphery, sensitivity to negation, and licensing conditions of the discourse particle *chyba* 'presumably'. Diachronically, I argue that mirative clauses developed out of purpose clauses, resulting in two distinct attachment heights. As it turns out, these two structural positions give rise not only to interpretative differences, but also account for the syntactic differences observed between clause types.

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1 The Puzzle

Descriptively, three types of dependent clauses are usually distinguished: (i) complement clauses, (ii) adverbial clauses, and (iii) relative clauses. In Polish, all three types can be introduced by the complex complementizer *żeby*, which consists of the declarative complementizer *że* 'that' and the subjunctive clitic *-by* (for a general overview the interested reader is referred to Orszulak 2016):[1]

(1) Chcę,   żeby Anna przeprowadziła się do Paryża.
    want₁SG COMP Anna move*l*-PTCP.3SG.F REFL to Paris
    'I want Anna to move to Paris.'

(2) Anna uczy   się, żeby zdać   egzamin.
    Anna learn₃SG   REFL COMP pass_INF exam
    'Anna is learning to pass the exam.'

(3) dzieci to   nie króliki żeby były   do pary²
    children it   NEG rabbits COMP be*l*-PTCP.3PL.N-VIR to pair
    'children are not rabbits who/which could be paired'

In (1), *żeby* introduces a complement clause embedded under the desiderative predicate *chcieć* 'want'. (2) exemplifies the embedding of an infinitive adverbial clause expressing a purpose. Finally, in colloquial (spoken) Polish, *żeby* can also introduce relative clauses. In (3), the DP *króliki* 'rabbits' is modified by a following *żeby*-clause with a clear relative clause shape, as *żeby* can be replaced by the canonical relative pronoun *które* 'which'. According to the generative mainstream literature on Polish complex clauses going back to Tajsner (1989), Willim (1989), Bondaruk (2004), among many others, I take *żeby* in (1)-(3) to be a complex C-head. Alternatively, one could argue for a more fine-grained C-layer analysis along the lines of Rizzi (1997) and postulate two

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[1] The following abbreviations are used in this article: 1/2/3–1st/2nd/3rd person, ACC–accusative, COMP–complementizer, DAT–dative, F–feminine, IMPER–imperative, INF–infinitive, *l*-PTCP–*l*-participle (inflected for number and gender), M–masculine, N-VIR–non-virile, NEG–negation, NON-PST–non-past tense, PL–plural, PST–past tense, REFL–reflexive, SG–singular, TOP–topic, VIR–virile.
[2] I extracted this example from *Narodowy Korpus Języka Polskiego* 'National Corpus of Polish' (http://nkjp.pl/).

different structural positions – one for *że* and one for *-by* – within the C-domain, as Szczegielniak (1999) does. As nothing hinges on this point with regard to my concerns, I will not dwell on it here. What is more crucial in the context of the discussion in the present article is the question of what types of adverbial clauses *żeby* can introduce.

In this article, I zero in on infinitive adverbial clauses, leaving both complement and relative clauses out of consideration. Crucially, *żeby* can introduce infinitive adverbial clauses. (2) is usually analyzed as a purpose clause (cf. Schmidtke-Bode 2009). However, there is another infinitive adverbial clause type that can be headed by *żeby* as well:[3]

(4) Anna uczyła   się   przez cały   rok,
    Anna learn*l*-PTCP.3SG.F REFL through entire year
    żeby i   tak nie zdać   matury.
    COMP and   so NEG pass*INF* school.leaving.exam
    'Anna learned all year, only to not pass the school leaving exam anyway.'

To my knowledge, Leys (1971, 1988) was the first to discuss similar examples in German and labeled them as prospective clauses, mainly based on a chronological relationship between the matrix and embedded clauses. This relationship requires the event encoded in the embedded clause to follow the event encoded in the matrix clause. Later on, Pauly (2013, 2014), applying different syntactic criteria, concluded that prospective clauses in German are structurally unintegrated adverbial clauses, i.e., subordinate clauses exhibiting no syntactic integration dependency with respect to the matrix clause. Johnston (1994: 213-223)

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[3] An adverbial infinitive *żeby*-clause can also have a counterfactual interpretation:
   (i) Ten   egzamin jest   zbyt   trudny, żeby go   zdać.
       this   exam   be3SG   too   difficult COMP him*ACC* pass*INF*
       'This exam is too difficult to pass.'
The example given in (i) can be paraphrased as follows: If one were able to pass this exam, it would not be as difficult as it is. The counterfactual reading seems to come about from the presence of the degree *zbyt*-phrase ('too'-phrase) in the matrix clause; for more details see von Stechow (1984), Meier (2000, 2003), Hacquard (2005), and Nissenbaum and Schwarz (2008, 2011). I am not concerned with such cases in the present article. Nor do I deal with other *żeby*-clauses, e.g., those with resultatives.

and Whelpton (1995, 2001),[4] unnoticed by Pauly (2013, 2014), analyzed similar examples in English as TP adjuncts. In the following, I provide empirical evidence from Polish for this claim and show that Pauly's account should be abandoned. Remarkably, studies dealing with mirative clauses in Slavic languages are missing, although they, as the following examples illustrate, exist:

(5) Czech (Radek Šimík, p.c.)
    a. purpose clause:
        Marie si   koupila   deštník, aby nez mokla.
        Marie REFL buy*l*-PTCP.3SG.F umbrella COMP NEG get.wet*l*-PTCP.3SG.F
        'Marie bought an umbrella in order not to get wet.'
    b. mirative clause:
        Marie   si koupila   deštník,
        Marie   REFL buy*l*-PTCP.3SG.F umbrella
        jen   aby ho pak zapomněla   doma.
        only[5] COMP it   then forget*l*-PTCP.3SG.F at.home
        'Marie bought an umbrella only to forget it at home.'

(6) Russian (Polina Berezovskaya, p.c.)
    a. purpose clause:
        Ona vzjala   s   soboj zont,
        she   take*l*-PTCP.3SG.F with REFL umbrella
        čtoby ne promoknut'.
        COMP NEG get.wetINF
        'She took an umbrella to not get wet.'

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[4] Whelpton (1995, 2001) uses the label *telic clauses*. I analyze examples like (4) as mirative clauses in the sense claimed by DeLancey (1997, 2001, 2012). Mirativity as a grammatical category refers to sentences reporting information that is new or surprising to the speaker.
[5] Some speakers do not accept mirative clauses if the focus/mirative particle *jen* 'only' is absent. Its presence/absence may vary from language to language and from speaker to speaker. Due to the lack of space, I do not dwell on this issue here.

   b. mirative clause:
      Ona postavila   zont   rjadom s   soboj,
      she   put$_{l}$-PTCP.3SG.F umbrella next   with REFL
      ego   vsjo-taki zabyt'.
      him$_{ACC}$ after.all forget$_{INF}$
      'She put the umbrella right next to herself only to forget it
      anyway.'

Interestingly, Polish *żeby*, Czech *aby*, and Russian *čtoby* are able to introduce both purpose and mirative clauses. However, this is not a universal hallmark of natural languages. In Japanese, for example, purpose complementizers cannot head mirative clauses:

(7) Japanese (Shinya Okano, p.c.)
    *Juliawa wasure.ru   yoo(-ni)/tame(-ni) kasa-o   kat.ta.
    Julia$_{TOP}$ forget$_{NON-PST}$ in.order.to   umbrella$_{ACC}$ buy$_{PST}$
    Intended meaning: 'Julia bought an umbrella in order to forget it.'

To render their meaning, one is forced to use dedicated adverbials, e.g. *odoroi.ta kotoni* 'to my surprise':

(8) Japanese (Shinya Okano, p.c.)
    Johnwa seichoo.shite odoroi.ta kotoni gengogakusha ninat.ta.
    John$_{TOP}$ grew.up$_{COMP}$ to.my.surprise   linguist   become$_{PST}$
    'John grew up (only) to become a linguist.'

It is the central aim of the present article to investigate properties of purpose and mirative adverbial clauses in Polish. Mainly, I argue that although they do not differ on the surface, they constitute two distinct clause types. Whereas purpose clauses are taken to be low adjuncts exhibiting no derivational restrictions, mirative clauses are analyzed as TP adjuncts frozen in their base position. Different arguments are discussed to underpin this view.

    This paper is structured as follows. In Section 2, I examine both purpose and mirative adverbial clauses in Polish at the syntax-semantics interface. In doing so, I focus on selected differences between both clause types and, contrary to Pauly (2013, 2014), I argue that mirative

clauses are structurally more integrated into their host clause than their purpose counterparts are. An account is presented in Section 3, which also explains where the differences noted in Section 2 come from. Finally, Section 4 furnishes the main results.

2 Purpose vs. Mirative Clauses in Polish

Purpose and mirative clauses have several properties in common. They are headed by the complementizer *żeby* and contain an infinitive verb form. Usually, they exhibit subject control; i.e., their embedded subject, PRO, has to be co-referential with the matrix subject. Finally, the temporal reference of the adverbial clause depends on the temporal reference of the matrix tense (= relative tense in the sense claimed by Comrie 1985). However, both clause types also differ in many respects. It is the central aim of this section to elaborate on these differences.

2.1 Syntax
2.1.1 Left Periphery. Only purpose clauses can occur on the left periphery of the matrix clause:

(9) a. purpose clause:
         Żeby nie zmoknąć, Anna kupiła   parasol.
         COMP NEG get.wetINF Anna buy*l*-PTCP.3SG.F umbrella
         'Anna bought an umbrella to not get wet.'
     b. mirative clause:
       *Żeby i   tak nie zdać   matury,
         COMP and so NEG passINF school.leaving.exam
         Anna uczyła   się   przez cały   rok.
         Anna learn*l*-PTCP.3SG.F REFL   through entire year
         Intended meaning: 'Anna learned all the year only to not pass the school leaving exam anyway.'

Mirative clauses lose their meaning in the left periphery of the matrix clause and are automatically interpreted as purpose clauses. Pittner (2016: 515) accounts for this restriction assuming that mirative clauses have to follow their host clause, as the embedded event has to follow the matrix event. I will elaborate on this restriction in Section 3 and show that it needs to be strengthened.

2.1.2 Negation. Interestingly, purpose clauses can occur in the scope of a negation marker. Mirative clauses, on the other hand, cannot be negated. The presence of a negation turns them into purpose clauses:

(10) a. purpose clause:
    Anna przeprowadza się   do Paryża, nie żeby świętować,
    Anna move_{3SG}   REFL to Paris   NEG COMP celebrate_{INF}
    ale żeby uczyć się   francuskiego.
    but COMP learn_{INF REFL}   French
    'Anna is moving to Paris not to party all the time, but to learn French.'

  b. mirative clause:
    Łukasz uczył   się długo do egzaminu, nieżeby
    Łukasz learn_{l-PTCP.3SG.M REFL} long to   exam   NEG COMP
    go   później nie zdać, ale żeby i   tak wszystko
    him_{ACC} later   NEG pass_{INF} but COMP and so all
    zapomnieć.
    forget_{INF}
    Intended meaning: 'Łukasz learned for an exam for a long time not only to fail later, but to forget everything anyway.'

The pair in (10) clearly illustrates that purpose and mirative clauses merge at different heights (for more details see Section 3 below).

2.1.3 Correlate. It is possible for purpose clauses to anaphorically refer to the correlative element *dlatego* 'therefore' occurring in the matrix clause, whereas this possibility is ruled out for mirative clauses:

(11) a. purpose clause:
    Anna przeprowadza się   [dlatego]_i   do Paryża,
    Anna move_{3SG}   REFL therefore   to Paris
    [żeby uczyć się francuskiego]_i.
    COMP learn_{INF REFL} French
    'Anna is moving to Paris to learn French.'

    b. mirative clause:
     *Anna uczyła   się [dlatego]$_i$ przez cały   rok
     Anna learn$_{l\text{-PTCP.3SG.F}}$ REFL therefore through entire   year
     [żeby i   tak nie zdać   matury]$_i$.
     COMP   and so NEG pass$_{INF}$ school.leaving.exam
     Intended meaning: 'Anna learned all year only to not pass the
     school leaving exam anyway.'

As the correlate *dlatego* 'therefore' can only refer to a purpose or reason, both missing in the compositional meaning of a mirative clause, the ill-formedness of (11b) straightforwardly follows.

2.1.4 Question-Answer Pairs. As Pauly (2013: 146) shows for German, purpose clauses can be questioned by using an appropriate purpose *wh*-word. A similar situation can be observed in Polish:

(12) A: Po co   Anna   przeprowadza się   do Paryża?
         for.what.purpose Anna   move$_{3SG}$ REFL to Paris
         'Why is Anna moving to Paris?'
     B: Żeby uczyć się   francuskiego.
         COMP   learn$_{INF}$ REFL   French
         'To learn French.'

Mirative clauses, on the other hand, cannot be used as an answer to any *wh*-question, as there is no appropriate *wh*-word corresponding to their meaning.

2.1.5 Discourse Particle *Chyba* 'Presumably'. According to *Słownik Współczesnego Języka Polskiego* 'Dictionary of Modern Polish' (1998), *chyba* 'presumably' is defined as follows:

  chyba: tym słowem mówiący sygnalizuje, że nie wie czegoś dokładnie, nie jest czegoś pewien, ale decyduje się to powiedzieć, sądząc, że to prawda; przypuszczalnie; być może, prawdopodobnie, bodaj (117)
  'using this word, the speaker signals that (s)he doesn't know something exactly, that (s)he is not certain about something, but at the same time (s)he decides to say it, claiming it is true; assumedly; maybe, probably, perhaps' [my translation: ŁJ]

Consider the example given in (13) illustrating the use of *chyba* in a root declarative clause:

(13) Chyba   jest pani niesprawiedliwa.
        presumably be$_{3SG}$ lady unjust
        'Miss, presumably you are unjust.'

Using the discourse particle *chyba* 'presumably', the speaker establishes a particular common ground relationship among discourse interlocutors. Concretely, the speaker indicates that her/his commitment towards the truth of what is embedded is speculative. Accordingly, I analyze *chyba* as a modifier of assertive speech acts, contributing to a weaker commitment of the speaker to the proposition; cf. Zimmermann (2004, 2011) for a similar analysis of the German discourse particle *wohl* 'presumably'.

(14)   Meaning of *chyba*(p):
       $[[chyba\ p]] = f^w$ assume(x, p), whereby x = speaker

Chyba is ruled out in information-seeking questions and imperatives:

(15) a. *Jesteś chyba   niesprawiedliwa?
          be$_{2SG}$ presumably unjust
          Intended meaning: 'Are you presumably unjust?'
    b. *Bądź   chyba   niesprawiedliwa!
          be$_{2SG.IMPER}$ presumably unjust
          Intended meaning: 'Be presumably unjust!'

In other words, *chyba* is excluded in non-assertive speech acts. To the best of my knowledge, not much is known about licensing conditions of *chyba* in Polish (infinitive) adverbial clauses. The following two corpus examples illustrate that purpose *żeby*-clauses can host *chyba*:

(16) a. A   tu   ktoś   wybił   dziurę w ścianie,
          and here   someone stave.in*l*-PTCP.3SG.M hole_ACC in   wall
          żeby   chyba   mieć   podgląd co   my tu   mamy.
          COMP   presumably   have_INF preview   what we   here   have_1PL
          'And here someone made a hole in the wall to, presumably, be
          able to see what we have here.'

                                        (NKJP, *Dziennik Zachodni*, 26/11/1999)

      b. Zrobili   mi   wyniki z   krwi,
          make*l*-PTCP.3PL.VIR me_DAT   results from   blood
          żeby   chyba   wykluczyć   zatrucie   ciążowe.
          COMP   presumably   exclude_INF pregnancy toxemia
          'They did blood tests on me in order to, presumably, exclude a
          pregnancy toxemia.'   (NKJP, internet forum, 22/05/2003)

Mirative clauses disallow *chyba* taking sentential scope, regardless of
which position it occupies in the embedded clause:

(17) Anna uczyła   się   przez cały   rok,
      Anna learn*l*-PTCP.3SG.F REFL   through entire year
      żeby (*chyba)   i   tak (*chyba)   nie
      COMP presumably   and   so presumably   NEG
      zdać   (^OKchyba)   matury.
      pass_INF   presumably   school.leaving.exam
      Intended meaning: 'Anna learned all the year only to (presumably)
      not pass (presumably) the school leaving exam (presumably)
      anyway.'

The incompatibility of *chyba* in (17) follows from the compositional
meaning of the mirative clause and the discourse particle *chyba*. I
elaborate on this issue in more detail in Section 3. However, there is one
reading where the derivation does not crash. This is the case if *chyba*
takes a narrow scope and quantifies over a set of objects, and not over a
set of propositions. In other words, the speaker knows that Anna did not
pass the exam, but (s)he does not know what exam it was. By being
uncertain about this, (s)he uses *chyba* presupposing and scoping over a
set of alternative exams. Note, however, that discourse particles scoping
over non-sentential constituents do not reveal any information about the

compositional meaning of a particular adverbial clause, as such scenarios are to be expected to occur in all kinds of adverbial clauses.

The selected differences between purpose and mirative clauses can be summarized as follows:

	Property	Purpose clause	Mirative clause
1.	Left periphery	+	-
2.	Negation	+	-
3.	Correlate	+	-
4.	Question-answer pairs	+	-
5.	Discourse particle *chyba*	+	-

Table 1: Selected differences between purpose and mirative clauses in Polish

As the next sections show, these differences straightforwardly follow from the compositional meaning of each clause type.

2.2 Semantics

Purpose clauses and mirative clauses differ semantically, as well. Schmidtke-Bode (2009) observes that cross-linguistically, the former are intentional, target-oriented and do not presuppose the truth value of the embedded proposition. Compare (2) with (4), repeated below for convenience:

(2) Anna uczy   się, żeby zdać   egzamin.
     Anna learn3SG REFL   COMP passINF exam
     'Anna is learning to pass the exam.'

(4) Anna uczyła   się przez cały   rok,
     Anna learnl-PTCP.3SG.F REFL   through entire   year
     żeby i   tak nie zdać   matury.
     COMP and so NEG passINF school.leaving.exam
     'Anna learned all the year only to not pass the school leaving exam anyway.'

As for the purpose clause, the matrix verbal situation (= Anna's learning) is performed with the intention of bringing about another situation (= passing the exam). No such intentionality can be observed with regard to the mirative clause in (4). It is not the purpose of Anna's learning to not pass the exam. Instead, the speaker reports two chronological events, whereby the event encoded in the embedded clause appears to be unexpected or surprising. Relatedly, the matrix verbal situation is target-oriented in (2), whereas in the mirative clause this property is missing altogether. Finally, purpose clauses by definition do not require the desired result to come about, as not every intention is successfully realized by action. In other words, it remains open whether Anna will pass the exam. Mirative clauses, on the other hand, inherently presuppose the truth value of the embedded proposition. Accordingly, it follows from (4) that Anna did not pass the exam. To illustrate this contrast, consider the following ambiguous sentence:

(18) Anna wyjechała   do USA,   żeby wyjść za mąż,
      Anna head.off$_{l\text{-PTCP.3SG.F}}$ to   USA $_{COMP}$ get.married$_{INF}$
      ale ja w   to   nie wierzę.
      but I   in   this $_{NEG}$ believe$_{1SG}$
      'Anna headed off to the USA to get married, but I don't believe it.'
    #'Anna headed off to the USA only to get married (anyway), but I don't believe it.'

(18) can be interpreted as either a purpose or mirative clause. That the mirative clause presupposes the truth value of the embedded proposition follows from the observation that speaker cannot question it, whereas no such restriction occurs in the purpose clause interpretation. Here, the speaker still does not know whether Anna got married or not.
How these differences can be represented in a formal way is presented in the next section.

3 Toward a New Account

We have seen so far that purpose and mirative clauses substantially differ at the syntax-semantics interface. In this connection, the question of how we can account for these differences needs to be addressed.

Pauly (2013), who investigates prospective clauses in German, assumes that both purpose and mirative clauses adjoin to the matrix VP:
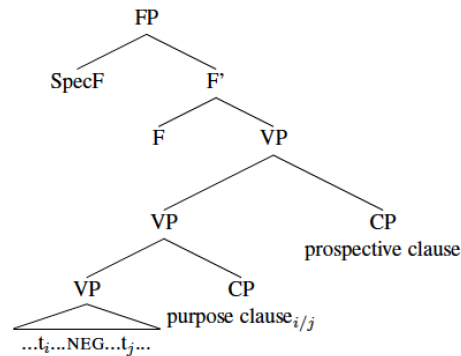
Fig. 1: Attachment positions of purpose and mirative clauses according to Pauly (2013)

This proposal runs into many problems, however. Firstly, it does not explain why mirative clauses cannot move to the left periphery, whereas purpose clauses can, and what would block the movement in the former case. Secondly, Pauly (2013, 2014) illustrates that variable binding into a prospective clause is possible. But if it is taken to be a syntactically unintegrated clause, then we should expect the reverse scenario (cf. Haegeman 2006 and her subsequent work). Hence, the argument of being unintegrated cannot be valid and is not deemed to be a possible explanation for the left periphery restriction. Thirdly, unintegrated clauses are supposed to be able to host discourse particles, as they possess their own illocutionary force (cf. Frey 2011, 2012). But, again, this is not the case for mirative clauses; cf. (17) above. Therefore, in what follows I propose a different analysis – mainly based on Johnston (1994) and Whelpton (1995, 2001) – and claim that mirative clauses are integrated adverbial clauses, and that their syntactic restrictions follow from their semantics.

Syntactically, I assume both purpose and mirative clauses are CPs. In either case, the complementizer *żeby* is a C-head. SpecCP hosts an adverbial clause operator taking a modal base, which is evaluated against a conversational background in the possible worlds semantics developed

by Kratzer (1981, 1991, 2012). Purpose clauses are vP adjuncts, while mirative clauses are TP adjuncts:
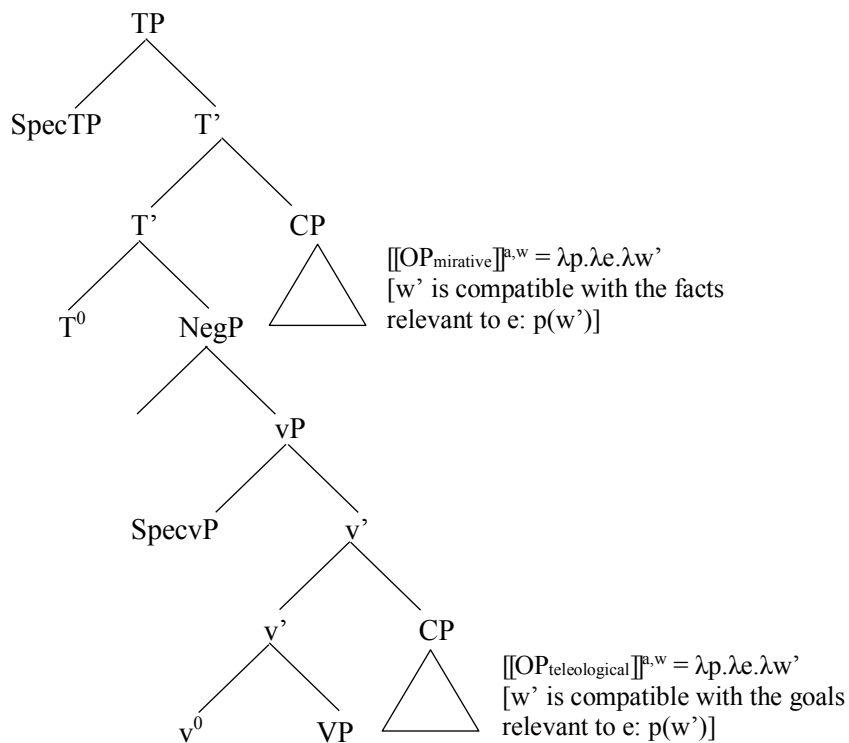
Fig. 2: Merge positions of purpose and mirative clauses

$[[OP_{mirative}]]^{a,w} = \lambda p.\lambda e.\lambda w'$
$[w'$ is compatible with the facts relevant to e: $p(w')]$

$[[OP_{teleological}]]^{a,w} = \lambda p.\lambda e.\lambda w'$
$[w'$ is compatible with the goals relevant to e: $p(w')]$

Essentially, I argue that mirative clauses emerge out of purpose clauses. Accordingly, we first need to examine purpose clauses. Nissenbaum (2005: 12)[6] characterizes them as modal expressions of desire denoting a

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[6] Nissenbaum (2005) distinguishes between VP-internal purpose clauses containing a gap bound to the matrix object, on the one hand, and VP-external rationale clauses being not dependent on the matrix clause, on the other. Based on English data, he shows, for example, that purpose clauses are incompatible with *in order* (see also Faraci 1974 and Huettner 1989 for more details). Note that in the present paper I label *żeby*-clauses – for the sake of convenience – as purpose clauses throughout if

relation between the aim that it expresses and the situation/eventuality that it holds of. It is therefore reasonable to assume purpose clauses take a circumstantial modal base and have a teleological conversational background, which can be spelled out as follows:

(19) a. $[[OP_{teleological}]]^{a,w} = \lambda p.\lambda e.\lambda w'$ [w' is compatible with the goals relevant to e: p(w')]
      b. *In view of goals*: function *f* which assigns sets of propositions to members of *W*, such that for any world $w \in W: f(w) \cap p \subseteq q$ (= *f* assigns to every possible world a set of propositions in which *p* is achieved)

A circumstantial modal base concerns what is possible or necessary given a particular set of circumstances. In case of purpose clauses, it is specified by a teleological conversational background, i.e., by a set of worlds consistent with a set of information describing the achievement of a particular goal. Mirative clauses, on the other hand, take a doxastic modal base and are evaluated against a realistic conversational background:

(20) a. $[[OP_{mirative}]]^{a,w} = \lambda p.\lambda e.\lambda w'$ [w' is compatible with the facts relevant to e: p(w')]
      b. *In view of facts such and such kind*: function *f* which assigns sets of propositions to members of *W*, such that for any world $w \in W: w \cap f(w)$ (= *f* assigns to every possible world a set of propositions that are true in it)

A doxastic modal base is broadly associated with what the speaker believes to be true. In the case of mirative clauses, it is restricted by a realistic conversational background, i.e., by a set of worlds consistent with a set of propositions that are true in one of these worlds.

The change from (19) to (20) appears to be possible based on cases like in (18), whereby an ambiguity between a purpose and a mirative reading arises. Semantically, in the case of a purpose clause, one has to

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they express an intention, although they share some properties with rationale clauses, as well.

consider what is possible or necessary for achieving a particular goal (= getting married in 18). This corresponds to intentionality and target-directedness, as described in Section 2.2. However, this particular goal can be achieved iff q, i.e., the matrix predication, is true in a possible world too. Connecting p and q this way establishes a temporal relationship between them. To put it differently, the event time of p, t_2, has to follow the event time of q, t_1. I argue that this temporal relationship has been accommodated into the compositional meaning of mirative clauses, not only leading to syntactic constraints, as outlined in Section 2.1, but also resulting in a change of the modal base and of the conversational background. The temporal implicature accommodation triggers interpretative effects, as no intentionality, target-directedness, and hypothetical result state are involved in the meaning of a mirative clause. Following this line of reasoning, uttering a mirative clause, the speaker believes that p is true, resulting in a doxastic modal base. As the content of a mirative clause cannot be denied, a realistic conversational background is required to pick out every possible world containing a set of propositions that are true in such a world. This leads us to (21) and is in accord with the formal way that grammaticalization processes have been analyzed along the lines proposed by von Fintel (1996), Eckardt (2010), and Deo (2015). Accordingly, it is claimed that grammaticalization entails changes in the syntactic structure of a sentence and, based on the fact that syntactic structure guides semantic composition, it is expected that the compositional meaning of the sentence needs to change, as well, cf. Fig. 2 above.

If this account is on the right track, we should also be able to account for the differences observed between purpose clauses and mirative clauses, as briefly presented in Section 2.1. Recall that as opposed to purpose clauses, mirative clauses cannot move to the left periphery of the matrix clause, cannot be negated, and finally, cannot host the discourse particle *chyba* 'presumably'. These differences straightforwardly follow. Firstly, I assume purpose clauses to be vP adjuncts exhibiting no movement restrictions (cf. (9a)). This is mainly due to the fact that the temporal relationship of the purpose clause with regard to the matrix clause is an implicature and not a truth condition. Mirative clauses, in turn, are TP adjuncts frozen in their base position. The factivity of mirative clauses creates a *consecutio temporum* condition between the

matrix clause and the mirative clause preventing the latter from moving from its base position. This explains why the condition proposed by Pittner (2016: 515) is too weak, as in both cases, the embedded event has to follow the matrix event, but only in the case of mirative clauses is it a truth condition. Secondly, if we treat mirative clauses as TP adjuncts, we expect them not to be in the scope of the matrix NegP. They are structurally inaccessible (see Fig. 2). Finally, the account proposed here also provides an explanation for the licensing conditions of the discourse particle *chyba* 'presumably'. Concretely, the derivation in (18) crashes because the semantic contribution of *chyba*, i.e., speaker uncertainty, and the truth value of mirative clauses conflict with each other. As purpose clauses, on the other hand, do not presuppose the truth value of the embedded clause (=hypothetical result state), no compositional mismatch arises.

4 Conclusion

The main aim of this paper was to show that the complementizer *żeby* can introduce two distinct types of infinitive adverbial clauses in Modern Polish: namely, purpose clauses and mirative clauses. Based on selected criteria, I provided empirical evidence illustrating that both clause types differ at the syntax-semantics interface and that they, accordingly, ought to be associated with two distinct merge operations mirrored by divergent derivational timing. Diachronically, I outlined a scenario according to which mirative clauses evolve from purpose clauses. Heine and Kuteva (2002) note that purpose markers can develop into either infinitive markers (cf. *na* in Baka, *pur* in Seychellois Creole) or causal markers (cf. *uri* in To'aba'ita, *sɛ* in Twi). However, they are silent about the development described in the present contribution. If this account is on the right track, the line of reasoning suggested here instantiates a new cross-linguistic grammaticalization path. Finally, I argued that the (in)compatibility of discourse particles with particular adverbial clauses does not follow from the attachment heights of adverbial clauses. Rather, as the asymmetry between purpose and mirative clauses convincingly illustrate, it follows from the compositional meanings of both discourse particles and adverbial clauses. More in-depth studies underpinning this view are needed, however. I leave this issue for future work.

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Different Loci of NegP in Old Slavic[*]

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It has been noted that the locus of sentential negation (NegP) may vary across languages (Belletti 1990, Laka 1990, Ouhalla 1991, Zanuttini 1991, Pollock 1993, Haegeman 1995, a.o.). This paper argues that word order variations involving sentential negation in Old Slavic languages resulted from a parametric change from an AuxP-over-NegP structure to a NegP-over-AuxP structure.[1] In Section 1, I compare the different surface orders of the sentential negation marker *ne*, the *be*-auxiliary, and participles in Old Russian (OR), Old Church Slavonic (OCS), and Modern South Slavic (MSSl).[2,3] In Section 2, I propose syntactic structures in which NegP occupies distinct positions and explain how the

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[1] Abbreviations: ACC–accusative, AOR–aorist, AUX–auxiliary, BBL–birch bark letter, CL–clitic, COMP/C–complementizer, COND–conditional, Cz–Czech, DAT–dative, FUT–future, I–inflection, INF–infinitive, IP–inflectional phrase, MBg–Modern Bulgarian, MSSl–Modern South Slavic, NEG–negation, OBg–Old Bulgarian, OCS–Old Church Slavonic, OR–Old Russian, OSSl–Old South Slavic, PART–participle, PF–perfective, PL–plural, PRST–present, PRTCL–particle, REFL–reflexive, S-C–Serbo-Croatian, SG–singular, T–tense, TP–tense phrase.

[2] Old West Slavic data are not included in the current study, but the word order patterns involving negation in West Slavic languages are similar to those in Old East Slavic. Here, I only mention Modern West Slavic data when necessary.

[3] This study is mostly based on data from the corpus of *Old Novgorodian birch bark letters (BBL)* in Zaliznjak (2004) for colloquial OR, *Codex Zographensis* for OCS, and *The First Novgorod Chronicle* and *The Primary Chronicle* for formal OR.

surface orders are realized from these structures. In Section 3, I construct a diachronic scenario for the development of different syntaxes of negation in Slavic languages. Section 4 summarizes and concludes the discussion.

1 Surface Orders of Neg, Aux, and Part in OCS, OR, and MSSl

The syntactic position of negation can be identified based on the relative order of the negation marker and other constituents such as auxiliaries, main verbs, and clitics. In OR and OCS, *be*-auxiliaries are combined with active *l*-participles and passive participles, expressing perfect tense, conditional mood, and passive voice, as illustrated in (1):

(1) a.   perfect: *jesmĭ*$_{BE}$ *dalŭ*$_{l\text{-PART}}$ '(I) have given'
    b.   conditional: *byxŭ*$_{BE}$ *dalŭ*$_{l\text{-PART}}$ '(I) would give'
    c.   passive: *jestĭ*$_{BE}$ *vŭdanŭ*$_{PASS\text{-PART}}$ '(He/she/it) is given'

Perfect tense and passive voice utilize the same type of auxiliaries. The current discussion largely focuses on the word order with respect to the negation marker and the perfect/passive auxiliary. The conditional auxiliary's position is also included in the discussion in the case of OCS, but not for OR, because the conditional auxiliary generally shows peculiar distributional patterns as a particle-clitic in OR (see Section 2.5).

Chart (2) illustrates the distribution of different surface orders of the sentential negation marker *ne* (Neg), perfect/passive auxiliary (Aux), and active/passive participle (Part) in OCS, MSSl, and OR. Since sentential negation does not appear after a main verb in Slavic, four patterns are potentially available. First, in colloquial OR, best reflected in Old Novgorodian birch bark documents (OR$_{BBL}$), we observe the 'Aux-Neg-Part' order in (2a) and the 'Neg-Part-Aux' order in (2b), as exemplified in (3a) and (3b), respectively.

(2)		OCS	MSSl	OR$_{BBL}$	OR$_{chronicle}$
	a. Aux-Neg-Part	✓		✓	✓
	b. Neg-Part-Aux	✓		✓	✓
	c. Neg-Aux-Part	✓	✓		✓
	d. Part-Neg-Aux				

(3) a. ože   *jeste*   *ne*   *storogovale…*[4]
    if   be$_{PRST.2PL}$ not   concluded.a.bargain$_{PART}$
    'If you have not concluded a bargain…'
                (OR, *Gram. Psk.* 6, mid-13th c., Zaliznjak 2004: 515)

  b. *ne   vŭzęle   jesmĭ*   ni   věkŭšě ni *vidalŭ*   jego.
    not   taken$_{PART}$ be$_{PRST.1SG}$ not   squirrel not seen$_{PART}$ him
    'I have not taken a penny, and not even seen him.'
              (OR, *BBL* 736b, early 12th c., Zaliznjak 2004: 264)

In MSSl, 'Neg-Aux-Part' in (2c) is the only possible order, as shown by the Bulgarian data in (4). Serbo-Croatian also shows similar patterns.

(4) a. (Tja) *ne   beše   pročela*   knigata.
    she   not   be$_{PAST.3SG}$ read$_{PART}$ book.the
    'She had not read the book.'
  b. *(Tja) *ne pročela beše* knigata.
  c. *(Tja) *pročela ne beše* knigata.   (MBg, Pancheva 2008: 322)

In OCS manuscripts and formal OR texts (e.g., chronicles), all three orders (2a-c) are attested, as can be seen in (5) and (6), respectively. According to Verčerka (1989: 34), the 'Neg-Aux-Part' (2c) order is more productive than the (2a) and (2b) orders in OCS.

(5) a. jedinogo *jesi*   *ne*   *dokonĭčalŭ.*
    one   be$_{PRST.2SG}$ not   completed$_{PART}$
    'You have not completed one thing.' (OCS, *Zogr.*, Mark 10: 21)
  b. i   mĭně nikoliže *ne   dalŭ   jesi*   kozĭlęte…
    and   me$_{DAT}$ whatsoever not   given$_{PART}$ be$_{PRST.2SG}$ young goat
    'And you have not even given me a young goat…'
                  (OCS, *Zogr.*, Luke 15: 29)

---

[4] The placement of the auxiliary in second position in this example is ambiguous because the given auxiliary form *jeste* is arguably a second position enclitic. However, the Aux-Neg-Part order is also found with a non-clitic form of the auxiliary (see (11)).

   c.   i   jašte *ne   bišę   prěkratili* sę   dĭne ti…
       and if   not be$_{\text{AOR.Pf.3PL}}$ stopped$_{\text{PART}}$ REFL days those
       'And if those days had not been cut short…'

                                      (OCS, *Zogr.*, Matthew 24: 22)

(6) a. a knjazju *jesme*   zla *ne*   *stvorili* nikotorago že.
       and prince$_{\text{DAT}}$ be$_{\text{PRST.1PL}}$ evils not   done$_{\text{PART}}$ whatsoever PRTCL
       'And we have not done any evil things to the prince.'
                                     (OR, *Novgorod Chronicle*)

   b. ože *ne*   *blagoslovenŭ jestĭ*   ot   velikago sbora…
       as   not   blessed$_{\text{PART}}$ be$_{\text{PRST.3SG}}$ from great   cathedral
       'As it is not blessed from the great cathedral…'
                                     (OR, *Novgorod Chronicle*)

   c. zdě bo   *ne*   *sutĭ*   *učili*   apostoli…
       here as   not be$_{\text{PRST.3PL}}$ taught$_{\text{PART}}$ apostles
       'As here the apostles have not taught…'
                                    (OR, *Primary Chronicle*)

Finally, the 'Part-Neg-Aux' (2d) order is not attested in any of these languages.

2 The Syntactic Positions of NegP

2.1 Preliminaries

Here, I posit that a sentential negation marker in Slavic merges as the head of NegP (cf. Zanuttini 1997, Zeijlstra 2004). This is confirmed by the observation that whenever a verb, either finite or non-finite, raises to a position higher than NegP (e.g. C^0), the negation marker moves with the verb. For instance, a negation marker and a verb move as a single unit to the position immediately preceding a clausal clitic (which may be either a complementizer, a focus marker, a topic marker, or a pronominal clitic) to host the clitic. The OR$_{\text{BBL}}$ and OCS examples in (7a-b) containing negation and finite verbs (*vŭdasi* 'give', *posŭla* 'send') clearly illustrate this type of movement.[5]

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[5] I remain agnostic as to whether this movement is a PF operation or a syntactic process. In any case, it is clear the negation marker and the verb formulate a single unit *before* they move. Another possible question is whether Neg and V undergo

(7) a. *ne* *vŭdasi* li a posŭlju na tę…
    not give$_{PRST.2SG}$ if$_{CL}$ and send$_{FUT.1SG}$ to you$_{ACC}$
    'If you don't give, then I will send to you…'
            (OR, *BBL* 862, early 13th c., Zaliznjak 2004: 275)
  b. *ne* *posŭla* bo bŭ sna svoego vŭ mirŭ …
    not send$_{AOR.3SG}$ for god son self in world
    'For God did not send his son into the world …'
            (OCS, John 3.17, Pancheva 2008: 325)

Neg cannot be left behind by verb movement past Neg^0 because of the Head Movement Constraint (Travis 1984), which forbids head-to-head movement skipping intervening heads.

Slavic negation markers are proclitics, which constitute a single phonetic unit with the following verb. For instance, in Polish, which has penultimate stress, stress falls on the negation marker *nie* when *nie* is followed by a monosyllabic verb. This indicates that negation and the following verb syntactically and phonetically constitute a single unit (Migdalski 2017: 187).

The *be*-auxiliary, as a kind of verb, merges as the head of AuxP and undergoes head-to-head movement to functional projections, such as IP.[6] In OR$_{BBL}$, present tense forms of the *be*-auxiliary are second position enclitics, while in OCS they are arguably either second position or verb-adjacent enclitics (see Lunt 2001, Pancheva 2005). Future and past tense forms of the *be*-auxiliary are orthotonic (i.e., bear independent stress).

In some Slavic languages, negation attracts present tense forms of the *be*-auxiliary and together they fuse into a single morphological word (e.g., *ne + jesi = něsi*). Fused forms are only observed in languages that

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complex head movement or remnant phrasal movement. Given that no other element may intervene between Neg and V in OR$_{BBL}$, Neg and V are likely to constitute a complex head in OR$_{BBL}$. In OCS, Neg and V can be separated by other elements (see Section 2.2.2).

[6] Throughout this paper, I use the labels IP and I^0 instead of TP and T^0 because I assume that, in OR, Tense is impoverished due to the loss of inflected past tenses. However, I maintain TP or T^0 when citing arguments from the literature.

feature the Neg-Aux-Part order. Such languages are OCS and MSSl, as exemplified in (8).

(8) a. sego   avraamŭ   *něstŭ*   sŭtvorilŭ.
         this   Abraham   not-be$_{PRST.3SG}$ done$_{PART}$
         'Abraham did not do this.'
                                                (OCS, John 8.40, Pancheva 2008: 325)
    b. Ja *nisam*   kupio   knjigu.
        I   not-be$_{PRST.1SG}$ bought$_{PART}$ book
        'I have not bought a book.'   (S-C, Ćavar & Wilder 1996: 5)

Fused forms are absent in languages that do not exhibit the Neg-Aux-Part order, e.g., in colloquial OR and Modern West Slavic.[7] If NegP is lower than AuxP in the language, the 'Neg+Aux' fusion cannot occur because Aux^0 cannot move down to Neg^0, and Neg^0 does not raise by itself (9).

(9)   AuxP
          ┌──────┴──────┐
        Aux^0 NegP
        *│   ┌────┴────┐
         └──→ Neg^0
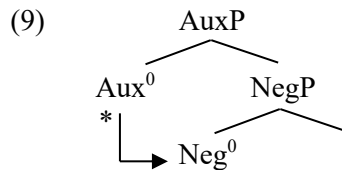
From the correlation between fused negated auxiliary forms and the Neg-Aux-Part order, I conclude that the surface order 'Neg-Aux-Part' in OCS and MSSl arises from a structure in which NegP is higher than AuxP. In contrast, in OR$_{BBL}$, which lacks fused forms, the Aux-Neg-Part (2a) order and the Neg-Part-Aux (2b) order are derived from a structure in which NegP is lower than AuxP. I revisit these structures in Section 2.3.

2.2 NEG Parameter: Two Word Order Patterns in Slavic
The three word orders attested across Old and Modern Slavic languages constitute two patterns, which can be analyzed in terms of Ouhalla's (1991) NEG parameter, i.e., a contrast between the NegP-over-IP structure and the IP-over-NegP structure. In the following discussion, I

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[7] Fusion of negation and the copula is possible in these languages. See fn 11 for West Slavic examples.

contrast the NegP-over-AuxP and AuxP-over-NegP structures in Old Slavic as a case of Ouhalla's parametric variation.

2.2.1 Aux-Neg-Part (Neg-Part-Aux). In OR$_{BBL}$, (2a) and (2b) appear to reflect a single grammar, in which the (2b) order is derived from the (2a) order. As summarized in (10a), when Aux is in the present tense, i.e., Aux is a second position enclitic, the Aux-Neg-Part (2a) order is observed in an embedded clause with a complementizer. In a matrix clause without a fronted element, the Neg-Part-Aux (2b) order is used. In the presence of a fronted element, (2a) is used. When Aux is an orthotonic word, the Aux-Neg-Part (2a) order is utilized (10b), as exemplified in (11).

(10) a. When Aux is a second position enclitic:
        In embedded clauses → Aux-Neg-Part (2a)
        In matrix clauses with no fronted element → Neg-Part-Aux (2b)
                        with a fronted element → Aux-Neg-Part (2a)
     b. When Aux is an orthotonic word → Aux-Neg-Part (2a)

(11) až[e] *budešĭ   ne   pomina[l]a ...*
      if   be$_{PRST.2SG}$ not   remember$_{PART}$
      'If you will not have remembered...'
                        (OR, *BBL* 363, late 14th c., Zaliznjak 2004: 606)

The strict complementary distribution of the (2a) and (2b) orders depending on the Aux's need for prosodic support demonstrates that these orders derive from a single underlying syntax. Sentence (11), with a non-clitic Aux, further shows that the Aux-Neg-Part (2a) order can occur without recourse to Aux's prosodic status, and that this order is the base word order.

Given the distribution of the word orders in (10) and the impossibility of verb movement past Neg, it is reasonable to conclude that the Neg-Part-Aux (2b) order arises from the Aux-Neg-Part (2a) order, as represented in (12).[8]

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[8] The Aux-Neg-Part (2a) order cannot be derived from the Neg-Aux-Part (2c) order because Aux, as a finite verb, cannot raise past Neg. As discussed in Section 2.1, a

(12)   …..   Aux | Neg Part |

While the Neg-Part-Aux order in (2b) derives from (2a), the Part-Aux-Neg order cannot result from (2a) by participle movement. This is because, in Old and Modern Russian, sentential negation and the verb (finite or non-finite) cannot be separated. In *BBL*, there is no instance of sentential negation separate from a verb (excluding the *be*-auxiliary) regardless of the verb's finiteness. The motivations and mechanisms of the movements of 'Neg-Part' and 'Neg-V$_{finite}$' are identical: the complex head of 'Neg-V$_{\pm finite}$' moves to provide prosodic support to the clitic.

The rigid adjacency of Neg and Part and the lack of fused 'Neg+Aux' forms together indicate an IP-over-NegP structure in which AuxP is higher than NegP and NegP immediately precedes PartP in OR$_{BBL}$ (AuxP > NegP > PartP).

2.2.2 Neg-Aux-Part (Neg-Part-Aux). In OCS, all three word orders are attested: 'Aux-Neg-Part' (2a), 'Neg-Part-Aux' (2b), and 'Neg-Aux-Part' (2c). Example (13), which includes both (2b) and (2c) orders in one sentence, confirms that (2b) and (2c) derive from a single grammar in OCS:

(13) ašte *ne   bi*   otŭ   b[og]a *bylŭ*   sŭ,
      if   not   would$_{COND.3SG}$ from   God   be$_{PART}$ this.one
      ne   moglŭ   bi   tvoriti   ničesože.
      not   be.able$_{PART}$ would$_{COND.3SG}$ do   anything
      'If he were not from God, he would not be able to do anything.'
      (OCS, John 9.33, Willis 2000: 328)

The (2c) order is explained if one assumes a NegP-over-IP structure. This structure has been posited for the (2c) order in MSSl in the literature (see Rivero 1991, 1994, Tomić 2001, Migdalski 2006, Pancheva 2008).

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finite verb cannot raise past Neg^0 (*V$_{finite}$-Neg) in Slavic. It is also impossible to posit Aux^0's left-adjunction to Neg^0 because a finite verb cannot left-adjoin to Neg^0.

In the case of the Neg-Part-Aux (2b) order, the configuration of Neg and Part in OCS is not always identical with the configuration found in OR$_{BBL}$. In OR$_{BBL}$, as noted above, Neg and Part are always adjacent. However, OCS also exhibits Neg and Part separated by an adverbial phrase that adjoins as a sister of I', as illustrated in (14):

(14)　da　　*ne*　[věry emŭše]　*spsñi*　　*bǫdǫtŭ*.
　　　　that　not　faith　taken$_{PART}$ saved$_{PART}$ be$_{FUT.3PL}$
　　　　'so that they not be saved, having faith.'
　　　　　　　　　　　　　　　(OCS, Luke 8.12, Pancheva 2008: 327)

The intervention of the gerund clause in (14) can be explained if NegP is higher than IP in OCS. The participle's precedence over the auxiliary in this order derives from the Neg-Aux-Part (2c) order by participle movement to the intervening position between Neg and Aux, as represented in (15).[9]

(15)　Neg … Aux ⟨Part⟩

In this movement, Part^0 may left-adjoin to Aux^0 or I^0 (T^0) under NegP (cf. Bošković 1995, Embick & Izvorski 1995, 1997). Alternatively, PartP may undergo remnant movement to SpecIP, thus intervening between Neg and Aux, as proposed by Migdalski (2006).

To summarize, OCS features two competing grammars resulting in two word order sets: in addition to the grammar represented by (2a) and (2b), which is also found in OR$_{BBL}$, (2c) and (2b) reflect another grammar in which NegP is higher than IP and Part optionally moves to intervene between Neg and Aux. In the second grammar, Neg is also not necessarily adjacent to a finite verb. Neg and a finite verb can be separated by elements raised to SpecIP, as shown in (16):

---

[9] In all of the languages under discussion in this paper, participle movement to the position immediately preceding Aux is possible when there is no Neg.

(16) ašte *ne* eže *viditŭ*   õtca   tv[r]oręšta.
      if   not that see_PRST.3SG father doing_PART
      'If he does not see his Father doing it.'

                          (OCS, John 5: 19, Pancheva 2008: 326)

One remaining question is why the Part-Neg-Aux (2d) order cannot arise from the Neg-Aux-Part (2c) order. With respect to this issue, I adopt the assumption of Lema and Rivero (1989) and Wilder and Ćavar (1994): Neg blocks participle movement past Neg.

2.3 Derivations of the Two Word Order Patterns
What syntactic positions does NegP occupy in the two contrasting grammars? I suggest that the Neg-Aux-Part order in (2c) is derived from structure (17a), in which NegP is higher than IP. I also propose that the Aux-Neg-Part (2a) order is derived from structure (17b), where NegP is lower than AuxP. The Neg-Part-Aux order (2b) can arise from both (17a) and (17b).

(17) a. Neg-Aux-Part (2c)   b. Aux-Neg-Part (2a)
          NegP-over-AuxP   AuxP-over-NegP
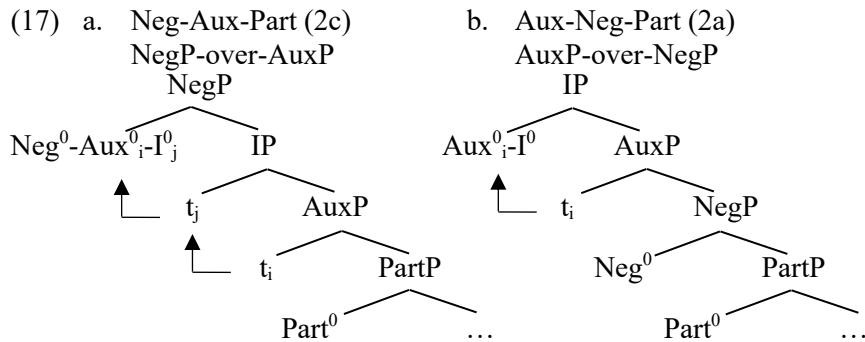
In the NegP-over-AuxP structure in (17a), Aux^0 moves to I^0, Neg^0 attracts Aux^0 under I^0, and Aux^0 optionally fuses into Neg^0. This operation results in the 'Neg-Aux-Part' (2c) order in OCS (as well as in MSSl). In contrast, in the AuxP-over-NegP structure in (17b), Aux^0 moves to I^0, resulting in the Aux-Neg-Part (2a) order in OR_BBL. Fused forms cannot be generated from structure (17b) since Aux^0 cannot move down to Neg^0.

In (17a), the Neg-Part-Aux (2b) order can occur when $Part^0$ moves to I^0, to which Aux^0 adjoins, before the Aux^0-I^0 complex head moves to Neg^0. In (17b), $Part^0$ is attracted to Neg^0 and the Neg^0-$Part^0$ complex head moves to I^0, to which Aux^0 adjoins, resulting in the Neg-Part-Aux order.

The low position of sentential negation in Russian, compared to other Slavic languages, has been noted in the literature. For instance, based on the distribution of the Genitive of Negation, Bailyn (1997) proposes that NegP is between vP and VP in Russian. Negation occupies a position lower than the auxiliary in dative-infinitival modal constructions in Russian (Fleisher 2006: 4), which also indirectly supports the low position of negation in OR:

(18) Začem   mne   (*ne)   budet   *ne*   sdat'   èkzamen?
      for what   me$_{DAT}$ not   will.be   not   pass$_{INF}$ exam$_{ACC}$
      'Why won't it be (in the cards) for me to pass the exam?'

2.4 What if an I^0-Final Structure is Assumed (Pancheva 2005, 2008)?
The discussion thus far is based on the assumption of a head-initial structure for IP. However, Pancheva (2005, 2008) proposes an I^0-final structure for the Neg-Part-Aux (2b) order in OCS/OBg, as shown in (19). In this structure, NegP is higher than IP. Aux^0 raises to I^0, resulting in the Neg-Part-Aux order.

(19)

```
              NegP
             /    \
         Neg⁰      IP
                    \
                     I'
                    /  \
                AuxP    Aux⁰ᵢ-I⁰
               /    \
             tᵢ     PartP
                   /    \
               Part⁰     …
```
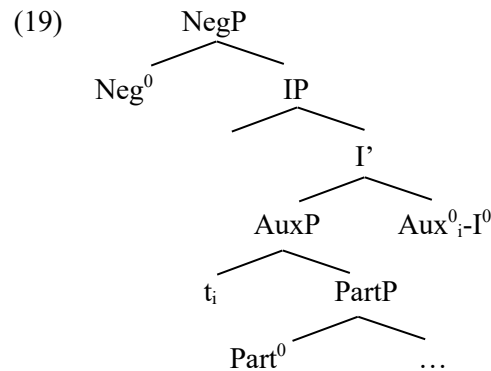
While structure (19) accounts for the Neg-Part-Aux order in OCS, it cannot simultaneously derive the Neg-Aux-Part order in this language. The Neg-Aux-Part order might be obtained by the optional movement of Aux^0 to Neg^0. However, it is unclear why Neg^0 would sometimes attract Aux^0 and sometimes would not. In my account in (17a), Neg^0 always attracts Aux^0 while their morphological fusion is optional. Alternatively, the Neg-Aux-Part order could be obtained when Aux^0 remained *in situ* in (19). However, it would be inappropriate to posit movement of Aux^0 for one of the attested orders (Neg-Part-Aux) and the lack of movement for another (Neg-Aux-Part) without legitimate motivations.

Let us apply structure (19) to the Aux-Neg-Part order and the Neg-Part-Aux order in OR$_{BBL}$. In OR$_{BBL}$, present tense auxiliary forms are second position enclitics. It looks like the Neg-Part-Aux order surfaces from the structure in (19), with Aux occupying the second position of the clause. However, Aux in (19) cannot occupy second position when the sentence contains constituents like complementizers, verbal objects, or verbal adverbs. For instance, when the sentence-initial position is occupied by a complementizer, as exemplified in (3a), it is difficult to think of a position to which Aux^0 can raise to appear in the second position, as illustrated in (20). In Slavic, finite verbs cannot raise past Neg^0 or left-adjoin to Neg^0. Aux is also a finite verb (see fn 8). It is also hard to articulate a PF-oriented account (e.g., Bošković 1995) that would locate Aux in the second position in (20).

(20)   [$_{CP}$ Comp ? Neg^0 [$_{IP}$ [$_{AuxP}$ t$_i$ [$_{PartP}$ Part^0 XP …]] Aux^0_i]]

This problem is rooted in the fact that Pancheva's T^0-final structure was actually proposed for the post-verbal clitic system in OCS/OBg. It is difficult to imagine a mechanism by which second position enclitic auxiliaries arise from a T^0-final structure. In Pancheva's proposal, in OCS/OBg, the shift from a T^0-final to T^0-initial structure motivated reanalysis in favor of a second position clitic system. In OR$_{BBL}$, the second position clitic system, for which Pancheva posits a T^0-initial structure, and the Neg-Part-Aux order, which she argues reflects the T^0-final structure, co-existed from the 11th century until the 15th-16th centuries.

If Aux^0's movement in (20) or any other operation resulted in the Aux-Neg-Part order, being motivated by auxiliary clitics' need to appear in second position, non-clitic auxiliary forms would appear in the sentence-final position, manifesting the Neg-Part-Aux order. However, that is not the case in OR$_{BBL}$. Non-clitic auxiliary forms appear in the Aux-Neg-Part order, as shown in (21). Thus, a configuration such as that in (22) has no empirical support in OR$_{BBL}$.

(21=11) až[e]   *budešĭ   ne   pomina[l]a* …
        if   be$_{PRST.2SG}$ not   remembered$_{PART}$
        'If you will not have remembered...'

(22)   *[$_{CP}$ X(P) *ne* [$_{IP}$ [$_{AuxP}$ t$_i$ [$_{PartP}$ *pominala* ...]] *budešĭ$_i$*]]

Finally, structure (19) cannot explain why fused forms are attested in OCS but not in OR$_{BBL}$.

An I^0-final structure with NegP being lower than AuxP, such as in (23), also cannot fully explain the attested orders in OR$_{BBL}$. In (23), if Aux^0 moves to I^0, the Neg-Part-Aux order occurs. The lack of fused forms in OR$_{BBL}$ can also be accounted for, because Aux^0 cannot be lowered to Neg^0. However, (23) cannot derive the Aux-Neg-Part order unless Aux^0 *in situ* is assumed. There is no legitimate motivation to posit Aux^0 *in situ* for the order 'Aux-Neg-Part' and the movement Aux^0 to I^0 for the order 'Neg-Part-Aux' within one language.

(23)

                IP
                      I'
           AuxP   Aux^0_i-I^0
      t$_i$ NegP
       Neg^0 PartP
         Part^0 …

There are other arguments against the hypothesis of an I^0-final structure in OCS and other Old Slavic languages. Pancheva (2005) argues that auxiliary clitics being right-adjacent to pronominal clitics reflects a $T^0(I^0)$-final structure in OCS/OBg. According to her, the T^0-final structure shifted to a T^0-initial structure, by which the post-verbal clitic system was reanalyzed as a second position clitic system. However, as was already mentioned, in the case of OR$_{BBL}$, a second position clitic system was firmly established in the earliest manuscripts (the 11th century) and continued until the 15th century. During this period, auxiliary clitics regularly occupied a position right-adjacent to the pronominal clitics. Pancheva's argument correlating the rightmost position of Aux in clitic clusters to T^0-final structure on one hand and second position clitics to T^0-initial structure on the other would be at odds with the OR$_{BBL}$ situation, in which Aux, a second position clitic, occupies the rightmost position in the clitic cluster. In addition, it is noteworthy that Modern West Slavic languages exhibit the Neg-Part-Aux order although they are all I^0-initial languages, as exemplified in (24) (Migdalski 2017).[10]

(24) a. Nepřišel   jsi.
          not+come$_{PART}$ be$_{PRST.2SG}$
          'You have not come.'
      b. *Nejsi   přišel.
          not+be$_{PRST.2SG}$ come$_{PART}$ (Cz, Migdalski 2017: 246)

In conclusion, there is no correlation between the T^0/I^0-final structure and the Neg-Part-Aux order in OCS and OR$_{BBL}$.

2.5 The Positions of the Conditional Auxiliary
As noted in Section 1, Old Slavic languages utilize two types of the *be*-auxiliary: the perfect/passive auxiliary and the conditional auxiliary. First

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[10] Cf. Neg precedes a copula and fuses with the copula in West Slavic.

(i) a. Nejsi   hlupák/zdráv/na řadě.
         not+be$_{PRST.2SG}$ idiot/healthy/on row
         'You are not an idiot/healthy/it is not your turn.'
     b. * Jsi   nehlupák/nezdráv/nena   řadě.
         be$_{PRST.2SG}$ not+idiot/not+healthy/not+on   row (Cz, Migdalski 2017: 246)

person singular conditional auxiliaries *bixŭ*/*byxŭ* are orthotonic, while second and third person singular auxiliaries *bi*/*by* are clitics. The dual and plural forms are all orthotonic words. When the distributional patterns of conditional auxiliaries in Table 1 are compared with those of perfect/passive auxiliaries in (2), it becomes evident that perfect/passive and conditional auxiliaries show almost identical distributions in OCS while they are distributed differently in OR.

	matrix clause	embedded clause
OCS	Neg-Aux-Part	Aux-Neg-Part Neg-Part-Aux Neg-Aux-Part
OR	Aux-Neg-Part Neg-Aux-Part	Aux-Neg-Part

Table 1. Positions of the conditional auxiliary in OCS and OR (Willis 2000)

In the case of OR, the Neg-Aux-Part order with the conditional auxiliary in the matrix clause in (25) demands explanation as this order is not observed with the perfect/passive auxiliary in *BBL*. The co-occurrence of a conditional auxiliary and negation is not attested in *BBL*. Yet, according to Zaliznjak (2008: 34), the Neg-Aux-Part order with the conditional auxiliary (*ne by*) is only found in formal texts and not in colloquial texts in OR. It is notable that Willis' OR examples of the Neg-Aux-Part order involving the conditional auxiliary are all from chronicles. Given that NegP lower than AuxP is posited for OR$_{BBL}$, the lack of the Neg-Aux-Part order with the conditional auxiliary in colloquial OR is just as expected.

In affirmative sentences in OR$_{BBL}$, orthotonic forms of the conditional auxiliary (e.g. *byxŭ*) largely appear in the 'Aux-Part' order. In *BBL*, conditional auxiliary forms other than *by*/*bi* appear only five times. According to Zaliznjak (2008: 34), all of them seem to behave as second position enclitics. The second and third person singular form *by* always appears as a second position clitic and occupies the fifth rank within the clitic cluster, unlike perfect/passive auxiliary clitics, which

occupy the seventh rank, following pronominal clitics (Zaliznjak 2008: 32-35). If the perfect/passive auxiliary occupies I⁰, *by* would appear under a head higher than I⁰, presumably C⁰. Historically, this *by* form was generalized as a fixed conditional marker regardless of person and number, as shown in (25), and the other conditional forms were lost in Russian.

(25)   čto   *by*   mę   *jestě*   žalovalě pro   svoe   kuně.
       what would_COND   me_ACC be_PRST.2PL grant_PART about own_REFL kuna
       'What would you offer to me for your kuna?'

                                        (OR, *BBL* 949, Zaliznjak 2008: 34)

Sentence (26) contains a second person plural null subject, with which the perfect auxiliary *jestě* agrees. The second person plural form of the conditional auxiliary should have been *byste*, but here instead *by* is used. This indicates that the conditional auxiliary must be treated differently from the perfect auxiliary, as the former is a particle, while the latter is a finite verb (see Zaliznjak 2008: 32-33).

3 The Developmental Scenario of Two Grammars

In this section, I reconstruct the developmental process of the different loci of negation in Slavic. Despite the lack of Old Slavic data older than OCS, it is possible to elaborate a diachronic scenario in light of the understanding of language change as a result of grammar competition (Kroch 1989, 1994, Lightfoot 1999, Yang 2000). Under the assumption that UG is parametric, competing grammars are viewed as parametric variants available in UG of a learner acquiring a given language. The learner applies one of the competing grammars to an input sentence. When the sentence is successfully parsed in that grammar, the probability of that grammar increases. This process eventually leads to the dominance of the more probable grammar in a given linguistic environment (Yang 2000: 234-236). With respect to the variation in the syntax of negation in this paper, I label the AuxP-over-NegP structure and the NegP-over-AuxP structure as Grammar A and Grammar B, respectively. Both grammars are potentially available in UG and a specific language may either feature one of them or both with different productivities.

Common Slavic (CS) is assumed to be a relatively homogeneous ancient language that was commonly used across Slavic regions. OCS (from the 9[th] century) reflects Old South Slavic (OSSl) in the Late CS period in which regional differences emerged. In the earliest OR manuscripts, the contrast between OR and OCS grammars is already prominent (e.g., distinct developments of Proto-Slavic liquid diphthongs: pleophony in OR vs. metathesis and lengthening in OCS). East Slavic regions were located in the periphery of the Slavic territory in terms of language change during the CS period, and some changes originating from the central part of Slavic regions (e.g., the lenition of *g) reached East Slavic relatively late or did not reach at all (see Andersen 1969). In this context, the developmental scenario in (26) explains how OR, OCS, MSSl, and MR came to feature different syntaxes of negation.

(26)   CS (Grammar A)

        OSSl/OCS (Grammar A&B)   OR (Grammar A)

        MSSl (Grammar B)   MR (Grammar A')
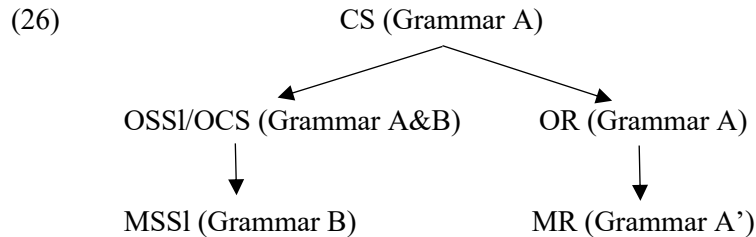
While it is possible to assume that Grammar A was operative in CS as both OR and OCS featured Grammar A, it is unclear if Grammar B also existed in CS due to the lack of evidence.

OR only featured Grammar A. This means that the parsability of word orders involving negation amounted to 100% on Grammar A. In OCS, as observed in Section 2.2.2, Grammar A and Grammar B co-existed. According to Večerka (1989: 34), the Aux-Neg-Part order was very rare and the Neg-Part-Aux order and the Neg-Aux-Part order were productive in OCS, which suggests that Grammar A was already waning while Grammar B had become prevalent in OSSl. I propose that the factor that determined the distribution of these grammars in OR and OCS is the type of clitics available in each language. The word orders under discussion all involve the *be*-auxiliary in clitic and non-clitic forms and

the syntax of negation co-varies with the type of clitic system in OR and OCS.

Grammar A, the AuxP-over-NegP structure, is compatible with second position clitic auxiliaries but is incompatible with post-verbal clitic auxiliaries. As summarized in (10), Grammar A produces two surface word orders when Aux appears in clitic form: the Aux-Neg-Part order occurs when sentence-initial position is occupied by a tonic word. Otherwise, the Neg-Part-Aux order appears. The former instance does not conform to the post-verbal clitic placement pattern.

On the contrary, Grammar B (NegP-over-AuxP) is compatible with post-verbal clitics. Grammar B derives the Neg-Aux-Part order and the Neg-Part-Aux order. In the Neg-Aux-Part order, Neg-Aux fuses into a tonic word when the auxiliary assumes a clitic form. Therefore, the Neg-Aux-Part order virtually contains no clitic and thus is compatible with any type of clitic system. In the case of the Neg-Part-Aux order, the auxiliary clitic always follows Part since Part adjoins to Aux. Thus, this order is compatible with post-verbal clitic auxiliaries.

A second position clitic system has widely been posited for Old Indo-European languages (e.g., Wackernagel 1892) including OCS (Lunt 2001). Colloquial OR featured a second position clitic system from the 11[th] century, to which the earliest manuscripts are dated. In OCS/OBg, post-verbal clitics were dominant during the 9[th]-10[th] centuries, but second position clitics also existed, albeit marginally (Pancheva 2005: 105). This distributional pattern of clitic systems exactly corresponds to the distribution of the different grammars of negation in OR and OCS. OR only has the second position clitic system and Grammar A. OCS features prevalent Grammar B and post-verbal clitics on the one hand, and unproductive Grammar A and second position clitics on the other. It is plausible that when the post-verbal clitic system became dominant in OSSl, Grammar B, which is compatible with post-verbal clitic auxiliaries, overtook Grammar A, which is only compatible with second position clitics. The shift from Grammar A to B is actualized by the emergence of the configuration 'Neg-XP-Part-Aux' containing a non-clitic auxiliary in OCS, as exemplified in (27).

(27=14) da *ne* [věry emǔše] *spsñi* *bǫdǫtǔ*.
　　　　that not faith taken_PART saved_PART be_FUT.3PL
　　　　'So that they not be saved, having faith.'

　　OR chronicles' mixed patterns should rather be ascribed to strong Church Slavonic influence in this genre/style. Modern Russian lost Aux as a result of tense system change (Aux-Neg-Part → Neg-Part). MSSl only inherited Grammar B from OCS.[11] Modern West Slavic languages maintain the old structure (A) with an innovation that attaches negative marker to participles.

4 Conclusions

In this paper, I showed that different surface orders of the sentential negation marker, the *be*-auxiliary, and participles in Old and Modern Slavic languages resulted from parametric variation in terms of the syntactic position of NegP. I identified two word order patterns deriving from two distinct grammars: 'Aux-Neg-Part' from the AuxP-over-NegP structure (colloquial OR) vs. 'Neg-Aux-Part' from the NegP-over-AuxP structure (MSSl). In OCS, both patterns are attested.

　　I analyzed the development of the different grammars of negation across Old Slavic as a result of grammar competition. I posit both the grammar with the 'AuxP-over-NegP' structure (Grammar A) and the grammar with 'NegP-over-AuxP' (Grammar B) as parametric variants available in UG. Based on the co-variance of the clitic system and the syntax of negation in Old Slavic, I argued that in OCS, Grammar A that is only compatible with second position clitic auxiliaries was replaced by Grammar B that allows post-verbal clitic auxiliaries when the post-verbal clitic system arose in OSSl. For OR, a language which only features second position clitics, Grammar A was the only possible option.

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[11] Pancheva (2005) argues for a shift from post-verbal to second position clitics by the 13th century and a shift from second position to pre-verbal clitics during the 17th-19th centuries in Bulgarian. The Neg-Aux-Part order derived from Grammar B (NegP-over-AuxP) is compatible with clitic auxiliaries of all these types, but the other order from Grammar B, 'Neg-Part-Aux,' is compatible with second position clitic auxiliaries only when no tonic element precedes Neg and is incompatible with a pre-verbal clitic system. This may have caused the eventual loss of the Neg-Part-Aux order in Bulgarian.

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Frequency as a (Non)-Predictor of Acceptability: Russian V-N Collocations with *Čto*-Clause Complements[*]

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The aim of this paper is to evaluate the previously proposed hypothesis that *čto*-clause complements of nouns are restricted to restructuring V-N collocations. The hypothesis has been supported by an acceptability rating study, which found an interaction between restructuring and clause type. The paper addresses a confound of that study arising from the frequency contrast between restructuring and non-restructuring V-Ns. The effect of frequency on the acceptability of *čto*-clauses was tested in a forced-choice experiment controlling for the effect of restructuring. The results did not provide clear evidence for the frequency effect, lending indirect support to the grammatical account.

1 Background on the Collocational Restriction

1.1 Introducing the Collocational Restriction
Indicative complement clauses in Russian come in two main types: (a) ordinary clauses introduced by the complementizer *čto* (henceforth *čto*-

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clauses) and (b) nominalized clauses headed by the demonstrative *to* 'that' (with appropriate case-marking) followed by a *čto*-clause, which have roughly the distribution of noun phrases (henceforth *to,čto*-clauses). The two clause types have a contrasting but overlapping distribution. Preverbal subjects and complements of P are obligatorily realized as *to,čto*-clauses, whereas accusative complements of V are normally realized as *čto*-clauses unless they are contrastively focused, in which case a *to,čto*-clause is used (see Švedova 1982, Hartman 2012). Non-accusative complements of V and complements of A and N, which are always oblique, can in principle be realized in either way (as a *čto*-clause or as a *to,čto*-clause marked with oblique case or embedded in a PP). Although a large number of such predicates show genuine alternations between the two clause types, individual predicates are often subcategorized for or show overwhelming preference for one of the two clause types (see Kobozeva 2013 and references therein). A question arises: are there any grammatical (in the broadest sense) factors involved in the choice of clause type that could reduce the amount of lexical idiosyncrasy?

Arguing that such factors do exist, Knyazev (2016) shows that the realization of the complement clause in Russian can be affected by the manipulation of certain syntactico-semantic features of the predication, while keeping the lexical item corresponding to the predicate constant. One case—referred to as the agentivity restriction—is provided by a class of speech act verbs (*govorit'* 'say', *namekat'* 'hint', *grozit'* 'threaten', *napominat'* 'remind', and a few others), which strongly disprefer *čto*-clauses (but not *to,čto*-clauses) when used in a non-agentive (epistemic) sense (cf. *Èto govorit *(o tom)*, *čto…* 'This indicates that…'), but do not show this restriction when used in an agentive (illocutionary) sense (cf. *Èksperty govorjat (o tom)*, *čto…* 'Experts say that…'

Another case, which is the focus of this paper, is provided by the contrasting pairs of examples like (1a)-(2a) and (1b)-(2b), where the realization of a *čto*-clause complement (but not a *to,čto*-clause) of a noun depends on the verb that takes this noun as its argument (rather than on the noun itself). Knyazev (2016, to appear) shows that V-N combinations that allow *čto*-clauses are systematically different from those that disallow them. First, in the allowed V-Ns, the meaning of the

construction is mostly contributed by N, while V has an impoverished content, usually expressing (causation of) possession/externalization of a mental state, with some additional aspectual or voice distinctions (thus reminding us of Melčuk's 1974 lexical functions), cf. allowed V-Ns *est' nadežda* '(there) is hope', *vselit' nadeždu* 'instill hope', *vyrazit' uverennost'* 'express conviction, *est' verojanost'* '(there) is likelihood', etc. Second, in the allowed V-Ns the possessor of N usually cannot be realized. Third, such V-Ns form set collocations, which have to be listed in the lexicon. There are further differences having to do with extraction of PP and pronominalization (see Knyazev 2016 for details).

(1) RESTRUCTURING
    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.'

(2) NON-RESTRUCTURING
    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.'

Partially similar properties have been observed for V-Ns that take infinitival complements in Russian (see Franks & Hornstein 1992, Lyutikova 2010) and V-Ns that take *that*-clause complements in English (Davies & Dubinsky 2003), both of which were analyzed as involving restructuring of V-N leading to the formation of a complex predicate. Building on these analyses, Knyazev (2016, to appear) takes the allowed V-Ns to be marked with a "restructuring property", and formulates the restriction in (3), originally dubbed the **collocational restriction**.

(3) *Collocational Restriction*
   Clausal complement of N can be realized as *čto*-clauses only if N belongs to a V-N collocation that can undergo restructuring to form a complex predicate.

1.2   A Grammatical Account

Knyazev (2016) proposes a two-step grammatical account of the restriction in (3). The first step is the assumption that *čto*-clause complements in Russian are underlyingly nominal (e.g., by virtue of projecting a null nominal layer), building on Davies and Dubinsky (2009); see also Hartman (2012) and Kastner (2015).[1] By virtue of their nominal layer, *čto*-clause complements are tied to direct (non-oblique) positions where they can undergo standard nominal licensing. However, Russian grammar also provides a way of exceptionally licensing *čto*-clauses in oblique positions by inserting a null P to license the nominals.

The second step is the licensing requirement of the null P itself, which is the immediate cause of the collocational restriction (and also the agentivity restriction). Knyazev assumes that C(onceptual)-I(intentional) interface considerations require the null P to get a default interpretation, specifically as a basic relation HOLD(ER) between some (sentient) attitude holder and a proposition.[2] The C-I considerations further require the external and internal θ-roles of the null P (henceforth P_{HOLD}) and the predicate to be unified, which is achieved by incorporation of P_{HOLD} into the predicate (cf. a similar proposal in Neeleman 1997), see (4a,b), which has the semantic effect of predicate conjunction, shown in bold in (4c). The consequence of the θ-unification process in (4) is that the sentience restriction on the external role of P_{HOLD} is transmitted to the external argument (EA) of V. This accounts for the agentivity restriction. But how does this account extend to the collocational restriction?[3]

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[1] The peculiarity of Knyazev's (2016) proposal is that, in contrast to the proposals cited above, it postulates a nominal layer analysis for *all* clausal arguments.

[2] The account is 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). The account can be viewed as an extension of Pustejovsky's (1995) proposal to propositional complements.

[3] Below I present a slightly modified version of the account in Knyazev (2016).

(4) a.[$_{VP}$ EA$_i$ [$_{V'}$ V$_{\theta i, \theta j}$ [$_{PP}$ P$_{\theta i, \theta j}$ [$_{Clause}$ *čto*…]$_j$]]]   →
    b.[$_{VP}$ EA$_i$ [$_{V'}$ [$_V$ P$_{\theta i, \theta j}$ V$_{\theta i, \theta j}$] [$_{PP}$ *t* [$_{Clause}$ *čto*…]$_j$]]]
    c.$\lambda y.\lambda x.\lambda e.$ **V**(e) & EA(e,x) & Theme(e,y) **& HOLDER(x, y)**

The basic idea is that external arguments of nouns are suppressed in the sense of Grimshaw (1990); thus, subject-like arguments of nominalizations of Subject Experiencer verbs like *nadežda* 'hope' are not true (θ-marked) external arguments. However, they can become such just in case they are transferred to a light verb (Grimshaw & Mester 1988). By hypothesis, this is exactly what happens in restructuring V-Ns, as shown in (5), with the subject-like argument of N marked with a star.

(5) V$_{Light}$ N $_{*\theta i \, \theta j}$ →   [$_{CompPred}$ V$_{\theta i}$ N $_{*\theta i \, \theta j}$]   Complex Predicate formation

The account runs as follows. Since Ns do not take direct arguments, P$_{HOLD}$ is inserted to license *čto*-clauses. P$_{HOLD}$, however, cannot be licensed by N directly since Ns have suppressed external arguments, blocking θ-unification. When, however, N forms a complex predicate with the higher V, which happens only in restructuring V-Ns, its subject θ-role is transferred, satisfying the licensing condition on P$_{HOLD}$, as shown in (6). This completes the account of the collocational restriction.

(6) a.[$_{VP}$ EA$_i$ [$_{CompPred}$ V$_{\theta i}$ N $_{*\theta i \, \theta j}$] [$_{PP}$ P$_{\theta i, \theta j}$ [$_{Clause}$ *čto*…]$_j$]]]   →
    b.[$_{VP}$ EA$_i$ [P$_{\theta i, \theta j}$ [$_{CompPred}$ V$_{\theta i}$ N$_{*\theta i \, \theta j}$]] [$_{PP}$ *t* [$_{Clause}$ *čto*…]$_j$]]]

2 The Previous Experimental Study and an Alternative Hypothesis

One problem with the collocational restriction (and thus with the proposed analysis) is that there is considerable inter- and intra-speaker variation regarding contrasts like (1)-(2). Specifically, (i) *čto*-clauses are not totally degraded with non-restructuring V-Ns; and (ii) *čto*-clauses are not always perfect even with restructuring V-Ns. Thus, it is not clear whether there is a *qualitative* difference between the two conditions, calling for a *quantitative* (experimental) study.

2.1 The Previous Experimental Study
In order to experimentally quantify the effect of the violation of the collocational restriction, we can measure the difference between *čto*- and

to,čto-clauses in both types of V-Ns and then compare the obtained differences. This utilizes a *factorial definition* of a grammatical effect (see Sprouse, Wagers & Phillips 2013 for island effects), leading to a 2 × 2 factorial design with crossed factors of CLAUSE_TYPE and ±RESTR(UCTURING). Specifically, the effect of the collocational restriction can be measured as the "differences-in-differences" (DD) score calculated, as in (7), by analogy with experimental studies of island effects (see Sprouse et al. 2013, Sprouse, Caponigro, Greco & Cecchetto 2016).

(7) DD = ([–RESTR]$_{to,čto}$– [–RESTR]$_{čto}$) – ([+RESTR]$_{to,čto}$– [+RESTR]$_{čto}$)

The collocational restriction can be established experimentally in case the obtained DD-score is positive (and above a certain threshold). This should also be reflected in a statistically significant interaction between CLAUSE_TYPE and ±RESTRUCTURING. Following the studies cited above, the effect of the collocational restriction, should it occur, could provide evidence for the proposed grammatical account (see Section 1.2) to the extent that alternative accounts fail to explain it.

Precisely this kind of experiment using a 5-point Likert-scale acceptability rating task was conducted by Knyazev (to appear). In the study, 12 pairs of V-N hypothesized to differ in the ±RESTRUCTURING property followed by a *čto-* or a *to,čto*-clause were tested. The results showed a significant interaction between CLAUSE_TYPE and ±RESTRUCTURING, which showed that the choice of a *čto*-clause (compared to a *to,čto*-clause) leads to a stronger decrease in the acceptability in the non-restructuring condition than in the restructuring condition, with the DD-score of 0.43, as shown in the interaction plot in Fig. 1. The experiment also revealed a significant (simple) effect of the CLAUSE_TYPE, which showed that *čto*-clauses have an independent lowering effect on acceptability even in the restructuring condition, as reflected in the slope of the solid line in the plot.
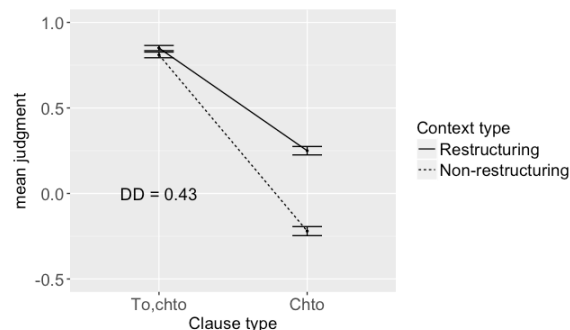
Fig. 1: Interaction plot for the experiment in Knyazev (to appear)

The results of the experiment generally support the collocational restriction in (3), which, in turn, can be taken to provide evidence for the grammatical account proposed in Section 1.2.[4] The interaction effect, i.e., the higher decrease in acceptability of *čto*-clauses (relative to *to,čto*-clauses) in the non-restructuring condition, can be explained by the presence of a grammatical violation in this condition (failure to license the null P introducing the *čto*-clause), assuming that grammatical violations can be defined factorially (Sprouse et al. 2013) and that the discovered interaction effect (0.43) is strong enough to count for a grammatical violation (see Kush, Lohndal & Sprouse 2018 for some discussion).

2.2. A Processing Alternative
Although the grammatical account in Section 1.2 is consistent with the interaction effect obtained in the experiment, other explanations, including non-grammatical ones, are possible. It is tempting to explore such explanations given the complexity of the proposed grammatical account. First of all, observe that restructuring V-Ns are intuitively more frequent than non-restructuring ones (see below for some corpus evidence; see also Lyutikova 2010 for the same conclusion regarding Russian V-N collocations with infinitival complements). But why should the higher frequency of V-Ns affect the acceptability of *čto*- and *to,čto*-clauses differently?

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[4] For a detailed discussion of the experiment, including some potential problems with its design, see Knyazev (to appear).

One possibility is the following. Recall that *čto-* and *to,čto*-clause complements of V-Ns differ not only in the presence of the demonstrative *to* as such but also in the realization of the oblique/inherent morphological case on the demonstrative and (typically) in the presence of the preposition, both idiosyncratically selected by the predicate (i.e., N in the case of V-N collocations). Although this idiosyncratic selectional information can in principle be recovered from the predicate, it is nonetheless lost in the case of *čto*-clauses. We may assume that this information loss has a cost. In particular, it might violate some general "soft" constraint on the deletion of P and/or OBL(ique) case features (see Pesetsky 1998 for a similar proposal in the OT framework for Russian relative clauses with *čto*). In the case of *čto*-clauses, this constraint could be encoded as a (violable) "rule" in (8), which requires the realization of P/oblique case (and thus *to,čto*-clauses) in non-direct positions, including complements of V-Ns.

(8) $V/A/N_{(Pi)OBLj}$ + [$_{Clause}$ *čto…*] $\rightarrow$ V/A/N [(P_i) *to*$_{OBLj}$ *čto…*]

The rule in (8) could be taken to reflect the fact that *čto*-clause complements of V-N collocations (and Oblique/PP-selecting predicates in general) are somehow less "regular" or "exceptional" from the point of view of the grammatical system of Russian and speakers' implicit knowledge of this system. Consequently, we may expect that speakers will have more difficulty processing "violations" of (8), which would result in their lower acceptability. Indeed, as we saw above (see Fig. 1), *čto*-clauses are judged less acceptable than *to,čto*-clauses in V-N collocations independently of the restructuring status of the collocation. Similar evidence obtains for *čto*-clause complements of Oblique/PP-selecting verbs (see Knyazev 2018).

Now we have a way of understanding how the frequency of V-Ns could (more strongly) affect the acceptability of *čto*-clauses as opposed to *to,čto*-clauses. The basic idea comes from the so-called Frequency × Regularity interactions familiar from the psycholinguistics literature, particularly their extension to sentence processing (see Wells, Christiansen, Race, Acheson & MacDonald 2009, Christiansen & Chater

2016).[5] Such interactions are taken to show that "interpretation of less regular sentence types (those with idiosyncratic syntax-meaning mappings) depend heavily on specific experience (frequency) of that exact structure" (Wells et al. 2009: 252). In other words, the facilitating effect of direct exposure to particular *instances* of the construction (i.e., token frequency) on its processing will be stronger for less regular sentence types than for more regular sentence types, whose processing will be facilitated by the experience with similar *patterns* in the language, thus weakening the effect of token frequency. For example, in Wells et al. (2009), the Frequency × Regularity interaction was demonstrated by the stronger facilitating effect of frequency (which was induced by experimentally manipulating people's exposure to particular constructions) on the object relatives than on the subject relatives, where the latter are taken to be more "regular" in the sense that they more directly reflect the dominant SVO (subject-verb-object) word order in English.

Extending this reasoning to the alternation between *čto-* vs. *to,čto-*clauses in V-N collocations, we may expect that the processing (and hence acceptability) of the "less regular" "V + N + *čto*" construction will be more strongly affected by its frequency (in the corpus) than the processing of the "more regular" "V + N + *to,čto*" construction. Indeed, assuming that Russian speakers have sufficient evidence to adopt the rule in (8), they will take *to,čto*-clauses to be the default complement realization in V-N collocations, which will be unaffected by the frequency of particular "V + N + *to,čto*" constructions. This will result in consistently high acceptability ratings of *to,čto*-clauses, as seen in Fig. 1.

By contrast, *čto*-clauses in V-N collocations will be taken to be exceptions to (8) and will thus have to be learned via statistical mechanisms, i.e., with the help of exposure to particular instances of the "V + N + *čto*" construction. Because the frequency of particular "V + N + *čto*" constructions will play a crucial role in their successful learning, we may expect that speakers' acceptability judgments of *čto*-clauses in

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[5] Frequency × Regularity interactions were observed in different domains, including word recognition, past tense acquisition, etc. See references in the studies cited above.

V-N collocations will be higher for those "V + N + *čto*" constructions that are more frequent. Assuming that restructuring V-Ns have higher frequency than non-restructuring ones, this is indeed what we see in Fig. 1. The above reasoning is formulated explicitly in (9) as the Processing Hypothesis to be tested below.[6]

(9) *Processing Hypothesis*
   a. *To,čto*-clauses in V-N collocations are the more "regular" sentence type, as opposed to *čto*-clauses; they are generally easier to process and are more acceptable than *čto*-clauses;
   b. Higher frequency of *čto*-clauses in particular V-N collocations facilitates their processing and increases their acceptability;
   c. The processing/acceptability of *to,čto*-clauses is not affected or affected less strongly by their frequency in particular V-N collocations.

Crucially, the hypothesis in (9) is consistent with the results of the experiment in Section 2.1 and thus can serve as an alternative to a grammatical account proposed in Section 1.2.

3 Experimental Study

3.1 A Preliminary Corpus Study
Prior to the experiment, a corpus study was conducted to assess the frequency of various V-N combinations occurring with *čto*- and *to,čto*- clauses and to construct materials for the experiment.[7] The data for five different Ns that were used in the previous study discussed in Section 2.1 (*nadežda* 'hope', *uverennost'* 'conviction', *somnenie* 'doubt', *dokazatel'stvo* 'proof', and *verojatnost'* 'likelihood') were collected.[8] For each N, two separate lists of Vs with the associated frequencies (counts)

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[6] A simpler alternative capitalizing on frequency effects might employ a *direct* relation between form and frequency ("more frequent forms tend to receive less coding")—see Haspelmath, Calude, Spagnol, Narrog & Bamyaci (2014)—without mediation of "regularity". The exploration of this alternative is left for future work.

[7] The study was based on the subcorpus of the Russian National Corpus, or RNC (http://www.ruscorpora.ru), which included texts written after 1950.

[8] The queries involved V separated from N + *to,čto* or N + *čto* (except after *to*) by 0-2 words. Aspectual pairs (including prefixal derivatives) were coded as the same V.

of *čto-* and *to,čto-*clauses in the subcorpus were compiled. The 10 most frequent Vs (with counts higher than five) for each N with each clause type are given in the Appendix (see also Table 1 in Knyazev to appear).

An inspection of the frequency lists found that the most frequent V-Ns (a) tend to be similar for both *čto-* and *to,čto-*clauses and (b) have the restructuring property (as discussed in Section 1.1). This suggests that restructuring might indeed be confounded with frequency, giving some plausibility for the processing account.

3.2. Goal and Design of the Experiment
In order to decide between the processing alternative and the grammatical account, an experimental study was conducted. The goal of the experiment was to assess the effect of the frequency of the V-N combination on the acceptability of constructions with *čto-* and *to,čto-*clauses when the restructuring property of V-N is controlled for. Thus, the logic of the design reflected the dissociation between the two factors shown in (10a), cf. two other dissociations in (10b,c).[9]

(10) a. both restructuring | different frequency   **→ this study**
      b. both non-restructuring | different frequency
      c. different restructuring status | same frequency

Frequency was treated as a binary categorical variable FREQUENCY_LEVEL with two levels HIGHER_FREQUENCY and LOWER_FREQUENCY, reflecting the difference in frequencies between different V-Ns for a given N. Acceptability judgments were collected using a binary forced-choice (FC) task, with the CLAUSE_TYPE treated as a dependent variable.[10]

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[9] The choice of (10a) was motivated by the fact that true non-restructuring V-Ns with either *čto-* or *to,čto-*clauses are very infrequent in the corpus, rendering (10b) practically impossible. As for (10c), there are too many different ways to operationalize frequency (see, e.g., Divjak 2017), which makes it hard to choose the right measure *a priori*, running the risk of an uninformative result. It also did not allow us to control for a potential confound associated with independent semantic differences between restructuring and non-restructuring V-Ns, as opposed to (10a).
[10] For a recent use of an FC task for investigating acceptability contrasts, see, e.g., Ackerman, Frazier and Yoshida (2018).

What are the predictions of the Processing Hypothesis in (9) for the present experimental design? Given that under the hypothesis, *to,čto*-clauses are generally more acceptable than *čto*-clauses in V-N collocations, the hypothesis predicts a clear preference for *to,čto*-clauses with lower frequency V-Ns, where the facilitating effect of the frequency of V-N is *not* expected. By contrast, with higher frequency V-Ns, where the facilitating effect on *čto*-clauses *is* expected, the hypothesis predicts either an equal preference for both *čto*- and *to,čto*-clauses or at least a decrease in preference for *to,čto*-clauses (depending on the strength of the facilitating effect, which is yet unknown).

An anonymous reviewer suggests that a rating task would be more appropriate for testing the Processing Hypothesis, given the theoretical possibility that speakers may *equally* often choose *to,čto*-clauses over *čto*-clauses with both lower and higher frequency V-Ns in a situation where *to,čto*-clauses have higher acceptability than *čto*-clauses in both lower and higher frequency groups, but there is still a contrast in acceptability of *čto*-clauses *between* lower and higher frequency groups. Thus, the experimental results are unlikely to support the *Processing Hypothesis* even if it is true.[11]

While I agree that a rating task would be more fitting, also making it easier to compare the two experiments, I believe that the hypothetical possibility alluded to by the reviewer is unlikely and that the FC experiment can still provide meaningful results.[12] Although the *overall* mean acceptability rating of *čto*-clauses in the higher frequency group could well be lower than that of *to,čto*-clauses, the results of the rating experiment in Knyazev (to appear) (see Fig. 1) suggest that, at least for

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[11] The reviewer is also concerned that a direct comparison between the two clause types inherent in the FC task is undesirable. While this is a legitimate concern, it also arises in the rating task, as it is practically very difficult to conceal the fact the experiment compares *čto*- and *to,čto*-clauses without greatly increasing the number of fillers and thus making the questionnaire too long. The hope then is that the crucial manipulation is unaffected by the participants' partial awareness of the goal of the study.

[12] For an interesting discussion on how to compare the results of FC and rating experiments, see Parafita Couto and Stadthagen-González (2017).

some *particular* higher frequency V-Ns, there will be an equal preference for *čto-* and *to,čto*-clauses, which should lead to participants selecting an option at random some of the time and, consequently, a *lower* overall preference for *to,čto*-clauses in the higher frequency than in the lower frequency group.

First, for several items in the experiment reported in Knyazev (to appear), the acceptability contrast between *čto-* and *to,čto*-clauses in the restructuring condition was very weak (if present at all), making it quite likely that some of the items in the present experiment will show the same pattern and, given that the items for the rating experiment were generally chosen among frequent V-Ns, we expect this pattern to be more pronounced in the higher frequency group. Second, for each V-N in the higher frequency group, the frequency of *čto*-clauses was higher than that of *to,čto*-clauses (see Table 1 below), which should bias participants to select the *čto*-clause option at least some of the time, whereas there was no such contrast or it was less clear for the lower frequency group. Given the above reasoning, we expect (under the Processing Hypothesis) that if frequency of V-Ns indeed has a stronger effect on the acceptability of *čto*-clauses, this effect will be reflected in the differential preference for the clause type in the FC experiment.[13]

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[13] To ensure the validity of the results, a direct replication of the present experiment using a rating task and the same critical items was also conducted; see Section 4.

	HIGHER FREQUENCY (A)	LOWER FREQUENCY (B)
set 1	*est' nadežda* '(there) is hope' *Čto*: 255(1);.29; *To,čto*: 42(1); .22	*ostaetsja nadežda* 'remains hope' *Čto*: 41(4); .05 *To,čto*: 11(5.5); .06
set 2	*pojavilas' nadežda* 'appeared hope' *Čto*: 42(3); .05; *To,čto*: 6(8); .03	*zarodilas' nadežda* 'was born hope' *Čto*: 8(18.5); .01 *To,čto*: 0
set 3	*vyrazit' nadeždu* 'express hope *Čto*: 156(2).18; *To,čto*: 25(2); .13	*vyskazat' nadeždu* 'voice hope *Čto*: 15(11.5); .02 *To,čto*: 1(21); .01
set 4	*davat' nadeždu* 'give hope' *Čto*: 24(7.5); .03; *To,čto*: 18(3); .09	*darit' nadeždu* 'deliver hope' *Čto*: 0; *To,čto*: 3(12); .02
set 5	*poter'at' nadeždu* 'lose hope' *Čto*: 38(5); .04; *To,čto*: 8(7); .04	*poxoronit' nadeždu* 'bury hope' *Čto*: 0; *To,čto*: 2(14.5); .01
set 6	*est' uverennost'* '(there) is conviction' *Čto*: 147(1); .24; *To,čto*: 29(2);.13	*soxranjat'sja uverennost'* 'remains conviction' *Čto*: 1(47);.002; *To,čto*: 1(53.5);.005
set 7	*pojavilas' uverennost'* 'appeared conviction' *Čto*: 23(4); .04; *To,čto*: 2(20); .01	*voznikla uverennost'* 'emerged conviction' *Čto*: 8(12); .01; *To,čto*: 1(53.5); .005
set 8	*vyrazit' uverennost'* 'express conviction' *Čto*: 104(2); .17; *To,čto*: 40(1); .18	*vyskazat' uverennost'* 'voice conviction' *Čto*: 17(7); .03; *To,čto*: 6(8); .03
set 9	*est' dokazatel'stva* '(there) are proofs' *Čto*: 29(1); .29; *To,čto*: 12(4); .08	*imejutsja dokazatel'stva* 'are present proofs' *Čto*: 5(5); .05; *To,čto*: 2(15); .01

Table 1: Experimental V-N collocations with the associated counts, ranks, and relative frequencies for each clause type

To conclude, a positive result of the present experiment will provide evidence in favor of the Processing Account and against the grammatical account in Section 1.2, as the former would account for both the effect of frequency in the FC-experiment as well as the interaction effect in the rating experiment (given that restructuring V-N are more frequent), whereas the latter would only account for the interaction effect.

3.3 Materials and Procedure
Materials were constructed on the basis of the subcorpus of RNC (see Section 3.1) by manually selecting 12 pairs of V-Ns that shared the same N and were close in meaning and argument structure, but maximally

distinct in the frequency of the V-N. As the frequency of V-Ns was different for *čto-* and *to,čto*-clauses, to identify V-Ns with higher frequency, the *sum* of the two frequencies (*čto + to,čto*) was used. After the data were collected, however, it was realized that this slightly alters the experimental hypothesis, according to which the acceptability of a sentence depends on the frequency of V-N **relative to the clause type**, that is, the acceptability of *čto*-clauses should depend on the frequency of the "V +N + *čto* construction" rather than the frequency of the V-N as such.

To counter this problem, the pairs of V-N in the two frequency groups were inspected to ensure that the higher frequency V-Ns were more frequent for *both* clause types (although the contrast in frequency could still be higher for one of the clause types). The frequency of a particular V-N collocation (for a given clause type) was measured both by its raw count and by its relative frequency calculated as the proportion of examples with this particular collocation among examples with all V-N collocations for a given N. These frequencies were calculated separately for both clause types. The procedure led to the removal of three pairs from the analysis, leaving nine pairs of V-N, which are shown in Table 1, along with the associated raw frequencies for each clause type, the rank of each V-N for a given N and clause type (in parentheses) and the relative frequency of V-N for a given N and clause type (in percentages).[14] Some example stimuli are given in (11a-c).

(11) **Higher and lower frequency V-Ns with *čto-*/*to,čto*-clauses**
      a. U   nix   <u>pojavilas'/zarodilas'</u>   nadežda (<u>na to</u>),   <u>čto</u>
         at   them   appeared/was conceived   hope   for itACC   that
         pojavjatsja novye   rabočie mesta.
         will appear   new   work   places
         'They started to have hope that new workplaces will appear.'

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[14] The following pairs were removed: i) *vselit' uverennost'* 'instill conviction' (*ČTO*: 19(5); .03; *TO,ČTO*: 7(6); .03) vs. *pridavat' uverennost'* 'add conviction' (*ČTO*: 2(22); .003; *TO,ČTO*: 7(6); .03); ii) *najti dokazatel'stva* 'find proof' (*ČTO*: 2(12); .02; *TO,ČTO*: 8(6.5); .05) vs. *obnaružit' dokazatel'stva* 'discover proof' (*ČTO*: 1(18); .01; *TO,ČTO*: 2(15); .01); iii) *predstavit' dokazatel'stva* 'present proof' (*ČTO*: 1(18); .01; *TO,ČTO*: 15(3); .09) vs. *predostavit' dokazatel'stva* 'present proof' (*ČTO*: 1(18); .01; *TO,ČTO*: 2(12); .02).

b. Ona <u>vyrazila/vyskazala</u> uverennost' (<u>v tom</u>), <u>čto</u>
    she expressed/voiced conviction in itACC that
    storony pridut   k   soglašeniju.
    sides   will.come to agreement
    'She expressed conviction that the parties will come to an
    agreement.'

c. U nix <u>est'/imejutsja</u> dokazatel'stva (<u>togo</u>), <u>čto</u>   on
    at them is/are present   proofs   itGEN that he
    soveršil   pobeg.
    committed escape
    'They have/possess proof that he has escaped.'

Twenty-four experimental sentences with the same lexicalization within
each pair were constructed from the (original) 12 pairs and distributed
across two lists in a Latin Square design so that each participant saw only
one sentence per pair. Twelve sentence pairs with various verbs with a
preference for either of the two clause types served as fillers to obscure
the main manipulation of the experiment. Each sentence was presented in
two variants (in a random order) with both clause types. The participants
were asked to choose the variant that sounded more natural and were
instructed that there is no correct answer. 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 199 participants
(mean age = 25.4, *SD* = 7.6; 143 female).

3.4 Results and Follow-Up Analyses
Data from the FC selection were coded as 0 for a *to,čto*-clause selection
and 1 for a *čto*-clause selection and were entered into a generalized linear
mixed model with Higher/Lower frequency as the fixed effect, with both
random intercepts and random slopes of item and subject (Barr et al.
2013). The results showed an overall preference (66%) for *to,čto*-clauses,
with a slightly stronger preference for *čto*-clauses in the Higher
frequency group (*čto*-clauses = 36%) than in the Lower frequency group

(*čto*-clause = 32.5%), as shown in Fig. 2. Crucially, the effect of Higher frequency was not significant.[15]
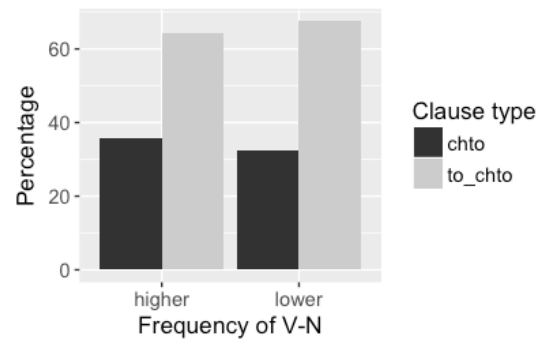
Fig. 2: Proportion of *čto-*/*to,čto*-clause responses by frequency group

The by-item inspection confirmed this result, showing that the preference for a clause type was stable across all items (sentence pairs) and was not affected by the relative frequency of V-N, as can be seen in Fig. 3.[16]

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[15] β = 0.16, SE = 0.13, χ^2 (1) = 1.25, p = 0.26. The p-values were obtained by comparing the model with the FREQUENCY_LEVEL to the model without it using the ANOVA function of the *lmer* package for *R*.

[16] The visual impression was confirmed by chi-square tests of independence between the clause type and frequency level, none of which showed a significant association. Such tests violate the assumption of independence of observations, so they should be viewed as a descriptive statistic.
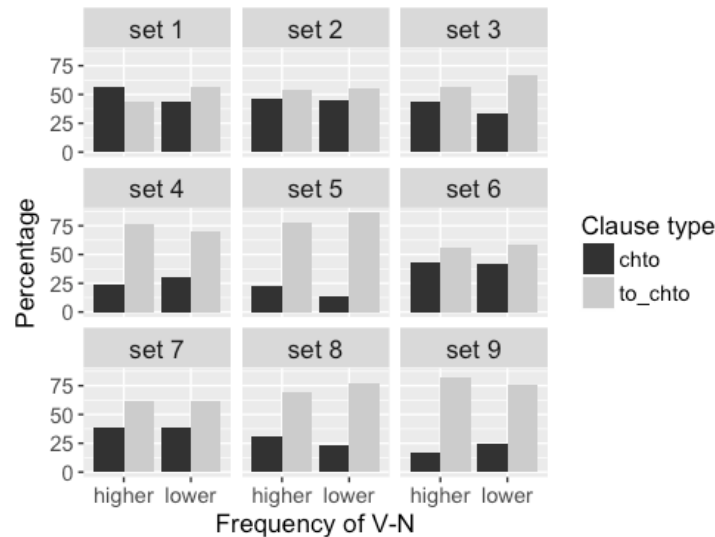
Fig.3: Proportion of *čto-* /*to,čto*-clause responses by item set

These preferences themselves, however, were slightly different for different sentence pairs. For example, while for most sentence pairs, there was a preference for *to,čto*-clauses, for seven sentences (1A–B, 2A–B, 3A and 6A–B) an equal preference for a clause type was obtained; none of the sentences showed a significant preference for *čto*-clauses.[17] It turned out that in three of these seven sentences (1A, 3A and 6A), the higher frequency V-N had very large raw frequencies of *čto*-clauses (>100), whereas in the remaining 11 sentences, only one sentence (8A) showed such a high frequency. This suggests that there might be an association between the *absolute* frequency of V-N + *čto* and the higher (= equal) preference for a *čto*-clause in the experiment (as opposed to the frequency of V-N defined *relative* to other V-Ns for a given N and a clause type).

This hypothesis was supported by the marginal correlation between the log frequency of *čto*-clauses (plus 1) and the proportion of *čto*-clause responses ($r(16) = 0.46$, p = 0.057), as shown in the left panel of Fig. 4.

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[17] These results were obtained by chi-square goodness-of-fit tests on individual sentences. The same disclaimer as in the previous footnote applies.

By contrast, there was no correlation between the frequency of *to,čto*-clauses and the proportion of *čto*-clause responses ($r(16) = 0.13$, p = 0.58); see the right panel of Fig. 4.[18] This suggests that when frequency is treated as a continuous variable, it might indeed marginally increase the preference for *čto*-clauses. This finding, however, requires further study.
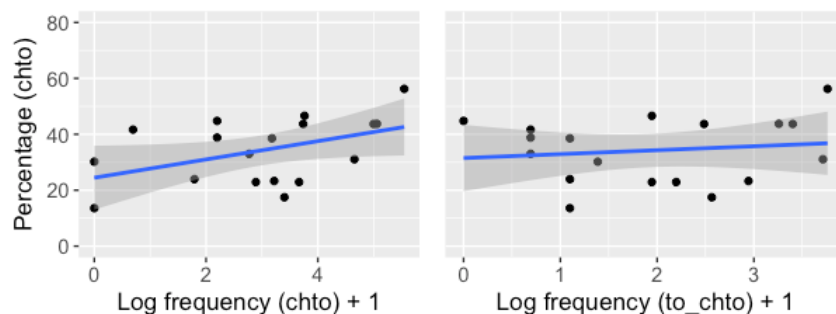
Fig. 4: Proportion of *čto*-clause responses as a function of log frequency of V-N by clause type

4 Discussion and Conclusion

This paper explored an alternative, frequency-based account of the collocational restriction in (3), according to which *čto*-clause (but not *to,čto*-clause) complements of N are restricted to V-N collocations that can undergo restructuring to form a complex predicate. The restriction was supported by the interaction effect between the clause type and the restructuring status of V-N found in the previous acceptability rating

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[18] These results should be taken with caution as they violate independence of observations. To take care of that, a generalized mixed model with log frequency of *čto*-clauses (plus 1) as a fixed effect (and the same random effects structure as above) was constructed. A marginal increase in the odds of selecting a *čto*-clause was found for higher frequency V-Ns ($\beta = 0.09$, SE = 0.05, χ^2 (1) = 2.89, p = 0.09). However, a control model with log frequency of *to,čto*-clauses as a predictor and a similar random effect structure (with the random slope for the item removed due to non-convergence) also showed a similar marginal effect of frequency ($\beta = 0.13$, SE = 0.07, χ^2 (1) = 3.6, p = 0.06). I leave the interpretation of these results for another occasion.

study. This effect, however, was confounded by the frequency contrast between the restructuring and non-restructuring V-Ns. An alternative hypothesis was proposed that attempted to derive this effect from the assumption that *čto*-clauses in non-direct position (including complements of N) are in some sense exceptional and thus should be subject to frequency effects (Frequency × Regularity interaction). In order to evaluate this hypothesis, the effect of the frequency of V-N collocations on the preference for *čto*-clauses was tested in a FC experiment, which manipulated the frequency of occurrence of a V-N collocation (treated as a binary categorical variable and defined relative to other V-N for a given N) while controlling for the semantics of the collocations.

The experiment showed an overall preference for *to,čto*-clauses; however, this was not significantly affected by the frequency of V-Ns as participants chose *čto*-clauses in the Higher and Lower frequency groups at the same rate (34% of the time). This pattern was fairly consistent across different item sets and frequency contrasts of different magnitude. For example, none of the 18 collocations showed preference for *čto*-clauses even though, for many of them, the *čto*-clauses greatly outnumbered the *to,čto*-clauses. This result can be explained by the fact that speakers tend to preserve Oblique/PP marking in non-direct positions, a tendency which was also observed in the rating experiment (see Knyazev to appear). This supports the "regularity" part of the Processing Hypothesis in (9a). However, it does not support the "frequency" part (Frequency × Regularity interaction) in (b–c), which predicts a facilitating effect on the processing of *čto*-clauses and an increase in their preference with higher frequency V-Ns.[19]

Interestingly, seven out of 18 collocations in the FC experiment showed an equal preference for *čto*- and *to,čto*-clauses and an overlap with V-Ns with the highest raw frequency of *čto*-clauses, raising the

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[19] The absence of the Frequency × Regularity interaction was further confirmed in the replication experiment (N = 175) that tested (as part of one of its sub-designs) the same nine critical items as Table 1, using a 7-point rating task and a 2 × 2 Latin square design. The experiment revealed the higher acceptability of *to,čto*-clauses (p < 0.001), but no effect of frequency (p = 0.41), and, crucially, no interaction (p = 0.53). A full discussion of the experiment is beyond the scope of this paper.

possibility that the effect of frequency might be better observed if frequency is treated as a *continuous* variable (rather than as a *categorical* one, as in the FC experiment), which was supported by the marginal correlation between the log frequency of *čto*-clauses and the proportion of *čto*-clause responses.

Although this possibility remains to be investigated, it should be stressed that not all V-Ns with the highest raw frequency of *čto*-clauses (e.g., 8A) led to an increase in preference for *čto*-clauses (= equal preference) and, conversely, such increase was shown by some V-Ns with moderate/low frequency of *čto*-clauses (1B, 2A–B, 6B). Indeed, semantic similarity is often a better predictor for an increase in preference for *čto*-clauses. For example, all four items in sets 1 and 2, which all express the existence of a mental state, showed the same response pattern despite rather different frequencies of *čto*-clauses; the same is true for sets 6 and 7.

This trend could in principle be accommodated by the Processing Hypothesis if statistical learning of "V + N + *čto* constructions" is supplemented by access to semantic generalizations (as opposed to a structural basis for "V + N + *to,čto* constructions"); cf. Ambridge, Pine, Rowland, Freudenthal and Chang (2014). Note, however, that the correlation with semantics is partial, as it still falls short of accounting for why 3B and 8A,B did not show equal preference for a clause type despite being similar to 3A, which did (see also 7A,B and 1-2, respectively).

Thus, to the extent that frequency (or semantics) of the V-N cannot provide a satisfactory account for the response patterns in the FC experiment, it can be concluded that the Processing Hypothesis was not supported in this study. Instead, the results point to the partly idiosyncratic nature of the preference for clause type, which is more consistent with the grammatical account (see Section 1.2), according to which the restructuring property of V-Ns has to be *lexically* specified (despite sharing many semantic features with one another).[20] This

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[20] This means that such an account would probably identify V-Ns with equal preference for a clause type with "true" restructuring collocations. Working out the details of such an account is left for future work.

indirectly supports the hypothesis that the interaction in the rating experiment (see Section 2.1) is the result of the grammatical restriction on *čto*-clauses rather than an instance of the Frequency × Regularity interaction.

Although the evidence against the particular formulation of the Processing Hypothesis is rather subtle, the results of the experiment lead to a general skepticism toward simplistic frequency-based accounts of the collocational restriction, as it revealed a striking discrepancy between the preference patterns for *čto*- and *to,čto*-clauses and their associated frequencies (e.g., none of the 18 items showed preference for *čto*-clauses despite the fact that most of the items occurred significantly more often with *čto*-clauses than with *to,čto*-clauses in the subcorpus, except for a few items, where the rate was similar; see Table 1). This potentially leads to interesting methodological questions about how exactly speakers' implicit knowledge of corpus frequencies maps to their behavior in FC and other acceptability tasks, which are, of course, beyond the scope of this paper.[21]

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[21] See Arppe and Järvikivi (2007) for some discussion.

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Appendix. Most Frequent V-N Collocations for Five Different Nouns in the Subcorpus or RNC

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nadežda 'hope'

ČTO: **1.** *byt'* N_{NOM} 'be$_{EXIST}$ N' (255; .29); **2.** *vyražat'* N_{ACC} 'express N' (156; .18); **3.** *pojavljat'sja* N_{NOM} 'appears N' (42; .05), **4.** *ostavat'sja* N_{NOM} 'remains N' (41; .05); **5.** *terjat'* N_{ACC} 'lose N' (38; .04); **6.** *vseljat'* N_{ACC} 'instill N' (27; .03); **7-8.** *teplit'sja* N_{NOM} 'glimmers N' (24; .03); **7-8.** *davat'* N_{ACC} 'give N' (24; .03); **9.** *tešit' sebja* N_{INS} 'flatter oneself with N' (23; .03); **10.** *l'stit' sebe* N_{INS} 'flatter oneself with N' (19; .02). ***To,čTO***: **1.** *byt'* N_{NOM} 'be$_{EXIST}$ N'' (42; .22); **2.** *vyražat'* N_{ACC} 'express N' (25; .13); **3.** *davat'* N_{ACC} 'give N' (18; .09); **4.** *vseljat'* N_{ACC} 'instill N' (12; .06); **5-6.** *ostavat'sja* N_{NOM} 'remains N' (11; .06); **5-6.** *ostavljat'* N_{ACC} 'leave N' (11; .06); **7.** *terjat'* N_{ACC} 'lose N' (8; .04); **8.** *pojavljat'sja* N_{NOM} 'appears N' (6; .03).

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uverennost' 'conviction'

ČTO: **1.** *byt'* N_{NOM} 'be$_{EXIST}$ N' (147; .24); **2.** *vyražat'* N_{ACC} 'express N' (104; .17); **3.** *prebyvat' v* N_{LOC} 'be in N ($\approx$ have N)' (40; .06); **4.** *vseljat'* N_{ACC} 'instill N' (23; .04); **5.** *vseljat'* N_{ACC} 'instill N' (19; .03); **6.** *byt' v* N_{Loc} 'be in N ($\approx$ have N)' (18; .03); **7.** *vyskazat'* N_{ACC} 'express N' (17; .03); **8.** *davat'* N_{ACC} 'give N' (13; .02); **9.** *krepnut'* N_{NOM} 'N strengthens ($\approx$ grows)' (12; .02); **10.** *ostat'sja v* N_{Loc} 'remain in N ($\approx$ maintain N)' (10; .02).   ***To,čTO***: **1.** *vyražat'* N_{ACC} 'express N' (40; .18); **2.** *byt'* N_{NOM} 'be in N ($\approx$ have N)' (29; .13); **3.** *krepnut'* N_{NOM} 'N strengthens ($\approx$ grows)' (9; .04); **4.** *vnušat'* N_{ACC} 'instill N' (8; .04); **5-7.** *vseljat'* N_{ACC} 'instill N' (7; .03); **5-7.** *pridavat'* N_{ACC} 'contribute N ($\approx$ add to N)' (7; .03); **5-7.** *darit'* N_{ACC} 'deliver N' (7; .03); **8.** *vyskazat'* N_{ACC} 'voice N' (6; .03).

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somnenie 'doubt'

ČTO: **1.** *byt'* N_{NOM} 'be$_{EXIST}$ N' (114; .44); **2.** *ostavat'sja* N_{NOM} 'remains N' (49; .19); **3.** *voznikat'* N_{NOM} 'emerges N' (25; .10); **4.** *ostavljat'* N_{ACC} 'leave N' (20; .08); **5.** *vyražat'* N_{ACC} 'express N' (15; .06); **6.** *vyskazat'* N_{ACC} 'express N' (6; .02).
To,čTO: **1.** *byt'* N_{NOM} 'be$_{EXIST}$ N' (75; .31); **2.** *ostavljat'* N_{ACC} 'leave N' (56; .23); **3.** *ostavat'sja* N_{NOM} 'remains N' (25; .10); **4.** *voznikat'* N_{NOM} 'emerges N' (20; .08); **5.** *vyražat'* N_{ACC} 'express N' (19; .08); **6.** *vyskazat'* N_{ACC} 'voice N' (13; .05); **7.** *vyzyvat'* N_{ACC} 'rouse N' (6; .03)

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dokazatel'stvo 'proof'

ČTO: **1.** *byt'* N_{NOM} 'be$_{EXIST}$ N' (29; 29%); **2.** *služit'* N_{INS} 'serve as N' (6; 6%); **3.** *polučit* N_{ACC} 'get N' (6; 6%). ***To,čTO***: **1.** *byt'* N_{INS} 'be ($\approx$ serve as) N' (18; 11%); **2.** *javljat'sja* N_{INS} 'be ($\approx$ serve as) N' (16; 10%); **3.** *predstavljat'* N_{ACC} 'constitute N' (15; 9%); **4.** *byt'* N_{NOM} 'be$_{EXIST}$ N' (12; 8%); **5.** *služit'* N_{INS} 'serve as N' (9; 6%); **6-7.** *byt'* N_{NOM} 'be ($\approx$ serve as) N' (8; 5%); **6-7.** *najti* N_{NOM} 'find N' (8; 5%); **8-9.** *polučit* N_{ACC} 'get N' (7; 4%); **8-9.** *suščestvovat'* N_{NOM} 'exist N' (7; 4%).

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verojatnost' 'likelihood'

ČTO: **1.** *byt'* N_{NOM} 'be$_{EXIST}$ N' (69; .23); **2.** *suščestvovat'* N_{NOM} 'exist N' (23; .23).
To,čTO: **1.** *suščestvovat'* N_{NOM} 'exist N' (18; .26); **2.** *byt'* N_{NOM} 'be$_{EXIST}$ N' (14; .21)

Slovenian 'Dopuščati' and the Semantics of Epistemic Modals[*]

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There has been much recent interest in the analysis and distribution of embedded epistemic modals (Yalcin 2007, Anand & Hacquard 2013, a.o.). We present novel data using the embedding verb *dopuščati* 'to allow for the possibility that' from Slovenian, analysed as an existential doxastic attitude, and argue for a new analysis of epistemic modals that captures their restricted distribution under doxastic attitudes.

1 Introduction

Suppose you wake up late one morning. It's already bright outside but you are too lazy to open your eyes. You could entertain the following two thoughts about the light:

(1) a. Mislim, da   utegne biti zunaj sončno.
       I.think   that   might   be outside sunny
       'I think it might be sunny outside.'

    b. Mislim,   da   mora   biti zunaj sončno.
        I.think   that must   be outside sunny
        'I think it must be sunny outside.'

As noted previously (Stephenson 2007, a.o.), doxastic attitudes like *think* can embed two kinds of modal verbs: possibility epistemic modals (e.g., *might*) and necessity epistemic modals (e.g., *must*).[1] The same facts hold in Slovenian, as illustrated above. Put differently, universal doxastic quantifiers can embed existential and universal epistemic modals.

In addition to verbs like *misliti* 'think' or *verjeti* 'believe', Slovenian has a weaker doxastic verb *dopuščati* 'to allow for the possibility'. The difference that I explore in this paper is the contrast between (1) above and (2) below, where an embedded necessity modal is odd.[2]

(2) a. Dopuščam, da   utegne biti sončno.
        I.allow   that   might be sunny
        'I allow for the possibility that it might be sunny.'
    b. #Dopuščam, da   mora biti sončno.
        I.allow   that   must be sunny
        'I allow for the possibility that it must be sunny.'

This data yields the generalization that (in a situation where the evidence under consideration is the attitude holder's) it is odd to combine a strong embedded modal with a weak doxastic attitude, while the other three combinations are acceptable. This idea, that existential doxastic attitudes can only embed existential (and not universal) epistemic modals, is not new (see Anand & Hacquard 2013), but has so far only been discussed in the context of attitude verbs involving preferences (*hope* and *fear*) or negative orientation (*doubt*). Since *dopuščati* involves neither, it delimits the space of possible analyses in an important way.

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[1] "Epistemic modal" is used for modals under an epistemic construal.

[2] I use '#' descriptively, to signal that a sentence is odd in the given context (without making claims about grammaticality or interpretability in other contexts). The symbols '??' and '?' are used for weaker levels of oddness.

The paper has two goals. The first is empirical: to discuss *dopuščati* and the formally relevant data in a non-technical way (§2). This section will hopefully be of use to a broader audience. The second goal (§3-4) is to propose that (2b) is odd because it contextually expresses the same proposition as (1b), using a weak constituent (*dopuščati*) in comparison. The challenge lies in rethinking epistemic modals and doxastic attitudes (§3) so that such an equivalence does not arise between (2a) and (1a).

2 Embedding under Doxastic Attitudes

I first discuss some properties of *dopuščati* and argue that it is a weak doxastic attitude (§2.1). Building on the data in (1) and (2), I show that *dopuščati* cannot embed epistemic necessity modals or their equivalents (negated possibility modals) (§2.2). Section §2.3 discusses matrix clause negation with doxastic attitudes – embedded necessity under *don't think* and negated *dopuščati* is odd. Finally, *dopuščati* reveals an important difference in acceptability between embedding epistemic modals and embedding doxastic attitudes (§2.4).

2.1 What it Means to 'Dopuščati'
Consider (3). The sentence conveys the idea that Othello considers it possible that Desdemona loves Cassio, but he leaves it open as to whether she actually does. That is, the proposition that Desdemona loves Cassio is consistent with Othello's beliefs, but he is understood to not have made up his mind as to whether he should believe it.

(3) Othello dopušča, da   Desdemona ljubi Cassija.
    Othello allows   that   Desdemona loves Cassio
    'Othello allows for the possibility that Desdemona loves Cassio.'

Below are some naturally occurring examples regarding the same point. Example (4c) illustrates the fact that *dopuščati* can appear with the (always optional) noun *možnost* 'possibility'.[3]

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[3] The Russian cognate *dopuskat'*, which is also used as a weak doxastic attitude, does not seem to do this as naturally. The Russian National Corpus (http://www.ruscorpora.ru/en/index.html, last accessed May 2017) contains 406 tokens of *dopuskaju* 'I allow' immediately followed by a *čto* 'that' clause, compared

(4) a. Dopuščam da je vaša laž posledica   neznanja   in ne
       I.allow   that is your lie consequence ignorance   and not
       zlonamernosti.
       malevolence.
       'I allow for the possibility that your lie follows from ignorance
       and not malevolence.'   (web)

    b. To je   seveda   le moje mnenje, nikakor ga ne
       this is   of.course only my opinion in.no.way it not
       vsiljujem, tudi dopuščam, da se   motim.
       I.impose   also I.allow   that REFL I.err
       'This is of course only my opinion, I definitely do not impose it,
       I even allow for the possibility that I'm wrong.'   (web)

    c. Tusk dopušča možnost,   da brexita ne bo.
       Tusk allows   possibility that Brexit not will.be
       'Tusk allows for the possibility that there will be no Brexit.'

                                                               (web)

In English, some speakers use the verb *allow* (without *for the possibility*) in a related way, as in (5).[4] The difference, however, is that *allow* is more "discursively" (used, for example, to admit something to be true for the sake of the argument). *Dopuščati*, on the other hand, carries no such implication – it is used merely to report on your mental state.[5]

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to 20 tokens of *dopuskaju* immediately followed by a noun, of which one is 'possibility' and 19 are 'thought' (Rafael Abramovitz, p.c.).

[4] Thanks to Matt Mandelkern (p.c.) for first pointing this out to me.

[5] A reviewer notes that the Czech *připouštět* seems to mean *concede* (not allow for a possibility and then allow for it) rather than *allow for the possibility*. In Slovenian, this meaning is not expressed by *dopuščati*IPF but by *dopustiti*PF, where the perfective aspect plausibly contributes the change of state described by the reviewer. What is interesting is that the Czech verb is actually imperfective. More research on the Czech aspect is needed to understand where this effect is coming from and whether change-of-state meanings show any interaction with the ability to embed epistemic modals.

There is in fact other micro-variation between the cognates of *dopuščati* in Slavic that I do not have the space to explore. For example, a speaker of Bulgarian and a speaker of Ukrainian have pointed out to me that their versions of (6a) are unacceptable, which suggests that their verb might be somewhat stronger (at least when the embedded proposition is not modal). On the other hand, a speaker of

(5) a. Othello allows that Desdemona might love Cassio.
    b. I'll allow that I'm wrong.

Unlike vanilla doxastic attitude (*think*/*believe*), *dopuščati* is **weak** in the sense that one can *dopuščati* something as well as its opposite, as in (6a).

(6) a. Dopuščam, da   je notri, in dopuščam, da   je zunaj.
         I.allow   that is inside and I.allow   that is outside
         'I allow that he's inside and I allow that he's outside.'
    b. #Mislim,   da   je notri, in mislim, da   je zunaj.
         I.think   that is inside and I.think that is outside
         'I think that he's inside and I think that he's outside.'

The relationship between *dopuščati* and attitudes like *think/believe* resembles that of *some* compared to *all*.[6] In (7), we see that a *dopuščati* claim can be strengthened into a belief claim (cf. *some students passed the exam, in fact all of them did*).

(7) In a debate with Flat-Earthers, a scientist is asked: *Ali dopuščate, da je Zemlja okrogla?* (Do you allow for the possibility that the Earth is round?) The scientist replies:
    Seveda   dopuščam, da je – trdno   verjamem, da je!
    of.course I.allow   that is firmly believe   that is
    'Of course I allow for the possibility that it is – I firmly believe it!'

The reason why one might think that *dopuščati* talks about something that is consistent with our **beliefs**, rather than knowledge, is that it is

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Serbian and an anonymous Polish-speaking reviewer report that they cannot find equivalents of *dopuščati* in their languages/dialects.
[6] The analogy with *some* and *all* runs into trouble with the example below, which is not odd (contradictory). There is plausibly, however, a contextual shift involved – I think x but I allow for the possibility that I'm wrong in which case not x. Alternatively, *think*/*believe* are in fact weaker than usually assumed (Hawthorne et al. 2016), in which case the analogy might be closer to, for example, *some* and *most*.
  (i) Marija misli/verjame, da je notri, ampak dopušča, da je zunaj.
      Mary   thinks/believes that is inside but   allows   that is outside
      'Mary thinks/believes he's inside but allows for the possibility that he's outside.'

commonly assumed that there is no such thing as false knowledge. There are, however, false *dopuščati* states:

(8) Dežuje,   ampak Janez   ne dopušča, da   dežuje.
    rains   but   John   not allows   that rains
    'It's raining but John doesn't allow for the possibility that it's raining.'

In §3, I assume that *dopuščati* is an existential quantifier over the doxastic (belief) state.

2.2 Embedding Epistemic Modals

Epistemic **possibility modals** can be embedded under strong doxastics like *misliti* or *think* (1a), but also under weak ones like *dopuščati* (2a). The examples in the introduction involved the verb *utegniti*, but the same point can be made with an adverb like *mogoče* 'maybe', as in (9a).

(9) Othello is asked whether he thinks that Desdemona is cheating on him. He replies:
    a. Dopuščam, da   me (mogoče) vara.
        I.allow   that me maybe   cheats.on
        'I allow for the possibility that she might be cheating on me.'
    b. Mislim, da   me mogoče vara.
        I.think   that me maybe   cheats.on
        'I think she might be cheating on me.'

Is there a difference between (9a) and (9b)? The two are very close, but speakers report Othello to have perhaps some reason for suspecting Desdemona of cheating in (9b), while (9a) merely expresses that she might in principle be unfaithful. Speakers report the modal in (9a) to be somewhat redundant, i.e., not needed for conveying that she might in principle be unfaithful, but they note that its presence adds tentativeness.[7]

    In contrast to possibility modals, epistemic **necessity modals** do not behave uniformly with respect to the strength of the embedding verb, as

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[7] The tentativeness effect seems to occur also with *must* under *think*. I leave it aside here.

illustrated in (1b) and (2b). What leads to oddness in (2b), however, seems to be the embedding of a wide-scope necessity meaning. Consider:

(10)   Situation as in (1) and (2).
       #Dopuščam, da   ne more deževati.
        I.allow   that not can   rain
       'I allow for the possibility that it can't be raining.'

On a fairly standard assumption, the force of a negated possibility modal, as in (10), equals that of a necessity modal with a negated complement. Given that (10) is odd, the culprit in (2b) is plausibly not *morati* 'must' per se, but the overall force in the embedded clause of *dopuščati*.[8]

2.3 Negated Doxastic Attitudes
Consider the following example:[9]

(11)   Situation: You, me, and John see Bob go home from work early. We sit down on some couches in front of Bob's office. John has his back turned to Bob's door. He puts on some headphones and starts cheating on the latest homework. After a while, Bob, who has a secret entry to his office, which he used to come back, creeps out of his office and comes up behind John's back. John, still immersed in cheating, does not notice this. I nudge you and whisper, with both of us staring at Bob:
       a.   John does not think that Bob might be behind his back.
       b.??John does not think that Bob must be behind his back.

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[8] It is difficult to find negated necessity modals to check whether those are acceptable, by analogy to (2a). Here is a potential candidate:
(i) Dopuščam možnost, da ni   nujno,   da sem prinesel "tako" hude
     I.allow   possibility that is.not necessary that AUX brought   such bad
     poškodbe in bil zato   lahek plen MOMa [...]
     injuries   and AUX therefore easy   pray BPD
     'I allow for the possibility that it is not necessarily the case that having such bad wounds made me easy prey to BPD [...]' (web)
[9] Judgments in this section vary somewhat; I mark the most charitable interpretation (e.g., "??" should be read as "?? or worse").

This data is in line with Anand and Hacquard's (2013, fn. 27) finding for Romance that main clause negation degrades the embedding of a necessity modal under a doxastic attitude.[10,11] The same pattern occurs in Slovenian with *misliti*, which is not neg-raising.

(12) Situation: as in (11).

    a. Janez   ne misli, da je Bob mogoče za   njegovim
        John   not thinks that is Bob maybe   behind his
        hrbtom.
        back
        'John does not think that Bob might be behind his back.'

    b. ??Janez ne misli, da mora biti Bob za   njegovim
        John not thinks that must be   Bob behind his
        hrbtom.
        back
        'John does not think that Bob must be behind his back.'

The situation in (11) is constructed so that the only evidence that the embedded epistemic can be felicitously sensitive to is the attitude holder's, i.e., John (since you, me, and Bob know/see that Bob is behind John's back). The statements in (11b)/(12b) also express something that is intuitively true, cf. (13). While (13) may be a somewhat awkward way of putting it, it does not feel odd in the same way as (11b)/(12b) does.

(13) It's not the case that John thinks that Bob must be behind his back.

A possible fault with the scenario in (11) is that it gives John no reason for entertaining the thought that Bob must be behind his back.[12] Given

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[10] See also Crnič (2014) and Ippolito (2017).

[11] Homer (2015) makes this observation for American English with (i) below. He notes that the British English *must* is acceptable under *don't think* and argues that this is because it can participate in double neg-raising (i.e. *think>must>not* in (ii) below).

  (i) #*I don't think that John must*epis *be very intelligent.* (AmE)

  (ii) *I don't think that John must*epis *be very intelligent.* (BrE)

[12] Thanks to Kai von Fintel (p.c.) for raising this issue.

the contrast between (11b)/(12b) and (13), it is unclear why this should play a role. Nevertheless, consider a different scenario:

(14)   Situation: You and I have had the opportunity to work as assistants to Sherlock Holmes, who is investigating a recent murder. Sherlock has taken an interest in the gardener and the butler. You and I are discussing what Sherlock thinks about who the murderer is. I say:
?Sherlock does not think that the gardener must be innocent (since he followed him around this morning).

Speakers still find something a bit odd about this example.[13] Here, however, Sherlock presumably thinks that the gardener might, or possibly must, be guilty. It should therefore be felicitous, given his behaviour, to deny that he thinks that the gardener must be innocent.

Interestingly, this contrast between embedded possibility and embedded necessity modals is maintained with ***dopuščati***, as illustrated in (15). Put differently, negation over *dopuščati* does not seem to play a role in the embedding of epistemic modals under *dopuščati*.

(15)   Situation: as in (11).
a. Janez   ne dopušča, da je Bob mogoče za   njegovim
   John   not allows   that is Bob maybe   behind his
   hrbtom.
   back
   'John does not allow for the possibility that Bob might be behind his back.'

---

[13] Some speakers feel that (14) is as bad as (11b). The difference for the others could be related to the ability of *because*/*since* to suspend implicatures, e.g., *Some students passed the exam because all of them did*, bringing *doesn't think* closer to *it's not the case that he thinks*.

      b.??Janez ne dopušča, da mora biti Bob za   njegovim
          John   not allows   that must be   Bob behind his
          hrbtom.
          back
          'John does not allow for the possibility that Bob must be
          behind his back.'

In this section, we showed that embedding a necessity modal under a negated doxastic, be it a strong one like *think/misliti* or a weak one like *dopuščati*, leads to a certain degree of oddness. This does not occur with embedded possibility modals.[14]

2.4 Embedding Doxastic Attitudes
I want to briefly touch upon a difference between attitudes and modals, most influentially discussed in Yalcin (2007). I will not review his data here, but I will make a similar point with different data. Consider again example (2), which showed that embedding a weak epistemic modal under a weak attitude is acceptable, in (2a), while embedding a strong epistemic modal under a weak attitude leads to oddness, in (2b), repeated below. By contrast, embedding either kind of attitude strength (under a weak attitude) is odd, as illustrated in (17).

(2) a. Dopuščam, da utegne biti sončno.
        I.allow   that might be sunny
        'I allow for the possibility that it might be sunny.'
    b. #Dopuščam, da   mora biti sončno.
        I.allow   that must be sunny
        'I allow for the possibility that it must be sunny.'

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[14] A reviewer points out that the typology of doxastic attitudes could be extended along the lines of negative attitude verbs, such as *rule out* or the Polish *wykluczać* 'rule out'. Polish provides an interesting test case since it does not have a verb like *dopuščati* but uses *nie wykluczać* 'not rule out' in its place. The reviewer points out that (6a) is good with *nie wykluczać*, suggesting weakness, and that *nie wykluczać* behaves like *dopuščati* in examples like (2), while *wykluczać* behaves like *ne dopuščati* in (15) above. I hope to explore this suggestion in future work.

(17) a. #Dopuščam,   da   dopuščam, da   sem   se   zmotila.
         I.allow   that I.allow   that   am   self   err
         'I allow that I allow that I made a mistake.'
      b. #Dopuščam,   da   verjamem, da   sem   se   zmotila.
         I.allow   that I.believe   that   am   self   err
         'I allow that I believe that I made a mistake.'

Intuitively, what goes wrong in (17) is that the speaker (more generally, the attitude holder) fails to be an **authority** on his/her own beliefs. We take belief to be something that we all 'have privileged and immediate access to' (Klein et al. 2015; see also Dorr and Hawthorne 2013: 897-898).

The point about this is minor but important: (2a) and (17a) both involve embedding under a weak expression, but only the case of embedded attitudes leads to oddness. (On a related note, the oddness in (17b) feels distinctively different from that in (2b).) Informally, we can conclude from this that while people are assumed to be authorities on their beliefs, they are not assumed to be authorities of the same kind on their evidence. Nevertheless, a tight connection needs to be maintained between belief and epistemic modals embedded under belief, for reasons discussed in Yalcin (2007).[15]

3 A New Semantics for Doxastic Attitudes and Epistemic Modals

The generalization that we want to model is that embedded universal epistemic force is odd under *dopuščati* and negated doxastic attitudes (be it *misliti* or *dopuščati*). There are three key notions to the interaction: (i) doxastic states are structured in terms of prominence and the choice of what is made salient depends on the attitude verb, (ii) epistemic modals are "local" (Mandelkern forthcoming), and (iii) epistemic modals are "total". The rest of the interaction is carried by the assumptions about presupposition projection that I make.

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[15] The standard analysis (Hintikka 1962, Kratzer 1977, 1981) predicts (2a) and (2b) to both be good, while a simple extension of Yalcin's (2007) revised semantics predicts both to be odd. Our goal is to arrive at something intermediate for embedded modals, while keeping the common assumptions about belief introspection that explain the oddness in (17).

Formulas will be evaluated with respect to an index that consists of three parameters: (i) the information state (a set of worlds), as in Yalcin (2007), (ii) the salient state (a subset of the information state), and (iii) the world of evaluation. I will use intensional semantics à la von Fintel and Heim (2016) over these evaluation triples.

(18) a. extension: $[\![\cdot]\!]^{c,g,\langle s,s',w \rangle}$
      b. intension: $\lambda \langle s, s', w \rangle [\![\cdot]\!]^{c,g,\langle s,s',w \rangle}$ (abbreviated as $[\![\cdot]\!]_{\mathbb{C}}^{c,g}$)

In (18), c is the context set, g the assignment function, s the information state, s' the salient state, and w the world of evaluation. We can follow Lewis (1980) in assuming that assertions would simply be a set of worlds, letting the context close off the values of s and s'.[16] Here is then the proposed meaning for the relevant two doxastics in Slovenian:[17]

(19) **Semantics of doxastic attitudes**:
      a. $[\![misliti]\!]^{g,\langle s,s',w \rangle} = \lambda p \lambda x \forall w' \in \mathcal{B}_x^w [\, p(\langle \mathcal{B}_x^w, \mathcal{B}_x^w, w' \rangle) = 1]$
      b. $[\![dopuščati]\!]^{g,\langle s,s',w \rangle} = \lambda p \lambda x \exists w' \in \mathcal{B}_x^w [\, p(\langle \mathcal{B}_x^w, \{w'\}, w' \rangle) = 1]$

Following Hintikka (1962), the verbs in (19) are analysed as quantifiers over the set of worlds compatible with what the attitude holder x believes in w. Following Yalcin (2007), they both shift the information state parameter to the doxastic set. The difference lies in what is made salient: *misliti* is neutral in prominence in that it makes the whole doxastic state salient, while *dopuščati* brings to attention the witness(es) to its existential statement. This distinction is passed on to the embedded proposition (evaluated with respect to an updated point of evaluation). Notice then that the two verbs are duals for any expression that is not sensitive to the second coordinate (the salience parameter).

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[16] Assertion: $\lambda w. [\![\cdot]\!]^{c,g,\langle s_c,s_c,w \rangle}$ where s_c is the contextually determined s, etc.
[17] Thanks to Irene Heim (p.c.) for suggesting a simplification.

(20) **Semantics of epistemic modals**:

    a. $[\![morati]\!]^{g,\langle s,s',w\rangle} = [\![must]\!]^{g,\langle s,s',w\rangle} =$

      $= \lambda R: \forall v \in s[R(v) \subseteq s] \& \exists v \in s'[s \subseteq R(v)].\lambda p.\forall w'' \in R(w)[p(\langle s, s', w''\rangle) = 1]$

    b. $[\![utegniti]\!]^{g,\langle s,s',w\rangle} = [\![might]\!]^{g,\langle s,s',w\rangle} =$

      $= \lambda R: \forall v \in s[R(v) \subseteq s] \& \exists v \in s'[s \subseteq R(v)].\lambda p.\exists w'' \in R(w)[p(\langle s, s', w''\rangle) = 1]$

The entries in (20) follow the standard truth-conditional content of modals as quantifiers over a contextually-determined set of accessible worlds (Kratzer 1977, 1981). The modal combines with a free (modal base) variable of type *sst* (von Fintel 1994), which maps the world of evaluation to a set of accessible worlds (sloppily switching between function-talk and set-talk). The crucial component in (20) is a two-part presupposition on the modal base. I discuss the two parts ("Locality" and "Totality") in turn.

Following Mandelkern (2017, forthcoming), who builds on Yalcin (2007), epistemic modals carry a definedness condition called **Locality** (the first presupposition).[18] Under belief, this constraint requires the modal base function to map belief worlds onto subsets of the doxastic state. Locality, which constrains admissible modal bases, ensures that epistemic modals only access the information that is locally provided to them.[19] A way to intuitively understand Mandelkern's and Yalcin's idea is to think of our beliefs as pieces of evidence that we use to navigate the world. Epistemic modals under belief predicates are constrained by this kind of evidence.

There is a second constraint on epistemic modals, called **Totality**. Under belief, it requires that the modal base function finds at least one world (v) in the salient part of the belief state (s') and map the modal base from that world ($R(v)$) to a superset of the belief state (s). (Together with Locality, this means that the modal base from that world and the

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[18] This constraint is weaker than Yalcin's but can account for Yalcin's data (and more).

[19] Like Yalcin (2007) and Mandelkern (2017, forthcoming), I would need to assume a covert type-shifting operator for the cases in which the embedded epistemic modal is not sensitive to the attitude holder's evidence.

doxastic state coincide.[20]) Intuitively, epistemic modals under belief predicates are not allowed to be completely constrained by the outside evidence – there are salient worlds from which only belief-evidence is accessed.

I write the two presuppositions as intermediately accommodated into the restrictor of the attitude predicate (as is customary, restrictors are assumed to be non-empty). This is only crucial when Totality ends up containing a variable bound by the attitude (as with *dopuščati*), in which case, we need intermediate accommodation to derive the right truth-conditions. The formulas are, however, more transparent if Locality and Totality are kept together (it is easier to see how the negation is "pushed in", for example).

Consider first examples like (1b), repeated in (21) with *Janez* 'John' as the subject (*J* in the LFs). Here is how we derive the truth-conditions using the entries in (19a) and (20a).

(21) Janez misli, da mora biti sončno.
     John thinks that must be sunny
     'John thinks it must be sunny.'

$\llbracket (1b) \rrbracket^{g, \langle s, s', w \rangle} = 1$ iff

$\llbracket misli \rrbracket^{g, \langle s, s', w \rangle} (\llbracket mora_i \, biti \, sončno \rrbracket^g_{\mathfrak{C}})(\text{John}) = 1$ iff

$\forall w' \in \mathcal{B}^w_{\text{John}}[\llbracket mora_i \, biti \, sončno \rrbracket^g_{\mathfrak{C}}(\langle \mathcal{B}^w_{\text{John}}, \mathcal{B}^w_{\text{John}}, w' \rangle) = 1]$ iff

$\forall w' \in \mathcal{B}^w_{\text{John}}[\llbracket mora_i \, biti \, sončno \rrbracket^{g, \langle \mathcal{B}^w_{\text{John}}, \mathcal{B}^w_{\text{John}}, w' \rangle} = 1]$ iff

$\forall w' \in \mathcal{B}^w_{\text{John}}[\llbracket mora \rrbracket^{g, \langle \mathcal{B}^w_{\text{John}}, \mathcal{B}^w_{\text{John}}, w' \rangle}(\llbracket i \rrbracket^{g, \langle \mathcal{B}^w_{\text{John}}, \mathcal{B}^w_{\text{John}}, w' \rangle})(\llbracket biti \, sončno \rrbracket^g_{\mathfrak{C}}) = 1]$ iff

$\forall w' \in \mathcal{B}^w_{\text{John}}[\llbracket mora \rrbracket^{g, \langle \mathcal{B}^w_{\text{John}}, \mathcal{B}^w_{\text{John}}, w' \rangle}(g(i))(\llbracket biti \, sončno \rrbracket^g_{\mathfrak{C}}) = 1]$ iff

$\forall w' \in \mathcal{B}^w_{\text{John}}[[\lambda R : \forall v \in s[R(v) \subseteq s] \& \exists v \in s'[s \subseteq R(v)].\lambda p.\forall w'' \in R(w')[p(\langle \mathcal{B}^w_{\text{John}}, \mathcal{B}^w_{\text{John}}, w'' \rangle) = 1]](g(i))(\llbracket biti \, sončno \rrbracket^g_{\mathfrak{C}}) = 1]$ iff

$\forall w' \in \mathcal{B}^w_{\text{John}}[(\forall v \in \mathcal{B}^w_{\text{John}}[g(i)(v) \subseteq \mathcal{B}^w_{\text{John}}] \& \exists v \in \mathcal{B}^w_{\text{John}}[\mathcal{B}^w_{\text{John}} \subseteq g(i)(v)]) \rightarrow \forall w'' \in g(i)(w')[\text{it's sunny at } w'']]$

Fig. 1: Truth-conditions of (21)/(1b)

Given non-empty restrictors, the doxastic state *B* should be non-empty. Notice that this extends to satisfying Locality and Totality in the

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[20] Thanks to Daniel Rothschild (p.c.) for suggesting I adopt this weaker version of Totality.

antecedent.[21] Above, the two require the modal base $g(i)$ function to be such that it maps belief worlds onto subsets of the doxastic state, while there is a belief world that it maps onto the doxastic state itself. The rest of the truth-conditions are as expected: every belief world is such that it is sunny at every world in the modal base from it. Notice that since the modal base function from some world maps onto the whole doxastic state, it follows that it is sunny at every belief world.[22]

We now show that (22), based on (2b), is equivalent to (21).

(22) #Janez dopušča, da   mora biti sončno.
        John   allows   that   must be sunny
        'John allows for the possibility that it must be sunny.'

$$[\![(2b)]\!]^{g,\langle s,s',w\rangle} = 1 \text{ iff}$$
$$\exists w' \in \mathcal{B}^w_{\text{John}} [\![\![mora]\!]^{g,\langle \mathcal{B}^w_{\text{John}}, \{w'\}, w'\rangle} (g(i))([\![biti\ sončno]\!]^g_{\mathfrak{C}}) = 1] \text{ iff}$$
$$\exists w' \in \mathcal{B}^w_{\text{John}} [\forall v \in \mathcal{B}^w_{\text{John}} [g(i)(v) \subseteq \mathcal{B}^w_{\text{John}}] \ \& \ \exists v \in \{w'\} [\mathcal{B}^w_{\text{John}} \subseteq g(i)(v)] \ \& \ \forall w'' \in g(i)(w')[\text{ it's sunny at } w'']] \text{ iff}$$
$$\exists w' \in \mathcal{B}^w_{\text{John}} [\forall v \in \mathcal{B}^w_{\text{John}} [g(i)(v) \subseteq \mathcal{B}^w_{\text{John}}] \ \& \ [\mathcal{B}^w_{\text{John}} \subseteq g(i)(w')] \& \ \forall w'' \in g(i)(w') : \text{it's sunny at } w']$$

Fig. 2: Truth-conditions of (22)/(2b)

In Fig. 2, Locality is as before whereas Totality contains the variable w', bound by the existential quantification contributed by *dopuščati*. This means that it is the world that *dopuščati* talks about ('there is a world in the belief state such that...') that is such that the modal base maps it onto the doxastic state. Since the truth-conditions require it to be sunny in every world from that modal base ($g(i)(w')$), it again follows that the attitude holder believes that it is sunny. It is then easy to see how the two entail each other.[23]

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[21] Locating them in the antecedent of the conditional statement is logically equivalent to writing them as conditions on the set.

[22] On this semantics *must* is strong: Bp and $B\square p$ are equivalent.

[23] Similarly for the truth-conditions of (10), which mirror (22).
$$[\![(10)]\!]^{g,s,s',w} = 1 \text{ iff}$$
$$\exists w' \in \mathcal{B}^w_{\text{John}} [\![\![more]\!]^{g,\langle \mathcal{B}^w_{\text{John}}, \{w'\}, w'\rangle} (g(i))([\![deževati]\!]^g_{\mathfrak{C}}) = 0] \text{ iff}$$
$$\exists w' \in \mathcal{B}^w_{\text{John}} [\forall v \in \mathcal{B}^w_{\text{John}} [g(i)(v) \subseteq \mathcal{B}^w_{\text{John}}] \ \& \ [\mathcal{B}^w_{\text{John}} \subseteq g(i)(w')] \ \& \ \neg \exists w'' \in g(i)(w')[\text{it's raining at } w'']]$$

Let us now turn to embedded existential modals from (1a) and (2a), used in (23) and (24) with the subject *Janez* 'John' (*J* in the LFs).

(23) Janez misli, da   utegne biti sončno.
     John thinks that might be sunny
     'John thinks it might be sunny.'

(24) Janez dopušča, da   utegne biti sončno.
     John allows   that might be sunny
     'John allows for the possibility that it might be sunny.'

$[\![(1a)]\!]^{g,s,s',w} = 1$ iff
$\forall w' \in \mathcal{B}_J^w[(\forall v \in \mathcal{B}_J^w[g(i)(v) \subseteq \mathcal{B}_J^w] \& \exists v \in \mathcal{B}_J^w[\mathcal{B}_J^w \subseteq g(i)(v)]) \rightarrow \exists w'' \in g(i)(w')[p(w'') = 1]]$

$[\![(2a)]\!]^{g,s,s',w} = 1$ iff
$\exists w' \in \mathcal{B}_J^w[(\forall v \in \mathcal{B}_J^w[g(i)(v) \subseteq \mathcal{B}_J^w] \& \mathcal{B}_J^w \subseteq g(i)(w')) \& \exists w'' \in g(i)(w')[p(w'') = 1]]$

Fig. 3: Truth-conditions of (23)/(1a) and (24)/(2a)

The situation in Fig. 4 shows that (23) and (24) are not equivalent since (24) does not entail (23). That is, (24) is true in Fig. 4 while (23) is false (given the truth-conditions in Fig. 3). The modal base from both worlds in Fig. 4 does *not* map outside the belief state, so Locality is satisfied for both (23) and (24) and we can leave it aside. To see that (24) is true, consider the belief world on the left-hand side. The modal base from it is indeed a superset of the belief state and there is a world in its modal base, namely itself, that satisfies *p*. By contrast, the truth-conditions of (23) require every belief world to have a modal base in which there is a *p*-world. This is not the case for the world on the right hand side.
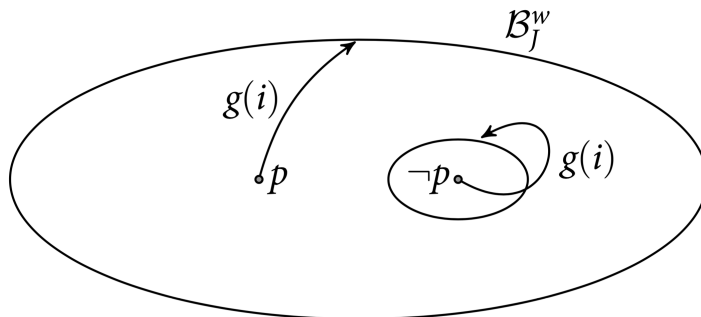
Fig. 4: $D\diamond_i p \nVDash B\diamond_i p$

It is easy to see that the converse holds: (23) entails (24), assuming non-empty restrictors. Thus, when *dopuščati* embeds an existential modal, the sentence is strictly weaker than the one obtained with *misliti*. This effect was indirectly observed in (9) where *misliti* suggested that Othello had some evidence for suspecting Desdemona of cheating while *dopuščati* triggered no such inference. This can be linked to the properties of the modal base function in Fig. 4 but I do not explore this here.

In sum, I proposed a semantics on which embedded universal modals collapse the distinction in the attitude force, while embedded existential modals preserve it. I will not go through the proofs, but this property is maintained under negation, as illustrated schematically in Fig. 6.[24] Fig. 5 provides the remaining truth-conditions.

$[\![\neg D_J \Box_i p]\!]^{g,s,s',w}=1$ iff $\forall w' \in \mathcal{B}_J^w[(\forall v \in \mathcal{B}_J^w[g(i)(v) \subseteq \mathcal{B}_J^w] \& [\mathcal{B}_J^w \subseteq g(i)(w')]) \rightarrow \exists w'' \in g(i)(w')[p(w'')=0]])$

$[\![\neg B_J \Box_i p]\!]^{g,s,s',w}=1$ iff $\exists w' \in \mathcal{B}_J^w[\forall v \in \mathcal{B}_J^w[g(i)(v) \subseteq \mathcal{B}_J^w] \& \exists v \in \mathcal{B}_J^w[\mathcal{B}_J^w \subseteq g(i)(v)] \& \exists w'' \in g(i)(w')[p(w'')=0]]$

$[\![\neg B_J \diamond_i p]\!]^{g,s,s',w}=1$ iff $\exists w' \in \mathcal{B}_J^w[\forall v \in \mathcal{B}_J^w[g(i)(v) \subseteq \mathcal{B}_J^w] \& \exists v \in \mathcal{B}_J^w[\mathcal{B}_J^w \subseteq g(i)(v)] \& \forall w'' \in g(i)(w')[p(w'')=0]]$

$[\![\neg D_J \diamond_i p]\!]^{g,s,s',w}=1$ iff $\forall w' \in \mathcal{B}_J^w[(\forall v \in \mathcal{B}_J^w[g(i)(v) \subseteq \mathcal{B}_J^w] \& \mathcal{B}_J^w \subseteq g(i)(w')) \rightarrow \forall w'' \in g(i)(w')[p(w'')=0]]$

Fig. 5: Truth-conditions for modals under negated attitudes
(D=*dopuščati*, B=*misliti*, J=attitude holder, *i*=modal base)

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[24] Fig. 4 can be re-used ($\neg B_J \diamond_i p$ is true while $\neg D_J \diamond_i p$ is false).

$$B\square p$$

$$D\diamond p \longleftarrow \quad B\diamond p$$

$$\#D\square p$$

$$\#\neg D\square p$$

$$\neg B\diamond p \longleftarrow \quad \neg D\diamond p$$

$$\#\neg B\square p$$
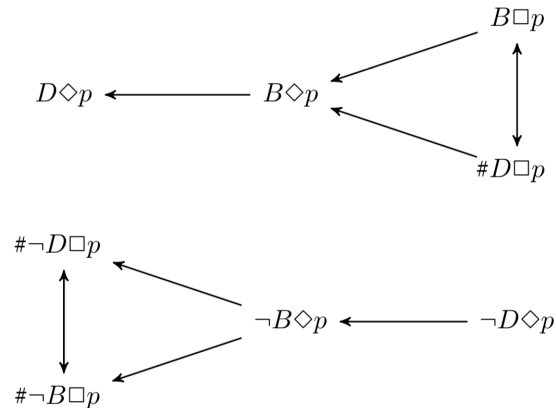
Fig. 6: Summary of the entailments

4 How to Derive the Oddness?

As illustrated in Fig. 6, the sentences with embedded strong modals are equivalent, regardless of what the embedding doxastic attitude is. In this section, I want to give an idea as to why this might trigger oddness, but I leave much of the work for future research.

(24)   a. #Some Italians come from a warm country.
        b. #Some students got an A. (Situation: the professor is known to assign the same grade to all of his students)

(Magri 2009, 2011)

Roughly, these sentences are odd because they are equivalent to their scalar alternatives (*All Italians come...*, *All students got....*). In a situation where everyone gets the same grade, if some students get an A, then they all do, and vice versa.[25] The semantics we set up in Section 3 gives us

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[25] Magri derives the oddness with an exhaust operator that generates the uncancellable inference *some but not all*, which yields a contextual contradiction. A reviewer points out that (24a) is acceptable with the continuation *in fact all of them do* and suggests a parallel to (7). The *in fact* data is a more general challenge for Magri-like theories, so I do not attempt to address it here, but the parallel is there. To show that *dopuščati* does not semantically encode *dopuščati but not think*, we used a context where 'think' was granted (the person in (7) is a scientist) and showed that

equivalence, as in Fig. 6. Can we exploit them to explain why it is odd to use *dopuščati* with 'it must be sunny outside'?

Let's have a rule that says that the sentence in (24a) is **deviant** in a context where Italians come from the same country because there is a Horn competitor *All Italians come from a warm country* (obtained by substituting *some* with *all*) such that (i) the two propositions are contextually equivalent and, importantly, (ii) (24a) is "structurally weaker" than its *all*-version. More precisely, there is a shared constituent *come from a warm country* that could be replaced by another structure, such as *smiled,* where *All Italians smiled* entails that *Some Italians smiled* and not vice versa.[26] In other words, we have access to the make-up of (24a), which uses a weaker expression than needed (to convey the same information).

This works well for the base case in (2b) ('I allow that it must be sunny') or (22) above. We say that (2b) is deviant in that context because there is a Horn competitor (1b) ('I think it must be sunny'), which is equivalent to it and, furthermore, (2b) is structurally weaker than (1b). Consider replacing the embedded clause (a shared constituent) with a non-modal proposition, e.g., 'it's sunny'. Intuitively, as well as theoretically (such simple propositions are not sensitive to prominence), *Dopuščam, da je sončno* 'I allow that it's sunny' is entailed by but does not itself entail *Mislim, da je sončno* 'I think it's sunny'. Thus, (2b) uses a weaker expression than needed to convey the same message as (1b), so it is odd.

The explanation works less well for the difference between embedded necessity epistemics under *don't think* and *it's not the case that think*, in (12b) and (13), respectively. To solve this, we need to appeal to meta-linguistic negation for (13). The more serious issue is (15b), for which we need the deviance principle to apply locally and

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we can strengthen *dopuščati* into *think* without oddness, which is what we can in principle do in (24) as well.

[26] We would probably need a more fine-grained notion of what kind of structure makes for a good replacement test.

percolate upward.[27] We stipulate that a constituent or a sentence is deviant if it contains a deviant subconstituent, and leave the details of this for future work.

5 Conclusion

This paper examined the behaviour of epistemic modals (*might*, *must*) when embedded under two types of doxastic attitude verbs: strong verbs like *misliti* 'think' and weak verbs like the previously undiscussed *dopuščati* 'to allow for the possibility' from Slovenian. I analysed the latter as an existential belief verb and showed that a semantics can be designed for doxastic attitudes and epistemic modals that captures the intuitive oddness of sentences like *Dopuščam, da mora deževati* 'I allow for the possibility that it must be raining'. I proposed a semantics where embedded universal modals collapse the distinction in the attitudinal force, while embedded existential modals preserve it. I concluded with some thoughts on why this leads to oddness in some cases, leaving the pragmatic details for future work.

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(4a)   http://www.delo.si/novice/slovenija/repe-zombiji-bodo-ukradeno-drzavo-priborili-nazaj.html   (last accessed Dec 17)
(4b)   http://www.delo.si/kultura/knjizevni-listi/recenzija-knjige-vcasih-se-zdi-da-je-cas-za-posmeh.html   (last accessed Dec 17)
(4c)   http://www.delo.si/svet/evropa/tusk-dopusca-moznost-da-brexita-ne-bo.html   (last accessed Dec 17)
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[27] Magri (2009, 2011) achieves this effect by making the exhaust operator obligatory at every scope site, so also in embedded positions, such as under negation.

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How to Represent Polish Comparisons with *jak*

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This paper discusses how Polish comparisons involving the word *jak* 'like' should be represented in syntax, arguing for an analysis where *jak* is the complementiser introducing a subordinate clause with an elided predicate – same as in the main clause.

1 Introduction

On the basis of attested[1] examples, this paper argues against the analysis proposed in Kallas (1986),[2] according to which *jak* in (1) is a preposition (P) taking the noun *siostra* 'sister' as its nominative complement (see (2)), while *jak* in (3) is a coordinating conjunction (CONJ) joining accusative

[1] Examples from the National Corpus of Polish (NKJP, http://nkjp.pl, Przepiórkowski et al. (2012)) are marked as 'NKJP', while examples from the Internet are marked as 'Google'.
[2] Glosses and free translations were added to examples taken from Kallas (1986).

nominals *naukę* 'learning' and *zabawę* 'fun' (as shown in (4)):

(1)   Kochała   Jurka   jak siostra.
       loved$_{3.SG.F}$ Jurek$_{ACC}$ like sister$_{NOM.SG.F}$
       'She loved Jurek like his sister (loved Jurek).'   (Kallas 1986: ex. (1))

(2)   Kochała Jurka [[jak]$_P$ [siostra]$_{NP}$]$_{PP}$.

(3)   Dzieci   często traktowały   naukę   jak zabawę.
       child$_{NOM.PL.N}$ often   treated$_{3.PL.N}$ learning$_{ACC}$ like fun$_{ACC}$
       'Children often treated learning like fun.'   (Kallas 1986: ex. (32))

(4)   Dzieci często traktowały [[naukę]$_{NP}$ [jak]$_{CONJ}$ [zabawę]$_{NP}$]$_{NP}$.

Upon closer scrutiny, it turns out that these two analyses, although appealing due to their simplicity, are problematic and untenable. Arguments presented to support this claim include: structural case assignment to numeral phrases (§ 2), independent case assignment in the comparison (§ 3), word order (§ 4: non-adjacency, fronting, pro-drop), interaction with passive voice (§ 5), and multiple dependents following *jak* (§ 6).

§ 7.1 argues against analysing comparisons with *jak* as gapping, a special type of clausal coordination with ellipsis, while § 7.2 presents the proposed analysis of such comparisons as a subordinate clause with ellipsis.

§ 8 discusses interesting and potentially problematic issues related to comparisons with *jak*: licensing of *n*-words and genitive of negation (§ 8.1), interactions with binding (§ 8.2), and comparisons as dependents of gerunds (§ 8.3). Finally, § 9 concludes the paper.

2   Numeral Phrases

(5) shows that the dependent following *jak* may be not only nominative, as in (1), but also accusative – the numeral phrase *siedem sióstr* 'seven sisters' is headed by the accusative non-agreeing numeral *siedem* which assigns genitive case to the accompanying nominal, *sióstr*.

(5)   Kochała   Jurka   jak jego siedem   sióstr.
      loved$_{3.SG.F}$ Jurek$_{ACC}$ like his   seven$_{ACC.PL.F}$ sister$_{GEN.PL.F}$
      'She loved Jurek like his seven sisters.'

Unlike (1), (5) has two readings – the comparison can be interpreted as
referring to the subject (*She loved Jurek like his seven sisters loved Jurek*),
as in (1), or to the object (*She loved Jurek like she loved his seven sisters*).

   There is no such ambiguity in (6) – since POMAGAĆ 'help' cannot take
an accusative object, the numeral phrase *siedem sióstr* can only be inter-
preted as referring to the subject. Furthermore, (6) shows that *jak* cannot
be followed by any accusative nominal – it must be an accusative numeral.

(6)   Pomagała   Jurkowi jak siostra   / *siostrę   /
      helped$_{3.SG.F}$ Jurek$_{DAT}$ like sister$_{NOM.SG.F}$ sister$_{ACC.SG.F}$
      jego siedem   sióstr.
      his   seven$_{ACC.PL.F}$ sister$_{GEN.PL.F}$
      'She helped Jurek like his sister / seven sisters (helped Jurek).'

Case constraints shown in (6) are identical to subject case marking restric-
tions in Polish which precisely require the subject of a finite verb[3] to be
nominative or to be an accusative[4] non-agreeing numeral (Franks 1995,
Przepiórkowski 1999). Therefore, analysing *jak* in (1) as a preposition re-
quiring a nominative complement misses a generalisation. Furthermore,
to account for the data presented above, the hypothetical preposition *jak*
would require a disjunctive case constraint mirroring structural case re-
quirements appropriate for the subject – another missed generalisation.

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[3] Gerunds require their subject to be marked with genitive case.

[4] There are alternative analyses claiming that Polish non-agreeing numerals in the subject
position are a special variety of nominative case, so as to preclude agreement with true
nominative forms of attributive and predicative adjectives with human masculine gender
(Kopcińska 1997). Though the argument presented here assumes accusative case (which
accounts for agreement), it can be translated to the special nominative, leading to the same
conclusion – the item following *jak* is not just nominative, but it also satisfies case require-
ments appropriate for the subject. This prediction is confirmed by the facts discussed in § 5
and § 6.

By contrast, this generalisation can be captured by analysing the comparison involving *jak* as a subordinate clause with a missing (elided) main predicate, as in (7), which corresponds to (1).

(7)   Kochała Jurka [[jak]$_C$ [siostra]$_{NP}$ ~~kochała Jurka~~]$_{CP}$.

The complementiser (C) *jak* introduces a subordinate clause (CP) headed by the elided predicate which corresponds to the overt predicate in the main clause (KOCHAĆ 'love' in (1)). The predicates KOCHAĆ and POMAGAĆ 'help' take a subject that, following general structural case assignment rules in Polish outlined above, may be nominative (as in (1) and (6)) or, with non-agreeing numerals, accusative (as in (5) and (6)).

3   Independent Case Assignment

3.1 Structural Case Assignment: The Genitive of Negation

Kallas (1986) analyses *jak* in (8) and (10), repeated from (3), as a conjunction (CONJ) that coordinates nominal phrases (see (9) and (11), repeated from (4)) to ensure that the phrase following *jak* matches the phrase preceding *jak* by satisfying the same case requirements imposed by the verb:

(8)   Jan   wywijał   rękami   jak cepami.
       Jan$_{NOM}$ waved$_{3.SG.M}$ hands$_{INST}$ like flails$_{INST}$
       'Jan waved his hands like flails.'   (Kallas 1986: ex. (31))

(9)   Jan wywijał [[rękami]$_{NP}$ [jak]$_{CONJ}$ [cepami]$_{NP}$]$_{NP}$.

(10)   Dzieci   często traktowały   naukę   jak zabawę.
       child$_{NOM.PL.N}$ often   treated$_{3.PL.N}$ learning$_{ACC}$ like fun$_{ACC}$
       'Children often treated learning like fun.'   (Kallas 1986: ex. (32))

(11)   Dzieci często traktowały [[naukę]$_{NP}$ [jak]$_{CONJ}$ [zabawę]$_{NP}$]$_{NP}$.

While WYWIJAĆ 'wave' assigns lexical instrumental case to its complement in (8), TRAKTOWAĆ 'treat' assigns structural case[5] to its object in

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[5] See Przepiórkowski (1999) for a discussion of structural case assignment in Polish.

(10) – in the absence of negation, the object is marked for accusative case. Kallas (1986) provides (12) to support her coordinating conjunction analysis of *jak* – her claim is that since negation on the verb assigning structural case triggers genitive case on both nominals (*nauki* 'learning', *zabawy* 'fun'), these nominals are coordinated (with a structure analogous to (11)).

(12)   Nie traktowały   nauki   jak zabawy.
       NEG treated$_{3.PL.N}$ learning$_{GEN}$ like fun$_{GEN}$
       'They did not treat learning like fun.'   (Kallas 1986: ex. (32"))

Although intuitive, the analysis of *jak* as a coordinating conjunction joining nouns is based on a false assumption. Contrary to what Kallas (1986) tried to prove using genitive of negation facts in (12), it is not necessary for the phrase inside the comparison (following *jak*) to be marked for the same case as its counterpart in the main clause, as shown in (13)–(14):

(13)   Dzieci   nie traktowały   nauki   jak zabawę.
       child$_{NOM.PL.N}$ NEG treated$_{3.PL.N}$ learning$_{GEN}$ like fun$_{ACC}$
       'Children did not treat learning like fun.'

(14)   Nie trzeba jej   obwieszać jak choinkę.
       NEG need   she$_{GEN}$ decorate$_{INF}$ like christmas tree$_{ACC}$
       'There is no need to decorate her like a christmas tree.'   (Google)

Both verbs in (13)–(14), TRAKTOWAĆ 'treat' and OBWIESZAĆ 'decorate', assign structural case to their object. In (13), negation is local to TRAKTOWAĆ, so its object, *nauki* 'learning', must be genitive. In (14), negation is not local to OBWIESZAĆ – negation on the higher verb, *trzeba* 'need', licences optional long distance genitive of negation (Przepiórkowski 2000) on *jej* 'her', the object of OBWIESZAĆ. By contrast, nominals following *jak* in (13)–(14), *zabawę* 'fun' and *choinkę* 'christmas tree', respectively, are accusative. If, as proposed by Kallas (1986), *jak* is analysed in examples such as (8), (10), and (12) as a conjunction coordinating nominal phrases, examples such as (13)–(14) are predicted to be ungrammatical, counter to fact, due to the mismatch in case (accusative instead of the predicted genitive).

Since negation found in the main clause does not have to influence case assignment in the comparison (as shown in (13)–(14)), it strongly suggests that the comparison is an independent clause with an elided predicate – see (15)–(16), where the comparison is a subordinate clause (CP):

(15)   Dzieci nie traktowały nauki [[jak]$_C$ ~~traktowały~~ [zabawę]$_{NP}$]$_{CP}$.

(16)   Nie trzeba [jej obwieszać [[jak]$_C$ ~~obwiesza się~~ [choinkę]$_{NP}$]$_{CP}$].

As a result, constraints imposed by the elided predicate are resolved independently of the main clause, making structural case mismatches possible.[6]

It is worth noting that these facts are consistent with the behaviour of negation in gapping (Repp 2009), where negation found in the non-gapped conjunct may or may not be transferred to the gapped conjunct.[7]

3.2 Case Marking under Coordination: Subject, Partitive Object
Let us briefly discuss two exceptions to the generalisation that in Polish coordinated nominal phrases are marked for the same value of case.

The first exception is related to the subject position, where particular conjuncts may be marked for different values of case, as shown in (17).

(17)   Na   parapecie   stało   kilka   książek   i
       on   windowsill   stood$_{3.SG.N}$ few$_{ACC.PL.F}$ book$_{GEN.PL.F}$ and
       futerał   z   waltornią.
       case$_{NOM.SG.M}$ with French horn
       'On the windowsill there were a few books and a case holding a French horn.'   (NKJP)

This, however, is not relevant to the examples discussed above, because the hypothetical coordinate phrase would be an object in (13)–(14).

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[6] Mismatches are not expected with lexical case – it is not variable, unlike structural case.
[7] However, it is argued in subsequent sections (§ 4.2 and § 7.1) that comparisons with *jak* are not an instance of coordination (gapping), but subordination with ellipsis.

The second exception to this generalisation are predicates that take a partitive object, such as DAĆ 'give' in (18) – its coordinated object consists of the partitive genitive *wina* 'wine' and accusative *całą świnię* 'whole pig':

(18) Dajcie   wina   i całą   świnię!
     give$_{2.PL}$ wine$_{GEN.SG.N}$ and whole$_{ACC.SG.F}$ pig$_{ACC.SG.F}$
     'Serve (some) wine and a whole pig!'   (Przepiórkowski 1999)

Although all examples in (13)–(14) and (18) involve an object, unlike (18), the predicates in (13)–(14) do not allow for a partitive object, as shown in (19)–(20), which means that this exception does not apply in these cases:

(19) *Dzieci   poważnie traktowały ciekawej   nauki.
     children$_{NOM}$ seriously treated$_{3.PL}$ interesting$_{GEN}$ learning$_{GEN}$
     'Children treated interesting learning seriously.' (intended)

(20) *Obwieszamy jej   / tego   dziecka.
     decorate$_{1.PL}$ she$_{GEN}$ this$_{GEN}$ child$_{GEN}$
     'We decorate her/this child.' (intended)

As shown above, while there are well-defined exceptions to the generalisation that in Polish, coordinated nominals bearing the same grammatical function must be marked for the same case, none of these apply in examples like (13)–(14). This confirms that *jak* in these examples cannot be analysed as a conjunction joining two nominals.

4   Ordering

The conjunction analysis of *jak* proposed by Kallas (1986) does not satisfy coordination criteria: hypothetical conjuncts do not have to be adjacent (§ 4.1), *jak* with items following it (hypothetical second conjunct) may be fronted without the hypothetical first conjunct (§ 4.2), and the hypothetical first conjunct may be dropped (§ 4.3). Together, these facts strongly argue against analysing *jak* as a coordinating conjunction.

4.1 Non-Adjacency

If comparisons with *jak* were analysed as coordination, where corresponding dependents are joined by *jak*, this would mean that the conjuncts in (21) are not adjacent, which is normally not allowed under coordination.

(21) Naukę   dzieci   często traktowały   jak zabawę.
      learning$_{ACC}$ child$_{NOM.PL.N}$ often   treated$_{3.PL.N}$ like fun$_{ACC}$
      'Children often treated learning like fun.'

Though (22)–(23) may be superficially seen as evidence that non-adjacency is allowed, this is not the case. While in (22), adjacent NPs are coordinated (*Pamiętam [Marysię i Janka]*), (23) involves gapping, whereby adjacent clauses are coordinated and *Marysię* and *Janka* belong to different clauses. In (23), the first clause contains the overt predicate whose object is *Marysię*, while in the second clause, the predicate on which *Janka* depends is elided (*[[Marysię pamiętam] i [Janka ~~pamiętam~~]]*).

(22) Pamiętam   Marysię   i   Janka.
      remember$_{1.SG}$ Marysia$_{ACC.SG.F}$ and Janek$_{ACC.SG.M}$
      'I remember Marysia and Janek.'

(23) Marysię pamiętam i Janka.

The examples below confirm that (23) involves gapping: unlike (24) and (26), which feature NP-level coordination, (25) and (27) are ungrammatical because relevant constraints cannot be satisfied under gapping, whereby relevant dependents belong to different clauses – the verb in (25) requires a plural subject, while the reciprocal verb in (27) requires a plural object.

(24) Szli   Marysia   i   Janek.
      walked$_{3.PL.M}$ Marysia$_{NOM.SG.F}$ and Janek$_{NOM.SG.M}$
      'Marysia and Janek walked.'

(25) *Marysia szli i Janek.

(26) Przedstawiłam   sobie nawzajem Pedra   i   Matyldę.
     introduced$_{1.SG.F}$ each other   Pedro$_{ACC}$ and Matylda$_{ACC}$
     'I introduced Pedro and Matylda to each other.'   (Google)

(27) *Pedra przedstawiłam sobie nawzajem i Matyldę.

To sum up, *jak* in (21) cannot be analysed as a conjunction joining NPs. Although it could potentially be analysed as gapping, this possibility is argued against later (see § 4.2 and § 7.1).

4.2 Fronting
While the conjunction and the second conjunct must not be fronted without the first conjunct (Haspelmath 2007), as shown by the grammaticality contrast in (28)–(29), the phrase with *jak* can be fronted alone, as shown in (30), which strongly suggests that *jak* is not a conjunction:

(28) Unikam   problemów   i   nieprzyjemności.
     avoid$_{1.SG}$ problems$_{GEN}$ and unpleasantness$_{GEN}$
     'I avoid problems and unpleasantness.'

(29) *I nieprzyjemności unikam problemów.

(30) Jak ognia   unikają   aparatu.
     like fire$_{GEN}$ avoid$_{3.PL}$ camera$_{GEN}$
     'They avoid the camera like fire.'   (NKJP)

This observation is important, because, apart from ruling out the analysis where *jak* coordinates NPs (as in Kallas (1986)), it also excludes analysing *jak* as a conjunction in gapping (which is a variety of coordination). While (31) is a grammatical example involving gapping, fronting the conjunction (*a*) and the gapped second conjunct results in ungrammaticality, as shown in (32). Comparisons can be fronted, as in (30), which rules out gapping.

(31) Janek   pomaga Marysi,   a   Tomek   Zosi.
      Janek$_{NOM}$ help$_{3.SG}$ Marysia$_{DAT}$ and Tomek$_{NOM}$ Zosia$_{DAT}$
      'Janek helps Marysia and Tomek (helps) Zosia.'

(32) *A Tomek Zosi, Janek pomaga Marysi.

4.3 Pro-Drop
As shown in (33)–(35), none of the conjuncts may be omitted.

(33) Lubię jabłka   i/lub gruszki.
      like$_{1.SG}$ apples$_{ACC}$ and/or pears$_{ACC}$
      'I like apples and/or pears.'

(34) Lubię *(jabłka) i/lub gruszki.

(35) Lubię jabłka i/lub *(gruszki).

(34) is only grammatical under a different reading, where *i* is not a coordinating conjunction ('and'), but an intensifier: "I also/even like pears" – this reading is not available with *lub* 'or'. (35) can only be thought of as a fragment sentence, with the second conjunct missing.

If one tried to analyse *jak* in (36), repeated from (1), as a conjunction joining NPs, the hypothetical first conjunct would be missing – this is because the main clause subject is implicit in (1).

(36) Kochała   Jurka   jak siostra.
      loved$_{3.SG.F}$ Jurek$_{ACC}$ like sister$_{NOM.SG.F}$
      'She loved Jurek like his sister (loved Jurek).'   (Kallas 1986: ex. (1))

(37) Jak psa   zgnoję   w lochu!
      like dog$_{ACC}$ destroy$_{1.SG}$ in dungeon
      'I will destroy you like a dog in a dungeon!'   (NKJP)

While Kallas (1986) claimed that *jak* in (36) is a preposition taking a nominative complement (argued against earlier), an analogous issue surfaces in

examples where the item following *jak* is not nominative. In (37) *jak* is followed by *psa*, an accusative nominal, which would be the hypothetical second conjunct. However, the accusative object of *zgnoję* 'destroy', to which the comparative phrase corresponds, is implicit, so the hypothetical first conjunct is missing, which is not allowed (as shown in (34)).

4.4 Partial Summary

All facts presented above undermine the hypothesis that *jak* is a coordinating conjunction. While non-adjacency only rules out coordination at the NP level (and generally non-clausal coordination, see § 4.1), the possibility of fronting the comparative phrase with *jak* rules out the coordination analysis in general, including gapping (as explained in § 4.2).

Though these issues are not problematic under the analysis which assumes that *jak* is a preposition, such an analysis is still not tenable – one would have to posit the existence of the preposition *jak* assigning nominative case (see (1), argued for in Kallas (1986)), accusative case (see (21) and (14)), genitive case (as in (30)), etc. Trying to account for the distribution of such PPs with *jak* so that appropriate cases appear in appropriate syntactic contexts would inevitably lead to more missed generalisations.

By contrast, these issues can be accounted for by analysing the comparison as a subordinate clause with an elided predicate. Under this account, corresponding dependents do not need to be adjacent. Furthermore, though in Polish the clause containing the predicate tends to precede the clause with an elided predicate, the opposite ordering is also attested (backward gapping, where the first conjunct has a gap) – this accounts for the fronted comparison in (30). Finally, pro-drop is not an issue – since constraints are resolved independently in each clause, the main clause may take an implicit argument while it is overt in the comparison (in (1) and (5) the main clause subject is implicit, while in (37) the main clause object is implicit).

5   Interaction with Passivisation

Examples in (38)–(39) show that the comparison undergoes passivisation in the same way as the main clause: when the main verb is active, the comparison follows case assignment rules appropriate for active voice. When the main verb is passive, the comparison follows passive voice rules.

(38) Gdy już   nas   wydoją jak krowę.
      when already us$_{ACC}$ milk$_{3.PL}$ like cow$_{ACC.F}$
      'When they have milked us like a cow.' = milked us dry   (NKJP)

(39) Zostaniesz   wydojony   jak krowa.
      become$_{2.SG.M}$ milked$_{NOM.SG.M}$ like cow$_{NOM.F}$
      'You will be milked like a cow.' = milked dry   (Google)

In (38), the main verb is active, so its object is accusative (*nas* 'us') and the corresponding nominal following *jak* is also accusative (*krowę* 'cow'). By contrast, in (39), the main verb is passive (making the active object the passive subject), so its implicit subject is nominative and the corresponding nominal following *jak* is also nominative (*krowa* 'cow').

While the object of WYDOIĆ 'milk' in (38) is marked with structural accusative case, the object of PILNOWAĆ 'watch' in (40), *jej* 'her', is marked with lexical genitive case – this is why *oka* following *jak* is also genitive. In Polish, the passivisable object does not have to be marked for structural case – it may also bear lexical case: instrumental or genitive, as in (40). A corresponding passive example is provided in (41) – the implicit subject of the passive main verb is nominative and the corresponding dependent following *jak* also bears nominative case, which is expected since the active object becomes the passive subject marked for structural case.

(40) Pilnujcie jej   jak oka   w głowie.
      watch$_{2.PL}$ she$_{GEN}$ like eye$_{GEN}$ in head
      'Watch her like an eye in the head.' (literal) = closely   (NKJP)

(41) Będzie pilnowany   jak oko   w głowie.
     will$_{3.SG}$ watched$_{NOM.SG.M}$ like eye$_{NOM}$ in head
     'He will be watched like an eye in the head.' = closely   (NKJP)

Such data is problematic under the analysis of Kallas (1986), where *jak* followed by a nominative dependent (as in (39) and (41)) is analysed as a preposition taking a nominative complement, while *jak* followed by a dependent marked for different case (accusative, genitive – as in (38) and (40)) is analysed as a conjunction joining NPs. This would mean that a change in voice requires changing the category of *jak* in order to account for different case requirements – another missed generalisation. By contrast, the clausal gapping-like analysis correctly captures all the data.

6   Multiple Dependents Following *jak*

Let us consider two examples which are different from the ones discussed so far, because there is more than one phrase following *jak* – each phrase in the comparison corresponds to a different dependent in the main clause:

(42) Chłonęli   Zachód jak gąbka   wodę.
     absorbed$_{3.PL.M}$ West$_{ACC}$ like sponge$_{NOM}$ water$_{ACC}$
     'They absorbed the West like a sponge (absorbs) water.'   (NKJP)

In (42) *gąbka* 'sponge' is nominative – it corresponds to the implicit subject of CHŁONĄĆ 'absorb', while *wodę* 'water' is accusative – it correponds to *Zachód* 'West', the accusative structural object of CHŁONĄĆ. In (43), *kwiatek* 'flower' is nominative, like *Halloween* – the subject of PASOWAĆ 'fit', while *do kożucha* 'to a fur coat' is a prepositional phrase analogous to *do naszej kultury* 'to our culture' – the complement of PASOWAĆ.

(43) Halloween   pasuje do naszej kultury   jak kwiatek
     Halloween$_{NOM}$ fit$_{3.SG}$ to our$_{GEN}$ culture$_{GEN}$ like flower$_{NOM}$
     do kożucha.
     to fur coat$_{GEN}$
     'Halloween fits our culture like a flower (fits) a fur coat.' = it is out of place   (NKJP)

Examples such as (42)–(43), where *jak* is followed by two (or more) different dependents corresponding to appropriate dependents of the main clause, pose a serious challenge to the analyses of *jak* proposed by Kallas (1986). If the dependent following *jak* is nominative (*gąbka* in (42), *kwiatek* in (43)), Kallas (1986) assumes that *jak* is a preposition taking a nominative complement. However, when the dependent following *jak* is not nominative (*wodę* is accusative in (42), *do kożucha* is a genitive PP in (43)), Kallas (1986) assumes that *jak* is a conjunction coordinating two phrases of the same type – an NP with an NP, a PP with a PP, etc. Since the two phrases following *jak* in (42)–(43) have different characteristics, neither analysis proposed by Kallas (1986) can account for the data.

By contrast, such examples can be handled by the clausal, gapping-like analysis (see (44)–(45)), whereby the subordinate clause with the comparison is assumed to contain an elided instance of the predicate from the main clause. This is why dependents of the comparison satisfy the same constraints as corresponding dependents of the main clause (though these constraints are resolved independently in each clause, as explained earlier).

(44)   Chłonęli Zachód [[jak]$_C$ [gąbka]$_{NP}$ [wodę]$_{NP}$]$_{CP}$.

(45)   Halloween pasuje do naszej kultury [[jak]$_C$ [kwiatek$_{NP}$] [do kożucha]$_{PP}$]$_{CP}$.

7   Analysis

On the basis of arguments presented above, it was shown that it is not appropriate to analyse *jak* in Polish comparisons as a preposition or as a coordinating conjunction, since these analyses fail to account for the data.

7.1 Why not Coordination?

Throughout this paper, comparisons with *jak* have been shown to closely resemble gapping. It may therefore seem natural to analyse such comparisons as instances of gapping. However, this would not be appropriate due to the fact that it is possible to front the phrase with *jak* (see § 4.2), which is not allowed under coordination – neither in general (joining simple,

non-elliptical structures) nor with gapping in particular.

There is another argument against analysing comparisons with *jak* as coordination. Predicates such as WYGLĄDAĆ 'look, appear' or TRAK-TOWAĆ 'treat' take an obligatory complement expressing manner – as shown in (46), it may be a comparison, but it can also be an adverb. While it might appear sensible to analyse the comparison via coordination (gapping), the adverb could not be interpreted in this way.

(46) Wyglądała *(dobrze / jak modelka).
    looked$_{3.SG.F}$ good$_{ADV}$ like model$_{NOM}$
    'She looked good$_{ADV}$ / like a model.'

Secondly, if (47), repeated from (3), involved coordination of NPs, where *jak* is the conjunction joining *naukę* 'learning' and *zabawę* 'fun', there would be no manner complement required by TRAKTOWAĆ – the hypothetical coordinated NP would be its object. Also, if (47) involved gapping, both coordinated clauses would lack the required manner complement.

(47) Dzieci często traktowały naukę *(jak zabawę).
    child$_{NOM.PL.N}$ often treated$_{3.PL.N}$ learning$_{ACC}$ like fun$_{ACC}$
    'Children often treated learning like fun.' (Kallas 1986: ex. (32))

Furthermore, examples such as (48) show that the adverb expressing manner can be coordinated with a comparison with *jak*.

(48) Zbyt dosłownie i jak prostak traktował nakazy.
    too literally and like simpleton$_{NOM}$ treated$_{3.SG.M}$ dictates$_{ACC}$
    'He treated the dictates too literally and like a simpleton.' (NKJP)

(49) *(Zbyt dosłownie / jak prostak) traktował nakazy.

Since it is possible to coordinate these phrases and to use them interchangeably (see (49)), they correspond to the same syntactic position – the obligatory manner complement. This rules out the possibility of analysing comparisons in (46)–(49) as coordination (including gapping). Moreover, the fact that the phrase containing the comparison in (48) is

fronted provides additional evidence against the gapping analysis of *jak* (see § 4.2).

Finally, the comparative phrase is often not required, as in (50), where it is coordinated with an adverb, which would normally be analysed as a modifier of the main verb. Therefore, the comparison with *jak* should also be analysed as a modifier, rather than as an instance of coordination.

(50)   Niech mi   ktoś   wytłumaczy logicznie i   jak debilowi.
       IMP   I$_{DAT}$ sb$_{NOM}$ explain$_{3.SG}$ logically and like idiot$_{DAT}$
       'Explain this to me logically and like to an idiot.'   (NKJP)

(51)   Niech mi ktoś wytłumaczy (logicznie / jak debilowi).

Summing up, although comparisons with *jak* behave very similarly to gapping, such constructions are not an instance of coordination, where *jak* is a conjunction coordinating the first conjunct, which contains the predicate, with the second, gapped conjunct, which corresponds to the comparison.

7.2 Representation as Subordination with Ellipsis
If comparisons with *jak* were an instance of coordination, they could be formalised in LFG, as described in Patejuk and Przepiórkowski (2017). However, it was shown that such comparisons do not involve coordination.

Instead, comparisons with *jak* should be represented as a subordinate clause (CP), which contains the complementiser (C) *jak* and an elided predicate, which corresponds to the main verb. Such an analysis is additionally supported by examples where the predicate in the comparison is overt:

(52)   Chłoniesz wiedzę   jak gąbka   chłonie wodę.
       absorb$_{2.SG}$ knowledge$_{ACC}$ like sponge$_{NOM}$ absorbs water$_{ACC}$
       'You absorb knowledge like a sponge absorbs water.'   (Google)

(53) Pasuje do otoczenia   jak kwiatek   pasuje do kożucha.
      fits   to surrounding$_{GEN}$ like flower$_{NOM}$ fits   to fur coat$_{GEN}$
      'He fits the surroundings like a flower fits a fur coat.' (literal)
      = he does not fit   (Google)

The mechanism handling ellipsis is analogous to gapping.   The
difference is that it involves copying a predicate from the main clause
to the subordinate clause (rather than to another conjunct). As a result,
the subordinate clause with the comparison contains a separate instance
of the same predicate. As in gapping, each instance of the predicate
imposes relevant constraints independently – they may be resolved so that
corresponding dependents in the main clause and in the comparison satisfy
the same constraints (identical case marking, as in (3) and (12)), but they
may also be resolved differently (resulting in mismatches, see (13)–(14)).

Let us discuss the LFG representations of two sentences which are pro-
duced by the proposed analysis. (42) is represented as a bracketed sentence
in (54), the corresponding f-structure is given in (55).

(54) [[Chłonęli]$_V$ [Zachód]$_{NP}$ [[jak]$_C$ [gąbka]$_{NP}$ [wodę]$_{NP}$]$_{CP}$]$_S$.

(55)
$$
\begin{bmatrix}
\text{PRED} & \text{`ABSORB}\langle \boxed{1},\boxed{2}\rangle\text{'} \\[2pt]
\text{SUBJ} & \boxed{1}\begin{bmatrix} \text{PRED} & \text{`PRO'} \\ \text{CASE} & \text{NOM} \end{bmatrix} \\[10pt]
\text{OBJ} & \boxed{2}\begin{bmatrix} \text{PRED} & \text{`WEST'} \\ \text{CASE} & \text{ACC} \end{bmatrix} \\[10pt]
\text{ADJ} & \left\{ \begin{bmatrix} \text{PRED} & \text{`LIKE}\langle\boxed{3}\rangle\text{'} \\[2pt] \text{COMP} & \boxed{3}\begin{bmatrix} \text{PRED} & \text{`ABSORB}\langle\boxed{4},\boxed{5}\rangle\text{'} \\ \text{SUBJ} & \boxed{4}\begin{bmatrix}\text{PRED} & \text{`SPONGE'} \\ \text{CASE} & \text{NOM}\end{bmatrix} \\ \text{OBJ} & \boxed{5}\begin{bmatrix}\text{PRED} & \text{`WATER'} \\ \text{CASE} & \text{ACC}\end{bmatrix} \end{bmatrix} \end{bmatrix} \right\}
\end{bmatrix}
$$

The main clause in (55) is headed by the verb ABSORB, which requires two arguments: a subject (SUBJ) and an object (OBJ). The nominative subject of the main clause is implicit (PRO), while its accusative structural object is WEST. The main clause has a set-valued attribute ADJ, which contains modifiers, namely the subordinate clause with the comparison, which is headed by the semantic complementiser (JAK) taking a clausal complement (COMP). Like the main clause, it is headed by the verb AB-SORB. It has two arguments corresponding to the main clause arguments: its nominative subject is SPONGE, while its accusative structural object is WATER.

The sentence in (50) also has two dependents in the comparison – its bracketing is given in (56),[8] see (57)[9] for the corresponding f-structure:

(56)   [[Niech]$_{\text{MOOD}}$ [mi]$_{\text{NP}}$ [ktoś]$_{\text{NP}}$ [wytłumaczy]$_{\text{V}}$ [[logicznie]$_{\text{ADVP}}$ [i]$_{\text{CONJ}}$ [[jak]$_{\text{C}}$ [debilowi]$_{\text{NP}}$]$_{\text{CP}}$]$_{\text{XP}}$]$_{\text{S}}$.

---

[8] XP is used for semantically-defined dependents (e.g., manner), which can correspond to different categories (which can be coordinated): for instance an adverb and a CP, as in (56).
[9] In (57), both instances of the predicate EXPLAIN have a shared implicit object (PRO).

(57)

$$
\begin{bmatrix}
\text{PRED} & \text{`EXPLAIN}\langle\boxed{1},\boxed{2},\boxed{3}\rangle\text{'} \\[4pt]
\text{SUBJ} & \boxed{1}\begin{bmatrix}\text{PRED} & \text{`SOMEBODY'} \\ \text{CASE} & \text{NOM}\end{bmatrix} \\[8pt]
\text{OBJ} & \boxed{2}\begin{bmatrix}\text{PRED} & \text{`PRO'} \\ \text{CASE} & \text{ACC}\end{bmatrix} \\[8pt]
\text{OBJ}_\theta & \boxed{3}\begin{bmatrix}\text{PRED} & \text{`I'} \\ \text{CASE} & \text{DAT}\end{bmatrix} \\[8pt]
\text{ADJ} & \left\{\begin{bmatrix}
\left\{\begin{bmatrix}\text{PRED} & \text{LOGICALLY}\end{bmatrix}, \\
\begin{bmatrix}
\text{PRED} & \text{`LIKE}\langle\boxed{4}\rangle\text{'} \\
\text{COMP} & \boxed{4}\begin{bmatrix}
\text{PRED} & \text{`EXPLAIN}\langle\boxed{1},\boxed{2},\boxed{5}\rangle\text{'} \\
\text{SUBJ} & \boxed{1} \\
\text{OBJ} & \boxed{2} \\
\text{OBJ}_\theta & \boxed{5}\begin{bmatrix}\text{PRED} & \text{`IDIOT'} \\ \text{CASE} & \text{DAT}\end{bmatrix}
\end{bmatrix}
\end{bmatrix}\right\} \\
\text{COORD-FORM} \quad \text{AND}
\end{bmatrix}\right\}
\end{bmatrix}
$$
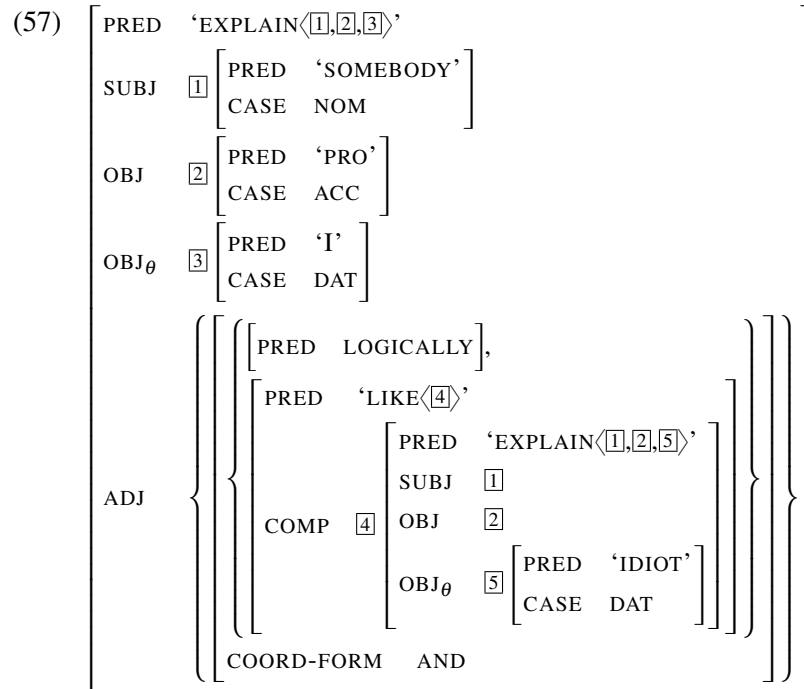
The main predicate of (57), EXPLAIN, takes 3 arguments: SOMEBODY as the subject, an implicit object (OBJ), and I as the indirect object (OBJ$_\theta$). The set-valued ADJ(unct) attribute contains one element – a structure consisting of the COORD-FORM attribute specifying the conjunction form (AND) and another set whose elements correspond to the two conjuncts: the first one is the adverb LOGICALLY, the second one is the comparison headed by the semantic complementiser JAK which takes a clausal complement (COMP). The head of the subordinate clause is the same verb as in the main clause, EXPLAIN: its subject and object are the same as in the main clause (they are shared), while its indirect object is IDIOT.

    The LFG formalisation of such an analysis can be found in Patejuk (2017).[10] Although it was originally designed for lexicalised (phraseological) comparisons such as (38)–(43), it can be extended to handle non-

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[10] See Patejuk (2017) for more f-structures and a detailed description of the formalisation.

lexicalised comparisons, such as (1), (3), and (50), by adding the optional comparison to every predicate in the lexicon (using templates, for instance). The only significant modifications with respect to Patejuk (2017) include representing *jak* as a semantic complementiser (introducing its PRED attribute) and adding statements which optionally share relevant dependents of the main clause with the comparison – this also applies to markers such as negation, making it possible to transfer negation from the main clause to the comparison. For instance, the following statement shares the subject of the main clause with the subject of the comparison which modifies the main verb: $(\uparrow \text{SUBJ})=(\uparrow \text{ADJ COMP SUBJ})$.

8   Issues

8.1 N-*words and the Genitive of Negation*
It is commonly agreed that Polish *n*-words need to be licensed, typically[11] by sentential negation (Przepiórkowski and Kupść 1999) – the negative particle *nie* needs to be present, possibly higher in the verb chain.

(58)   Nikt   *(nie) ufa   nikomu.
       nobody$_{\text{NOM}}$ NEG trust$_{3.\text{SG}}$ nobody$_{\text{DAT}}$
       'Nobody trusts anybody.'   (NKJP)

(59) *(Nie) kochał   żadnej   innej.
       NEG loved$_{3.\text{SG.M}}$ none$_{\text{GEN.SG.F}}$ other$_{\text{GEN.SG.F}}$
       'He did not love any other woman.'   (Google)

Still, it is possible to use *n*-words in comparisons with *jak* despite the absence of negation in the entire sentence:[12]

(60)   Znała   mnie przecież jak nikt
       knew$_{3.\text{SG.F}}$ I$_{\text{ACC}}$ but   like nobody$_{\text{NOM}}$
       'But she knew me like nobody else.'   (NKJP)

---

[11] The preposition BEZ 'without' also licenses *n*-words (Przepiórkowski and Kupść 1999).
[12] Unlike their English translations, the Polish examples in (60)–(64) are unambiguous – it is clear on the basis of case marking which dependent *like nobody* corresponds to.

(61) Ufał   jej,   jak nikomu   dotychczas.
      trusted$_{3.SG.M}$ she$_{DAT}$ like nobody$_{DAT}$ so far
      'He trusted her like nobody else so far.'   (NKJP)

(62) Gardzę   złodziejami jak nikim   innym.
      despise$_{1.SG}$ thieves$_{INST}$ like nobody$_{INST}$ other$_{INST}$
      'I despise thieves like nobody else.'   (Google)

(63) Żal mu   było   tego człowieka jak nikogo   na świecie.
      pity he$_{DAT}$ was$_{3.SG.N}$ this man$_{GEN}$ like nobody$_{GEN}$ in world
      'He pitied this man like nobody else in the world.'   (NKJP)

In (60)–(63) *jak* is followed by forms of NIKT 'nobody' that correspond to
different dependents of the main clause predicate: the subject in (60), while
(61)–(63) feature various nominal complements requiring lexical case (dat-
ive, instrumental, and genitive, respectively).

Consider examples with an object taking structural case – while *nikogo*
'nobody' in (64) may in principle be accusative or genitive, *żadną* 'none'
in (65) is unambiguously accusative (the genitive form would be *żadnej*).

(64) Kochał   tę kobietę   jak nikogo   do tej pory.
      loved$_{3.SG.M}$ this woman$_{ACC}$ like nobody$_{ACC/GEN}$ to this time
      'He loved this woman like nobody so far.'   (NKJP)

(65) Jesień   kocham, jak żadną   inną   porę   roku.
      autumn$_{ACC}$ love$_{1.SG}$ like none$_{ACC}$ other$_{ACC}$ time$_{ACC}$ year$_{GEN}$
      'I love autumn like no other time of the year.'   (NKJP)

On the basis of presented data, it seems that comparisons with *jak* are
sufficient for the purposes of licensing *n*-words, but they do not have to
trigger genitive of negation at the same time, as in (65), where *żadną* is
accusative.

8.2 Binding
Some comparisons involve interactions with binding – in Polish, ana-
phors such as SWÓJ are typically bound by the subject. Examples such

as (66)–(67)[13], where the anaphor modifies the object, are not problematic under the proposed analysis, which treats comparisons with *jak* as a subordinate clause with an elided predicate – they are bound by the local subject.

(66) Ona   Cie   traktuje jak swoja   wlasnosc.
      she$_{NOM}$ you$_{ACC.SG}$ treat$_{3.SG}$ like self$_{ACC}$ property$_{ACC}$
      'She treats you like her property.'   (NKJP)

(67) Przeczytałam to   jak swoja   własną   historię.
      read$_{3.SG.F}$ this$_{ACC}$ like self$_{ACC}$ own$_{ACC}$ history$_{ACC}$
      'I read this like my own history.'   (NKJP)

By contrast, examples such as (68)–(69) are a challenge to such an analysis: because the anaphor is a modifier of the subject, there is no item that could bind it. Still, the anaphor is interpreted as bound by the subject of the main clause, which should not be possible if the comparison is a CP.

(68) Wyglądała   jak swoja   młodsza   siostra.
      looked$_{3.SG.F}$ like self$_{NOM}$ younger$_{NOM}$ sister$_{NOM}$
      'She looked like her (own) younger sister.'   (NKJP)

(69) Potrafił   tak stąć   przez długą, chwilę w kompletnym
      could$_{3.SG.M}$ so stand$_{INF}$ for   long   while in complete
      bezruchu, prawie na bezdechu, jak swoja   woskowa kopia.
      stillness   almost on apnoea   like self$_{NOM}$ wax$_{NOM}$ copy$_{NOM}$
      'He could stand like this for a long time, completely still, almost breathless, like a wax figure of himself.'   (NKJP)

This is the only case where analyses of comparisons with *jak* as a conjunction or a preposition could provide a better explanation of the data. Unfortunately, as shown earlier, they suffer from numerous other problems.

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[13] Examples presented in this section include numerous typos (they mostly come from internet forums) – to avoid confusion, please rely on the interpretations provided in the glosses.

However, there are similar attested examples where the anaphor SWÓJ modifies the subject and is not bound at all (there is no binder):

(70) Najbardziej cieszą   swoje   wynalazki.
      most   please$_{3.PL}$ self$_{NOM}$ inventions$_{NOM}$
      'One's own inventions please most.'   (Google)

(71) Najbardziej cieszą   swoje, udane   pomysły.
      most   please$_{3.PL}$ self$_{NOM}$ good$_{NOM}$ ideas$_{NOM}$
      'One's own good ideas please most.'   (Google)

It may be the case that since the anaphor in (68)–(69) is not bound, it can be coindexed with the next potential binder found in the main clause.

8.3 Gerunds
Comparisons used with gerunds provide an important insight into their syntax. As is well-known, when the head assigning structural case is a gerund, it assigns genitive case to subjects and objects alike (which would otherwise bear simplifying nominative and accusative case, respectively).

In the examples below, *jak* is followed by a genitive dependent, which corresponds to the structural genitive object of the gerund in the main clause: *obywatelstwa* 'citizenship' in (72) and *spółki* 'company' in (73):

(72) Nie podoba mie sie   traktowanie   obywatelstwa
      NEG like$_{3.SG}$ I$_{ACC}$ REFL treating$_{NOM.SG.N}$ citizenship$_{GEN.SG.N}$
      jak karty   kredytowej.
      like credit$_{GEN.SG.F}$ card$_{GEN.SG.F}$
      'I do not like treating citizenship like a credit card.'   (NKJP)

(73) Czasami   wykorzystują ostatnie walne   zgromadzenie [. . .]
      sometimes use$_{3.PL}$ last   general meeting
      do wyciśnięcia   spółki   jak cytryny.
      to squeezing$_{GEN.SG.N}$ company$_{GEN.SG.F}$ like lemon$_{GEN.SG.F}$
      'Sometimes they use the last general meeting to squeeze the company like a lemon.' (literal) = take maximum advantage   (NKJP)

Such case marking is expected under the gapping-like analysis of comparisons – if the elided predicate is a gerund, it should assign genitive case to its dependents requiring structural case, as in (72)–(73).

However, there are numerous examples of comparisons where dependents following *jak* are not marked for structural case values that could be assigned by a gerund. In (74)–(75), dependents of comparisons corresponding to the genitive object of a gerund (*widza* 'viewer', *zwierząt* 'animals') bear accusative case (*idiotę* 'idiot', *przedmioty* 'things', *osoby* 'people').

(74) To   jest   traktowanie   widza   jak idiotę...
      this$_{NOM}$ is$_{3.SG}$ treating$_{NOM.SG.N}$ viewer$_{GEN}$ like idiot$_{ACC}$
      'This is treating the viewer like an idiot.'   (NKJP)

(75) Mnie się   nie podoba ani   traktowanie   zwierząt
      I$_{ACC}$ REFL NEG like$_{3.SG}$ neither treating$_{NOM.SG.N}$ animals$_{GEN}$
      jak przedmioty ani jak osoby.
      like things$_{ACC}$ nor like persons$_{ACC}$
      'I neither like treating animals like things nor like people.'   (NKJP)

In (76)–(77), dependents of comparisons that apply to the genitive implicit subject of the gerund are marked for nominative case (*oficerowie* 'officers', *kameleon* 'chameleon'):

(76) Istnieje   wielka   skłonność   do ubierania   się
      exist$_{3.SG}$ great$_{NOM}$ tendency$_{NOM}$ to dressing$_{GEN.SG.N}$ REFL
      i   wyglądania   jak oficerowie.
      and looking$_{GEN.SG.N}$ like officers$_{NOM}$
      'There is a strong tendency to dress and look like officers.'   (NKJP)

(77) Miała   wielki   dar   zmieniania   się   jak
      had$_{3.SG.F}$ great$_{ACC}$ gift$_{ACC}$ changing$_{GEN.SG.N}$ REFL like
      kameleon.
      chameleon$_{NOM}$
      'She had the great gift of changing like a chameleon.'   (NKJP)

Case marking, such as that found in the comparisons above, is only expec-
ted if the elided predicate assigning structural case is a finite form, not a
gerund.

9 Conclusion

This paper offered arguments against analysing *jak* in Polish comparisons
without an overt predicate as a preposition (assigning nominative case)
or as a coordinating conjunction, as argued in Kallas (1986). Arguments
presented include the following: the case of numeral phrases in subject
position in the comparison (§ 2), independent structural case assignment
in the comparison (§ 3), word order in comparisons (§ 4), the interaction
with passive voice in the main clause (§ 5), and comparisons with multiple
dependents (§ 6).

Based on these, it seems well-motivated to analyse comparisons
involving *jak* as subordinate clauses with an elided predicate – working
in a way that is extremely similar, though not identical, to gapping. This
way, the parallelism between the main clause and the comparison follows
naturally – the corresponding dependents are assigned case by another
instance of the same predicate. However, while full parallelism is possible
and frequently seen, this analysis also captures cases where corresponding
phrases are not identical – this is possible due to the fact that constraints
imposed by different instances of the verb are resolved independently in
both clauses.

This paper adopted a modified version of the LFG formalisation de-
scribed in Patejuk (2017). The modified formalisation provides a unified
account of lexicalised (phraseological) and non-lexicalised comparisons.

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Word Order and the Structure of Eventive Nominalizations in Russian[*]

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1 Introduction

Russian "free word order" has been extensively studied in the syntactic literature, yet one pattern of word order variation has so far remained overlooked: the order of the two arguments, internal and external, in eventive nominalizations, as in (1).[1]

(1) a. kollekcionirovanie redkix monet   professorom Iks
         collecting   [rare   coins]$_{GEN}$ [professor X]$_{INSTR}$
         'professor X's collecting of rare coins'
    b. kollekcionirovanie professorom Iks   redkix   monet
         collecting   [professor X]$_{INSTR}$ [rare   coins]$_{GEN}$
         'professor X's collecting of rare coins'

---

[1] It is, of course, possible to omit the external argument, or both arguments (but not the internal argument in the presence of the external one); the same pattern is discussed for English in Grimshaw (1990). Here, we also adopt Pereltsvaig, Lyutikova and Gerasimova's (2018) analysis of such nominalizations with "missing" arguments.

The possibility of both argument orders in eventive nominalizations, OS (as in (1a)) and SO (as in (1b)), has been noted in the literature; see Babby (1997), Engelhardt and Trugman (1998), Rappaport (2001), and Pereltsvaig (2018).[2] In this respect, eventive nominalizations differ crucially from result nominals, which allow only OS argument order, as shown in (2). (For a detailed analysis of this observation in regards to the result nominals, see Lyutikova 2014.)

(2) a. sobranie   kartin   Èrmitaža
        collection   paintings$_{GEN}$ Hermitage$_{GEN}$
        'the Hermitage collection of paintings'
    b. *sobranie   Èrmitaža   kartin
        collection   Hermitage$_{GEN}$ paintings$_{GEN}$

Babby (1997: 61-62) notes that in eventive nominalizations "[…] the order [of the arguments] is determined by roughly the same principles that govern free word order in the clause; e.g., pronominal arguments, which normally convey old information, are positioned to the left of NPs conveying new information without regard to their case and theta role, just as they are in the clause". Indeed, pronominal arguments appear first, as shown in (3).

(3) a. kollekcionirovanie   imi   marok
        collecting   they$_{INSTR}$ stamps$_{GEN}$
        'collecting of stamps by them'
    b. kollekcionirovanie   ix   det'mi
        collecting   they$_{GEN}$ children$_{INSTR}$
        'collecting of them by children'

In a similar vein, if one of the arguments is structurally heavy, it follows the lighter argument, as shown in (4), where structurally heavy arguments are boldfaced.

---

[2] The terms S (subject) and O (object) are used here and below in a purely descriptive way, without implying any particular analysis, and refer to the external and the internal argument, respectively.

(4) a. Heavy internal argument:
    podderžka Siriej   **èkstremistskix organizacij**
    support   Syria$_{INSTR}$ [extremist   organizations
    i   gruppirovok, veduščix   aktivnuju silovuju
    and groups,   conducting active   forcible
    bor'bu protiv Izrailja
    fight   against Israel]$_{GEN}$
    'Syria's support of extremist organizations and groups that are involved in an active power struggle against Israel' [from *National Corpus of Russian*]

    b. Heavy external argument:
    podderžka   drugix slojev   **razvitymi**
    support   [other   layers]$_{GEN}$ [developed
    institutami social'nogo gosudarstva
    institutions   welfare   state]$_{INSTR}$
    'the support of other classes by the developed institutions of a welfare state' [from *National Corpus of Russian*]

However, no account has been proposed so far for the derivation of the two orders in eventive nominalizations. Babby (1997: 75-76) merely notes that "[…] given that the word order is free in [eventive nominalizations], it is often difficult or even impossible to determine which of the two […] NPs has been assigned [the external θ-role] and which [the internal θ-role], especially when both […] NPs are potential agents […] The ambiguity […] is eliminated […]: [the external θ-role] is systematically realized as the INSTR BY phrase rather than the possessive GEN". However, this explanation that derives morphological case realization from the possibility of flipping the order of the arguments is incorrect, and it has the cause and effect backwards. First, it is possible to have two genitive (or two instrumental) arguments in an eventive nominalization, but only if one of the two genitives or instrumentals has lexical case:

(5) a. kasanie   snarjada   bëder
    touching   crossbar$_{GEN}$ hips$_{GEN}$
    'touching of the crossbar at the hips' [Google hit]

   b.   upravlenie   kuxarkoj   gosudarstvom
        managing   cook$_{INSTR}$ state$_{INSTR}$
        'managing of the state by a cook' [Google hit]

However, such nominalizations resist "flipping": the linearly first argument is understood as the external argument (S) and the second argument is understood as the internal one (O). Thus, (5a) means that the crossbar touches the hips, not the other way around. Similarly, in (5b) the cook manages the state (as per Lenin's famous quote) and not vice versa. In other words, the possibility of flipping the order of arguments depends on the non-ambiguous nature of case marking, not the reverse. Yet, Babby (1997) gives no account for why the order of arguments whose case marking unambiguously identifies them as the S or the O is free in the first place. This paper aims to fill that gap by addressing the following three questions, each of which is addressed in a dedicated section of the paper:

   1.   Are the two orders derivationally related?
   2.   If so, which of the two orders reflects the way that the arguments are merged?
   3.   What type of movement produces the derived order and where does the moved DP land?

   But first, some background assumptions on the structure of Russian eventive nominalizations are outlined. Following much work on the syntax of eventive nominalizations in various languages (e.g., Abney 1987, Ritter 1987, 1988, 1991, Hazout 1990, 1995, Borer 1991, 1997, Valois 1991, Alexiadou 2001, Fu, Roeper and Borer 2001, *inter alia*), we assume that eventive nominalizations in Russian consist of a verbal structure embedded under nominal functional projections. Following Tatevosov (2008), we take the verbal structure to contain at the most AspP, the projection that hosts the secondary imperfective *-yva*. Moreover, following Lyutikova (2014), Lyutikova and Pereltsvaig (to appear), Pereltsvaig (2018, in press) and Pereltsvaig, Lyutikova and Gerasimova (2018), we assume that the nominal part of the structure for Russian eventive nominalizations is larger than previously proposed (cf. Abney 1987; and, specifically for Russian, Engelhardt & Trugman 1998, 1999, Rappaport 2001) and includes the *n*P, the projection that

introduces a referential argument in nominals of all kinds and which hosts the nominalizing morpheme (and hence the derived noun itself) in eventive nominalizations. (In the representation below, the boundary between the nominal and verbal portions is marked by a bold-faced bracket.)

(6) [$_{DP}$ … [$_{QP}$ … [$_{n}$P kollekcionirovanie **[**$_{AspP}$ … [$_{v}$P … [$_{VP}$ …]]]]]]

Moreover, we take the genitive case of the O argument (cf. *redkix monet* 'rare coins' in (1)) to be an instance of structural case assigned by *n°*, whereas the instrumental of the S argument (cf. *professorom Iks* 'professor X' in (1)) is assumed to be an instance of "inherent case" (in the terminology of Woolford 2006), associated with the Agent θ-role (following Pereltsvaig, Lyutikova & Gerasimova 2018). With these assumptions in mind, we now proceed to consider the two possible word orders in Russian eventive nominalizations.

2 Are the Two Orders Derivationally Related?

With constructions that allow two grammatical frames with the same predicate (e.g., ditransitive predicates, *spray-load* alternations, etc.), the first question to address is whether the two frames (in the case of eventive nominalizations: the two argument orders) are derivationally related. There is much debate in the literature as to which constructions are to be analyzed as derivationally related and which ones as independently derivable. In order to address this question in relation to the eventive nominalizations, it is worth asking whether the argument orders differ in any significant way. It turns out that the two orders in eventive nominalizations do not differ in any of their crucial properties, as summarized in Table 1 and illustrated in examples below.

In particular, both the OS and SO orders (a) are compatible with the Agent-Theme and Experiencer-Cause argument structures, (b) can express a variety of Aktionarten, including activities, achievements, and states, (c) are compatible with manner adverbials, including both PPs and adverbs, (d) are compatible with aspectual adverbials, both *za* 'in' and *v tečenie* 'for' adverbials, and (e) can be pluralized (unlike their English counterparts; see Grimshaw 1990).

	OS	SO
Argument Structure:		
Agent-Theme	Y (1a)	Y (1b)
Experiencer-Cause	Y (7a)	Y (7b)
Aktionsart:		
Activity	Y (1a)	Y (1b)
Achievement	Y (9a)	Y (9b)
State	Y (7a)	Y (7b)
Manner Adverbials:		
PPs	Y (8a)	Y (8b)
adverbs	Y (8a)	Y (8b)
Aspectual Adverbials:		
za 'in' adverbials	Y (9a)	Y (9b)
v tečenie 'for' adverbials	Y (10a)	Y (10b)
Pluralization possible?	Y (11a)	Y (11b)

Table 1. Properties of the two orders

(7) a. obožanie Putina narodom
    adoring Putin$_{GEN}$ people$_{INSTR}$
    'adoring of Putin by the people' [Google hit]

   b. obožanie narodom Putina
    adoring people$_{INSTR}$ Putin$_{GEN}$
    'adoring of Putin by the people' [Google hit]

(8) a. vskrytie dveri professionalom bystro i bez šuma
    opening door$_{GEN}$ professional$_{INSTR}$ quickly and without noise
    'opening of a door by a professional quickly and noiselessly'

   b. vskrytie professionalom dveri bystro i bez šuma
    opening professional$_{INSTR}$ door$_{GEN}$ quickly and without noise
    'opening of a door by a professional quickly and noiselessly'

(9) a. zapolnenie ankety prositeljami za pjat' minut
    filling.out form$_{GEN}$ petitioners$_{INSTR}$ in five minutes
    'filling out of the form by petitioners in five minutes'

     b. zapolnenie prositeljami   ankety   za pjat' minut
        filling.out   petitioners$_{INSTR}$ form$_{GEN}$ in five minutes
        'filling out of the form by petitioners in five minutes'

(10) a. kollekcionirovanie monet   Pupkinym v   tečenie
        collecting   coins$_{GEN}$ Pupkin$_{INSTR}$ in course
        dolgix let
        long   years
        'Pupkin's collecting of coins for many years'
     b. kollekcionirovanie Pupkinym monet   v   tečenie
        collecting   Pupkin$_{INSTR}$ coins$_{GEN}$ in course
        dolgix let
        long   years
        'Pupkin's collecting of coins for many years'

(11) a. mnogočislennye zaxvaty   samolëtov   terroristami
        numerous   hijacking$_{PL}$ aircrafts$_{GEN}$ terrorists$_{INSTR}$
        'numerous hijackings of aircraft by terrorists'
     b. mnogočislennye zaxvaty   terroristami samolëtov
        numerous   hijacking$_{PL}$ terrorists$_{INSTR}$ aircrafts$_{GEN}$
        'numerous hijackings of aircraft by terrorists'

Given the pervasive similarities between the two orders, a unified analysis that derives both orders from the same underlying structure appears to be preferable.

3 Which of the Orders Reflects Merger?

To diagnose which of the two orders in eventive nominalizations represents the merged order and which is derived by an additional application of Move, we apply the Scope Freezing Generalization, proposed by Antonyuk (2015: 53): the merged order of arguments allows for scope ambiguity, whereas scope freezing "always results from overt raising of one QP over another to a c-commanding position as a result of a single instance of movement". For example, with English ditransitive predicates, the *to*-construction, which is independently argued to represent the merge order of internal arguments, allows for two scopal interpretations, whereas the Double Object Construction, in which the

merge order of internal arguments is reversed, allows only one scopal interpretation:

(12) a.   The teacher gave **a book** to **every student**. ($\exists > \forall, \forall > \exists$)
     b.   The teacher gave **a student every book**. ($\exists > \forall, *\forall > \exists$)

Similarly, Antonyuk (2015: 59) shows that ditransitive structures in Russian behave in the same way: the frame with the accusative-dative order, which she independently argues to reflect the merge order of internal arguments, allows for two scopal interpretations, whereas the frame with the dative-accusative order, which she argues to be derived by additional application of Move, is unambiguous:

(13) a. Učitel' podaril   kakuju-to knigu   každomu studentu.
     teacher presented [some   book]$_{ACC}$ [every   student]$_{DAT}$
     'The teacher presented some book to every student.'
     ($\exists > \forall, \forall > \exists$)
   b. Učitel' podaril   kakomu-to studentu   každuju   knigu.
     teacher presented [some   student]$_{DAT}$ [every   book]$_{ACC}$
     'The teacher presented some book to every student.'
     ($\exists > \forall, *\forall > \exists$)

The same diagnostic can now be applied to eventive nominalizations. It should be noted that some Russian speakers are reluctant to assign a non-surface scope for any structure at all, including the structures considered by Antonyuk (see above). Moreover, some speakers experience a strong scope bias rather than a complete freezing; the bias is alleviated if the universally quantified argument that otherwise does not take non-surface wide scope is focused; it is therefore important to keep the intonation and the information structure of these test examples neutral.[3] However, speakers who allow for non-surface scope in principle have clearly distinct judgments for the two orders in eventive nominalizations: the SO order is ambiguous between two scopal

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[3] Thanks to Svitlana Antonyuk (p.c.) for discussing these issues with me.

interpretations, whereas the OS order is unambiguous in allowing only the surface scope.[4]

(14) a. otkryvanie kakim-to gostem   každoj dveri
         opening   [some   guest]$_{INSTR}$ [every door]$_{GEN}$
         'opening by some guest of every door': ∃∀, ∀∃
     b. otkryvanie kakoj-to dveri   každym gostem
         opening   [some   door]$_{GEN}$ [every guest]$_{INSTR}$
         'opening by some guest of every door': ∃∀, *∀∃

(15) a. kopirovanie kakim-to konkurentom
         copying   [some   competitor]$_{INSTR}$
         každoj našej razrabotki
         [every our   design]$_{GEN}$
         'copying by some competitor of our every design': ∃∀, ∀∃
     b. kopirovanie kakoj-to   našej razrabotki
         copying   [some   our   design]$_{GEN}$
         každym   konkurentom
         [every   competitor]$_{INSTR}$
         'copying by every competitor of one of our designs': ∃∀, *∀∃

Therefore, we can conclude that the SO order reflects the order in which the arguments are merged, whereas the OS order is derived by an additional application of Move, raising the O argument over the S. This is indeed predicted by UTAH, which requires external arguments to be merged above the internal ones (or "S over O"); it is also compatible with the Verb-Object Constraint, proposed in Baker (2009). Having the S argument merged above the O also argues against a passivization-based analysis of (the Instrumental case marking in) eventive nominalizations (cf. Engelhardt & Trugman 1998, Rappaport 2001), which takes them to

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[4] The scope judgments reported here are from an informal survey of 7 speakers who all accept inverse scope in simple SVO sentences. The judgments on these sentences were unanimous. Note also that the examples are structured so that the linearly second quantifier is the ∀, making the inverse reading be the distributive reading, which cannot be achieved accidentally by the non-quantificational interpretation of the indefinite. Also, we use *kakoj-to* 'some' rather than *odin* 'one' for the same purpose.

be derived by some sort of syntactic "demotion" of the S argument, regardless of the word order. Under such an analysis, the OS order would be the "merged" one, whereas the SO order would be derived by an additional Move operation.

This conclusion that the SO argument order reflects the order of merger finds indirect confirmation in the observation made above in connection with (5), namely that eventive nominalizations where both arguments are marked with the same morphological case (both genitive or both instrumental) are understood as having the S precede the O (even though the reverse interpretation is compatible with the morphological case marking). This is reminiscent of the observation made first by Jakobson (1936/1984) and experimentally confirmed by Sekerina (1997): when presented with sentences such as (16), where the morphological case marking on both arguments is ambiguous between nominative and accusative, speakers interpret them as SVO rather than OVS (even though the latter interpretation is, once again, compatible with the morphological case marking). In other words, whenever the morphological case does not unambiguously identify at least one of the two arguments as either S or O, the "underlying" (i.e., merger) order comes to the fore:

(16) a. Mat'   ljubit   doc'.
         mother$_{NOM/ACC}$ loves   daughter$_{NOM/ACC}$
         'Mother loves daughter.' (NOT: 'Daughter loves mother.')
    b. Avtobus   obognal   trolleybus
         bus$_{NOM/ACC}$ passed   trolleybus$_{NOM/ACC}$
         'The bus passed the trolleybus.'
         (NOT: 'The trolleybus passed the bus.')

In the next section, we turn to the question of whether the movement operation involved in deriving the OS order is A-movement or A'-movement.

4. What Type of Movement Produces the Derived OS Order and What is the Landing Position of the O?

4.1. A- vs. A'-Movement?
In his overview of Russian "free word order", Bailyn (2012) contends that word order permutations descriptively known as "scrambling" come in two kinds: (a) shorter distance inversion, which is an instance of A-movement, and (b) "Movement-to-the-Far-Left", which is an instance of A'-movement. The former can occur at both *v*P level and TP level (the latter is also known as "Generalized Inversion"; cf. Bailyn 2004), whereas the latter can cross clausal boundaries. Since the flipping of arguments in eventive nominalizations is local and cannot cross out of the DP, it appears to be more akin to the former, A-movement type of scrambling. However, as shown below, it turns out that the movement of the O argument over the S is in fact an instance of A'-movement. The relevant diagnostics include binding and Weak Cross Over (WCO) facts.

First, let's consider binding. As shown below, in the derived OS order in (17a) and (18a), the O argument cannot bind into the S, causing Condition A violations. This is true for both reflexive anaphors in (17) and reciprocal anaphors in (18).

(17) a. * priglašenie dam   svoimi partnerami   na tanec
            inviting   ladies$_{GEN}$ [self's partners]$_{INSTR}$ to dance
            intended: 'inviting of ladies to a dance by their own partners'
      b.   priglašenie partnerami   svoix   dam   na tanec
            inviting   partners$_{INSTR}$ [self's ladies]$_{GEN}$ to dance
            'inviting of their lady partners by male partners to a dance'

(18) a. * podderživanie partnerov   drug drugom
            supporting   partners$_{GEN}$ [each other]$_{INSTR}$
            intended: 'the partners' supporting each other'
      b.   podderživanie partnerami   drug druga
            supporting   partners$_{INSTR}$ [each other]$_{GEN}$
            'supporting of each other by the partners'

Furthermore, as (19) below shows, the movement of the O argument over the S does not allow it to escape a Condition C violation:

(19) *podderživanie   Vaninoj$_i$ partnerši   im$_i$ samim
        supporting   [Vanya's female.partner]$_{GEN}$ [him self]$_{INSTR}$
        intended: 'Vanya's supporting his own partner'

In other words, the position into which the O argument lands is not a binding (i.e. A-) position. This conclusion is further supported by the fact that in the derived OS order, the S argument can bind into the O (the S argument is made long here to justify it being linearly after the O, which already has a reciprocal element in it; cf. the discussion surrounding (4) above):

(20)   povoračivanie partnerš   drug druga
        turning   [female.partners   each other]$_{GEN}$
        partnerami   v   pervom rjadu
        male.partners$_{INSTR}$ in   first   row
        'turning of each other's female partners by male partners in the first row'

    Finally, let's consider WCO effects. Unfortunately, native speaker judgments on the acceptability of examples like (21a) alone are unclear, and many naïve speakers want to rephrase the entire phrase/sentence by omitting the nominalization altogether. However, there are several potentially confounding factors here, including the structural complexity of the nominalization in the first place. As reported in Pereltsvaig, Lyutikova and Gerasimova (2018), acceptability judgments by native speakers for any nominalization structures on a scale from 1 to 5 do not exceed 3.9. That is not to say that no speaker ever judges any of the structures as a perfect "5", but overall acceptability judgments are as somewhat degraded. Another potentially problematic factor is the competition of possessive pronouns and anaphors (*ix* 'their' vs. *svoi* 'self's'), which occurs in other contexts as well. Therefore, to test for violations of WCO effects, we need to do a comparative judgment. According to Postal (1993), "the WCO effect arises only when the [moved element] represents semantically a 'true quantifier phrase'". We can therefore compare (21a) with (21b) in which the moved O argument of the nominalization (*každogo stixotvorenija* 'each poem's') contains a quantifier phrase. If the movement in question is an instance of

A'-movement, we expect a WCO violation, worse in (21b) than in (21a). A survey of 88 native speakers (almost all of them non-linguists) revealed that half of them have exactly that intuition: (21b) is worse than (21a). Notably, only 2% of the respondents think that (21a) is worse than (21b). The second largest group of respondents (23%) judged both examples as neither good nor bad but "in between" (note that it is often difficult for speakers to judge examples where the contrast is minimal; i.e., it is hard to tell if one structure is judged as a "2" and the other one as a "3"). Moreover, a fifth of the respondents deemed both structures to be "bad", and only 7% accepted both as good. It is thus reasonable to conclude that what we are dealing with here is a WCO violation, albeit muddled by other factors that are independently known to affect speaker judgments of similar structures.

(21) a. čtenie   stixov   ix   avtorami
          reading poems$_{GEN}$ their authors$_{INSTR}$
          'reading of poems by their authors'

      b. čtenie každogo stixotvorenija ego avtorom
          reading each   poem$_{GEN}$ its author$_{INSTR}$
          'reading of each poem by its author'

4.2 What is the Landing Position?

The next question to be addressed is where the O argument lands. What A'-position is there below the derived nominal itself (e.g., *kollekcionirovanie* 'collecting' in (1))? As mentioned in Section 1, we assume that the derived nominal appears rather low in the structure: not as high as D°, but in *n*°, the position below the DP and other nominal functional projections, such as QP. This accounts for the surface order Demonstrative>Numeral>derived nominal:

(22) èti   pjat'   zaxvatov   samolëtov terroristami
      these five   highjackings aircrafts$_{GEN}$ terrorists$_{INSTR}$
      'these five highjackings of aircraft by terrorists'

However, eventive nominalizations are taken to contain quite a few verbal functional projections, including AspP; following Tatevosov (2008), the AspP hosts the secondary imperfective suffix -*yva* and is the highest of the aspectual projections that can be embedded in an eventive

nominalization. Since SpecAspP is neither a Case nor a binding position, it is possible to consider it the landing site for the movement of the O argument, as in (23a). Another possibility is that the O moves to an adjoined position, as in (23b-c).

(23) a. [$_{DP}$ èti [$_{QP}$ pjat' [$_{nP}$ zaxvatov [$_{AspP}$ samolëtov [$_{vP}$ … [$_{VP}$]]]]]]
     b. [$_{DP}$ èti [$_{QP}$ pjat' [$_{nP}$ zaxvatov [$_{AspP}$ [$_{vP}$ samolëtov [$_{vP}$ … [$_{VP}$]]]]]]]
     c. [$_{DP}$ èti [$_{QP}$ pjat' [$_{nP}$ zaxvatov [$_{AspP}$ samolëtov [$_{AspP}$ [$_{vP}$ … [$_{VP}$]]]]]]]

At this point, we have no firm evidence to decide on this issue, which remains to be considered in future research.

5 Conclusions and Implications for the Study of Topic/Focus

In this paper, we examined the two possible orders in eventive nominalizations in Russian, where the O argument can either follow or precede the S. Based on Antonuyk's Scope Freezing Generalization, we concluded that the SO order reflects the order in which the arguments are merged, whereas the OS order is derived by moving the O over the S. Furthermore, we argued that the movement of the O is, despite its local nature, an instance of A'-movement. The evidence to support this conclusion comes from binding configurations and the appearance of WCO violations. In addition, we proposed that this A'-movement of the internal argument lands either in SpecAspP or in an adjoined position, an issue left open in the present paper.

Regardless of the details of the proposed analysis, namely whether the O argument lands in SpecAspP or in an adjoined position, the analysis proposed in this paper presents a number of challenges for the cartographic approach to syntax (cf. Rizzi 1997, 2001, Cinque 1999, 2002, Rizzi 2004, Ramchand 2008, Cinque & Rizzi 2008, 2010, *inter alia*).[5] One of the main tenets of the cartographic approach is the One Feature One Head (OFOH) principle (cf. Cinque and Rizzi 2008):

(24) Each morphosyntactic feature corresponds to an independent syntactic head with a specific slot in the functional hierarchy.

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[5] For a more detailed discussion of this issue, see Pereltsvaig (in press).

Postulating that the topic (or non-focus) O argument lands in SpecAspP (as in (23a) above), the projection that also hosts certain aspectual morphology, goes against the OFOH principle. Moreover, the cartographic approach, albeit logically independent of the Linear Correspondence Axiom (LCA) (Kayne 1994), often presupposes the latter (see van Craenenbroeck 2009 for a detailed discussion). Postulating that the inverted O argument lands in an adjoined position (as in (23b-c) above) goes against the basic tenets of the LCA. Furthermore, in the proposed analysis the movement of the O argument has an interpretative effect on the S, which remains *in situ*, also contrary to the cartographic approach (but see Neeleman 1994, Gill & Tsoulas 2004, Lekakou 2000, Neeleman & van de Koot 2008 for other examples of movement that have an interpretative effect on an unmoved element).[6]

In addition, the proposed analysis of Russian eventive nominalizations presents an even greater challenge for the cartographic approach, thus adding to the ever-growing body of work arguing against the cartographic approach in the domain of topic/focus (e.g., Neeleman & van de Koot 2008, Neeleman et al. 2009, Wagner 2009, *inter alia*). For example, Neeleman and Van de Koot (2008: 269) present arguments against the cartographic approach to topic and focus based on scrambling in Dutch and argue that various implementations of the cartographic approach are "either too weak, in that they cannot generate all the word orders found in Dutch, or too strong, in that they fail to capture restrictions on scrambling". In this paper, we show that there are instances of topic and focus that cannot be treated in line with Rizzi's (1997) cartographic proposal that topic and focus are represented in dedicated functional projections, TopP and FocP, in the split CP domain (or "left periphery"). It has been argued conclusively by Tatevosov

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[6] Note that an analysis of the OS order in which the S argument first moves to a dedicated FocP, followed by a remnant movement of the rest of the nominalization (i.e., derived noun + O argument) to an even higher TopP fails because the S need not appear in the final position:

(i) razrušenie Ierusalima   Vespasianom   v 70 godu
     destruction Jerusalem.GEN   Vespasian.INSTR in 70th year
     'the destruction of Jerusalem by Vespasian in 70 A.D.'

(2008), *inter alia*, that the verbal portion of Russian eventive nominalization contains only the lowest verbal functional projections and does not contain IP- or CP-level projections. The only solution within Rizzi's cartographic approach is to postulate an additional set of TopP and FocP projections. Note further that those projections would need to be located below *n*P and immediately above the verbal portion of the eventive nominalization:

(25)   [DP… [QP… [nP zaxvatov [**TopP** samolëtov [**FocP** …[vP … [VP]]]]]]]

In other words, we would not be able to utilize the TopP and FocP projections that have been postulated by numerous researchers to account for DP-internal topic/focus but which are located much higher, at the level of the DP or immediately below it (e.g., Giusti 1996, 2006, Grohmann & Haegeman 2004, Haegeman 2004, Bastos-Gee 2011, Caruso 2016, *inter alia*). Thus, we would need at least two sets of TopP and FocP within noun phrases, in addition to at least one set of clausal TopP and FocP projections.[7] Yet, postulating a multitude of TopP and FocP projections wherever they are necessitated by the data defeats the initial elegance of Rizzi's cartographic approach to topic/focus, which seemed to unify a wide range of data by postulating *one set* of TopP and FocP projections.

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[7] The position of TopP and FocP in (25) is consistent with the low TopP/FocP, placed at the left edge of *v*P, in the proposal of Belletti (2004). Her argument in favor of this low FocP is based on the observation that postverbal subjects in Italian, which are interpreted as new information focus, are low in the structure and hence can contain an NPI licensed by a negation marker *non*, in contrast to preverbal subjects:

(i)   Non parlerà   alcun linguista. (ii) *Alcun linguista non parlerà.
      not will.speak any   linguist   any   linguist not will.speak
      'No linguist will speak.'

While this indeed shows that postverbal subjects in Italian are structurally low, it need not entail that they are in a low FocP, *unless one assumes a strictly cartographic approach* à la Rizzi (1997). Therefore, the data considered by Belletti cannot serve as evidence in favor of a low FocP. See Brunetti (2004) and Samek-Lodovici (2015, Section 3.3) for arguments in favor of an *in situ* position of postverbal foci in Italian.

Thus, the present analysis reaffirms the existence of a "fine-grained parallelism between […] clauses and DPs with respect to focus", noted by Samek-Lodovici (2010: 817) and many others. Yet, although we do not wish to dispense with the cartographic approach altogether, we find ourselves in agreement with Neeleman and van de Koot (2008: 269), whose work "dispenses with discourse-related functional projections and instead relies on mapping rules that associate syntactic representations with representations in information structure". In that, we take the same general path of modeling topic/focus by relying on Information Structure as a separate linguistic interface, following proposals by Vallduví (1992), Zubizarreta (1998), Samek-Lodovici (2006, 2010, 2015), *inter alia*, and specifically for Russian clauses in Bailyn (2012) and Titov (2012). Note, however, that we do not accept all of the details of the above-mentioned analyses; for example, Titov (2012) claims that A-scrambling in Russian (clauses) leads only to "new information focus", whereas A'-scrambling derives only contrastive interpretations. But in Russian eventive nominalizations, it appears that A'-movement creates structures with a "new information focus" interpretation. However, this issue begs for further research (for a more detailed discussion, see Pereltsvaig in press).

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On DP Structure in Balkan Slavic:
Evidence from Multiple Determination[*]

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This paper investigates the structure of nominal phrases in the Balkan Slavic languages, Bulgarian and Macedonian, focusing on the relatively little-studied phenomenon of MULTIPLE DETERMINATION (MD). MD constructions, following Joseph (2019), are nominal phrases that contain more than one marker of definiteness: multiple articles and/or other definite determiners. In Balkan Slavic MD constructions, a demonstrative occurs with one or more of what are traditionally called postposed "definite articles". I use this traditional term through most of the paper but argue that the "article" is actually an inflectional affix. As usual in these very closely related languages, the constructions under discussion are nearly identical in Macedonian and Bulgarian, but not quite. I suggest that discrepancies reflect differences between Bulgarian and Macedonian DPs in the number and type of projections they include, with Bulgarian DP structure being more elaborated than that of Macedonian. The similar usage of MD constructions across Balkan Slavic is due in part to the semantics of demonstratives and definiteness and the ramifications of combining the two.

The paper begins with an introduction to the morphology and meaning of Balkan Slavic MD constructions, in Section 1, and their

syntactic characteristics, in Section 2. Section 3 compares Balkan Slavic MD to similar phenomena in other languages. Section 4 presents a structure for DPs with MD. Section 5 deals with differences between Macedonian and Bulgarian, and Section 6 is the conclusion.

1 The Basic Data: Formation and Usage

In standard Bulgarian and Macedonian, DPs contain no more than one definite determiner: either a demonstrative as in (1a) and (2a) or a definite article, as in (1b) and (2b), where it occurs suffixed to the adjective and is glossed as DEF. Demonstratives and articles are boldfaced.

(1) a. **tazi**   nova kola.   Bulg
        that   new   car
        'that new car'
    b. nova**ta** kola
        new_DEF car
        'the new car'

(2) a. **tie**   ubavi   fustani   Mac
        those pretty   dresses
        'those pretty dresses'
    b. ubavi**te**   fustani
        pretty_DEF   dresses
        'the pretty dresses'

However, in colloquial Bulgarian and Macedonian, it is possible for an article and a demonstrative to co-occur as well, as in (3); there can even be more than one article, as shown in (3b-c).

(3) a. **tazi**   nova**ta** kola   Bulg
        that   new_DEF car
        'that new car'
    b. **tazi**   tvoja**ta** nova(**ta**) kola   Bulg
        that   your_DEF new_DEF   car
        'that new car of yours'

c.   **tie**   ubavi**te**   fustani(**te**)   Mac
     those pretty_DEF   dresses_DEF
     'those pretty dresses'

MD phrases like those in (3) are not standard literary language, but they abound in social media and other informal contexts,[1] and are readily accepted by most speakers. In Macedonian, a large number of instances taken from a corpus of politicians' recorded phone conversations have been described by Friedman (2016), and other examples from fictional dialogue have been catalogued by Ugrinova-Skalovska (1960/61). MD has received less attention in Bulgarian, but has been at least noted by several linguists (Arnaudova 1998, Tasseva-Kurktchieva 2006, Mladenova 2007, Dimitrova-Vulchanova & Tomić 2009).

Bulgarian and Macedonian differ somewhat in their inventories of demonstratives and articles. Macedonian has three sets of demonstratives and corresponding sets of definite articles, with different consonant bases: proximal -*v*-, neutral -*t*-, and distal -*n*-. Bulgarian lacks any distinction in the article, having only the -*t*- set, and only has a two-way demonstrative deixis distinction; however, it has an additional split between a more formal/literary and a more colloquial set of demonstratives. MD occurs with all demonstratives and all articles, in both languages. But it is much more common, and for some speakers more natural, with the less formal demonstrative series in Bulgarian and the proximate demonstrative and article series in Macedonian, boldfaced in Tables 1 and 2. The demonstrative and article agree in number and gender in both languages, and also in deixis in Macedonian.

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[1] Macedonian examples in this paper are mostly from the *Bombi* recorded phone conversations (Prizma 2015), while Bulgarian examples are mostly from social media; constructed examples have been confirmed by speakers.

Macedonian	Demonstratives	Articles
Proximal	**ovoj/ovaa/ova/ovie** 'this m/f/n/pl'	**-ov/-va/-vo/-ve**
Neutral	toj/taa/toa/tie 'that m/f/n/pl'	-ot/-ta/-to/-te
Distal	onoj/onaa/ona/onie 'that m/f/n/pl'	-on/-na/-no/-ne

Table 1. Macedonian Articles and Demonstratives

Bulgarian	Demonstratives: more formal//less formal	Articles
Proximal	tozi/tazi/tova/tezi // **toja/taja/tuj/tija** 'this m/f/n/pl'	**-â(t)/-ta/ -to/-te**
Distal	onzi/onazi/onova/onezi // **onja/onaja/onuj/onija** 'that m/f/n/pl'	

Table 2. Bulgarian Articles and Demonstratives

This preference for informal and proximal forms relates to the colloquial nature of MD and to its function of expressing emotional reaction or personal involvement. Unlike DPs with a demonstrative but no article, MD constructions typically convey the speaker's attitude toward the item under discussion, often deprecating, but sometimes warmly positive. Consider these Bulgarian examples:

(4) a. **Taja** nova kola e   nemska.   Bulg
        this new car is German
        'This new car is German.'
    b. **Taja** nova**ta** kola napravo   me omrâzna.
        this new$_{DEF}$ car   simply   me annoyed
        'I'm absolutely fed up with that new car.'
    c. **Taja** nova**ta** kola e otlična!
        this   new$_{DEF}$ car is great
        'That new car is great!'

The non-MD construction in (4a) picks out a certain new car, possibly as opposed to other cars, and makes a neutral statement about it. The MD construction in (4b-c), on the other hand, does not pick out one car from a set, but rather expresses the speaker's frustration with or admiration of an already-known car. Friedman's (2016) corpus study reveals subjective

evaluation semantics as a central feature of MD in Macedonian as well. This characteristic meaning/usage is discussed in more detail in Section 4.3 below.

2   Syntactic Characteristics of Balkan Slavic MD

The word order of MD constructions is identical to that of a "normal" DP; in particular, the demonstrative is always initial, as it would be if there were no article present. For instance, in (5) the demonstrative cannot follow an adjective, regardless of the presence or absence of a definite article suffix on the adjective.

(5) a.   *nova **tazi** kola   Bulg
         new   this   car
    b.   *nova**ta** **tazi** kola   Bulg
         new_DEF   this   car
    c.   *ubavi **tie**   fustani   Mac
         pretty those dresses
    d.   *ubavi**te** **tie**   fustani   Mac
         pretty_DEF those dresses

This contrasts with the behavior of a superficially similar construction found in standard literary Bulgarian and Macedonian with certain adjectival quantifiers, roughly ones with universal or identity meaning, like *sâšt-/ist-* 'same' in (8).[2] Here an articled adjective can, or in Macedonian must, precede the demonstrative; this has been taken as evidence that the construction is not a single nominal but two separate, appositive DPs (see Giusti & Dimitrova-Vulchanova 1994, Arnaudova 1998, Franks 2001, Tasseva-Kurktchieva 2006, Dimitrova-Vulchanova & Tomić 2009). Conversely, the set Dem > Adj > N word order of the construction under discussion in the present paper indicates that it is in fact a single DP.

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[2] This quantifier construction has quite distinct properties from the colloquial MD construction, not only in word order, but in stylistic level, semantics/pragmatics (lacking the emotive flavor of colloquial MD), and in allowing only a single article, not repeated articles. See Rudin (2018) for further discussion.

(6) a. **tazi** sâšta**ta** kniga/sâšta**ta tazi** kniga   Bulg
       that   same_DEF book
   b. ista**ta**   **taa** kniga   Mac
       same_DEF that book
       'that same book'

In the examples given so far, the definite article always occurs on a modifier (adjective or possessive). In Macedonian, the article can also occur on a noun; several attested examples are given in (7a), with one full-sentence example from the *Bombi* in (7b):

(7) a. **ovie** karti**ve/taa**   tetratka**ta/ovie**   deca**va**
       those ballots_DEF/this notebook_DEF/these children_DEF
       toj čovek**ot**   Mac
       this person_DEF
   b. **Ovie** moroni**ve** od A1 me prašuvaa za   ova.
       those morons_DEF from A1 me asked   about that
       'Those morons from A1 were asking me about that.'

In Bulgarian, however, non-adjectival nouns cannot be articled; translations of (7) are ungrammatical.

(8) a. ****onezi** karti**te/*taja** tetradka**ta/*onija** deca**ta**
       those   ballots_DEF/this notebook_DEF/these children_DEF
       *toja čovek**a**   Bulg
       this   person_DEF
   b. ****Onija** idioti**te** ot   A1 me pitaha za   tova.
       those idiots_DEF from A1 me asked   about that
       'Those idiots from A1 were asking me about that.'

The article can occur on adjectival nouns/nominalized adjectives in both Bulgarian and Macedonian. Presumably these are simply adjectives with a null noun: *bogative (luǵe)/bogatite (xora)* 'the rich (people)'.

(9) a. **ovie** bogati**ve**   Mac
       those rich_DEF
       'those rich folks'

   b. **ovoj** moj**ov**
     that   my_DEF
     'that guy of mine'
   c. **ovie** naši**ve** polupismeni**ve**
     those our   semiliterates_DEF
     'those semi-literates of ours'

(10) a. **tija** bogati**te**   Bulg
     these rich_DEF
     'these rich folks'
   b. **taja** nejna**ta**
     that   her_DEF
     'that one of hers'
   c. **onija** naši**te** polugramotni**te**
     those our_DEF semiliterates_DEF
     those semi-literates of ours'

Articles can repeat on stacked modifiers,[3] or on modifier(s) plus noun in Macedonian, but an article cannot appear on later modifiers or noun unless there is also an article on all preceding modifiers.

(11) a. **tija** tvoi**te** novi(**te**) telefoni   Bulg
     these your_DEF new_DEF   phones
     'those new phones of yours'
   b. *****tija** tvoi novi**te** telefoni

(12) a. **ovie** tvoi**ve** novi(**ve**) telefoni   Mac
     these your_DEF new_DEF   phones
     'those new phones of yours'
   b. **ovie** tvoi**ve** novi**ve** telefoni(**ve**)
   c. *****ovie** tvoi novi**ve** telefoni(**ve**)
   d. *****ovie** tvoi novi telefoni**ve**

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[3] There is considerable speaker variation in the acceptability of repeated articles in Bulgarian: some speakers fully accept (11a) while others find it marginal. Macedonians, as far as I am aware, all accept (12a-b).

Note that repeated articles are not possible outside the MD construction, i.e. without a demonstrative. Compare (13) to (11)-(12) and (14) to (9c)-(10c). Strings like (13)-(14) are possible if spoken with a pause – that is, as two separate phrases – but not as a single DP.

(13) a. ***tvoite** novi**te** telefoni   Bulg
        your$_{DEF}$ new$_{DEF}$ phones
   b. ***tvoive** novi**ve** telefoni   Mac

(14) a. ***naši**te** polugramotni**te**   Bulg
        our$_{DEF}$ semiliterates$_{DEF}$
   b. ***naši**ve** polupismeni**ve**   Mac

To sum up: the Balkan Slavic MD construction necessarily includes an initial demonstrative, contains at least one definite article, on the first element following the demonstrative, and can also contain multiple articles on subsequent constituent(s). Any analysis must account for these facts, as well as for the difference between Macedonian and Bulgarian in whether lexical nouns participate in MD and of course also for the semantics of the construction.

3 Multiple Determination across Languages

Before presenting an analysis of Balkan Slavic MD, I briefly consider how these properties compare to similar phenomena in other languages. Numerous languages exhibit some type of multiple marking of definiteness, involving either multiple articles or demonstrative plus article. Alexiadou (2014) surveys a number of these. One type is the repetition of articles, sometimes called polydefiniteness, found, for example, in Omaha-Ponca (Rudin 1993) and Greek (Alexiadou & Wilder 1998), in which an article follows (Omaha-Ponca) or precedes (Greek) a noun and each of its modifiers:

(15) a. níkashi^{n}ga **ak^{h}a** nó^{n}ba **ak^{h}á** thé **ak^{h}á**   Omaha-Ponca
       person   the   two   the   this   the
       'these two people'
   b. thé **ak^{h}á** níkashi^{n}ga **ak^{h}a** nó^{n}ba **ak^{h}á**
       this the   person   the   two   the

(16) a. **to** meɣalo **to** kokkino **to** vivlio   Greek
          the big   the red   the book
          'the big red book'
      b. **to** vivlio **to** meɣalo **to** kokkino
          the book   the big   the red

These are quite different from the Balkan Slavic MD construction. Not only can they lack the demonstrative required in Balkan Slavic, they are arguably appositive constructions rather than single DPs: notice the variable constituent order. Balkan Slavic MD differs in having fixed word order, and also lacks other indications of appositive status, such as comma intonation.

Repeating articles are not necessarily an indication of appositive structure. There exist cases of multiple articles within what is clearly a single DP: for instance, obligatory definiteness agreement in Scandinavian (Alexiadou 2014) and Hebrew/Arabic (Doron & Khan 2015):

(17) **det**   store hus**et**   Swedish
      the   big   house$_{DEF}$
      'the big house'

(18) **ha**-sefer **ha**-gadol   Hebrew
      the-book the-big
      'the big book'

(19) ʔ**al**-ʔard ʔ**al**-muqaddasa   Classical Arabic
      the-land   the-holy
      'the holy land'

Other languages are more like Balkan Slavic MD in involving a demonstrative: for example, demonstrative + article definiteness agreement in Hungarian. However, the article in Hungarian is obligatory, and the construction lacks the special semantics of the optional Balkan Slavic MD. Only a single article is possible, as shown in (22b).

(20) a. **ez**   **a**   lány   Hungarian
          this   the girl
          'this girl'
      b. **ez**   **a**   magas (***a**) szőke   (***a**) amerikai (***a**) lány
          this   the tall   the blond   the American   the girl
          'this tall blond American girl'

Several varieties of Balkan Romance (Joseph 2019) have multiple
definiteness marking mediated by a demonstrative-like element, which I
label "adjectival article" in (21), following Joseph; Alexiadou (2014)
refers to this as a "demonstrative article". This looks rather similar to the
Balkan Slavic construction, but once again, at least one article is
obligatory and the special semantics appears to be lacking.

(21) om**lu**   **atsel**   bun(**lu**)   Aromanian
      man$_{DEF}$ ADJ.ART good$_{DEF}$
      'the good man'

Within Slavic, MD is reminiscent of the Slovenian "adjectival article" *ta*
(Marušič & Žaucer 2014), which co-occurs with demonstratives and can
repeat on stacked modifiers. It occurs only with adjectives, not nouns,
like MD in Bulgarian (though not Macedonian). However, *ta* is unlike
MD in showing no number/gender agreement, occurring in some
indefinite NPs, and not requiring a demonstrative. Marušič and Žaucer
analyze *ta* as a marker of "type definiteness" affecting only the adjective
and not the whole NP, which is not true of the articles in Bulgarian.

(22) tá   **ta**   debel **ta**   zelen   svinčnik   Slovenian
      this   *ta*   thick *ta*   green   pencil
      'this thick green pencil'

In short, multiple definiteness marking of one sort or another is fairly
widespread cross-linguistically. The constructions involved are quite
heterogeneous and unlikely to be amenable to a unified analysis.
Nonetheless all MD constructions raise similar issues. Is the MD string
one phrase or two (appositive)? Does it involve morphological
agreement? Where are demonstrative and articles located in the syntactic
structure, and what is their semantic contribution? In this paper, I deal

only with the Balkan Slavic demonstrative + article DP, which is not exactly identical to MD in any other language I know of,[4] leaving an account of MD constructions across languages for further research.

4 Structure of MD Phrases (and Other DPs) in Balkan Slavic

Turning back to Bulgarian and Macedonian, I propose a structure like (23) for a DP with only a demonstrative, (24) for a DP with only a definite article, and (25) for the MD construction.

(23)   [$_{DP}$ demonstrative [[$_D\emptyset$] [$_{AP}$ [A] [$_{AP}$ [A] [$_{NP}$ [N]]]]]

(24)   [$_{DP}$ [$_D\emptyset$] [$_{AP}$ [A] [$_{AP}$ [A] [$_{NP}$ [N]]]]]]
             DEF   DEF
             └──────→

(25)   [$_{DP}$ demonstrative [[$_D\emptyset$]   [$_{AP}$ [A]   [$_{AP}$ [A]   [$_{NP}$ [N]]]]]
             QF   *DEF.QF*   *DEF.QF*   *(DEF.QF) (DEF.QF)*
             └──────→   └──────→   └────→ └────→

Demonstratives are specifiers of DP. The D head in Balkan Slavic is always null, but can bear a [DEF] feature that induces inflectional definiteness marking (definiteness agreement) on the next highest head. When a [DEF] D head co-occurs with a demonstrative, Spec-Head agreement results in a specific interpretation that I have represented here as involving a feature QF ("Quality Focus"), contributed by the demonstrative, in addition to definiteness. This DEF.QF feature bundle induces definiteness marking not only on the next highest head, but potentially also on subsequent, lower heads. In this Abney-type structure, the highest head is A (or other modifiers – quantifier, numeral, possessive – which I have omitted for simplicity); definiteness inflection shows up on N only if there is no modifier, as in (26).[5]

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[4] A very similar system is found in Albanian, which I describe in joint work in progress with Victor Friedman; however, even this MD construction differs from Balkan Slavic in word order and in the complicating factor of an additional concord particle with most adjectives.

[5] I assume an Abney-style DP structure here, but the analysis is actually neutral between this and a more traditional structure with AP within NP. Under one such scenario, definiteness agreement within NP would extend not only to the head N but

There are three parts to this analysis: the position of demonstratives, the inflectional status of the "definite article", and the QF feature. The following subsections elaborate on each in turn.

4.1   *Demonstratives*

This portion of the analysis is the most straightforward. Previous work has established that demonstratives and articles in Balkan Slavic differ in both function and syntactic position (Dimitrova-Vulchanova & Giusti 1998, Tasseva-Kurktchieva 2006, Dimitrova-Vulchanova & Tomić 2009, Karapejovski 2017, a.o., as well as much work on other languages). Demonstratives clearly are not simply determiners, and are located higher than D, in some left-peripheral position within the nominal phrase.[6] Following Franks (2001), I assume this position is SpecDP. The demonstrative is then in a Spec-Head relation and shares features with D, including number/gender, spatial deixis (in Macedonian), and definiteness, as well as the QF feature. Suggestions other than SpecDP for the position of demonstratives include head of a DemP above DP (Tasseva-Kurktchieva 2006) or a "topic" position (Dimitrova-Vulchanova & Tomić 2009); agreement would presumably be possible in these configurations as well, but it is most clearly applicable to SpecDP.

4.2   *"Articles": The Status of* DEF

The suffixed elements traditionally called definite articles in Balkan Slavic (glossed DEF in this paper) are in fact not full-fledged articles/determiners, but instead inflectional definiteness markers, specifically an inflectional manifestation of definiteness on the head of the highest projection below DP in normal (non-MD cases). In simple cases, this means DEF appears on the first word of the DP:

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also to any adjoined modifiers, including AP, and their heads, and would be overtly realized on the highest (leftmost) of these. There may well be reasons to treat AP as an adjunct rather than dominating NP, but discussing this issue would take us too far afield for the present paper.

[6] Demonstratives can of course also function as separate, pronominal DPs.

(26) kniga**ta**   'the book'   Bulg
      frenska**ta** kniga   'the French book'
      nova**ta** frenska kniga   'the new French book'
      moja**ta** nova frenska kniga 'my new French book'

Numerous accounts have treated this as a 2P clitic phenomenon, derived by movement – either fronting of a host (e.g., Tomić 1996, Arnaudova 1998) or lowering of the "clitic article" (e.g., Embick & Noyer 2001). But this cannot account for more complex examples like (27), where DEF follows neither the first prosodic word nor the first phrase, but instead marks the head of AP with pre- and/or post-modifiers.

(27) [AP mnogo gorda**ta** ot studentite si]   prepodavatelka
            very   proudDEF of studentsDEF REFL teacher
            'the teacher who is very proud of her students'

An inflectional account in which definiteness is manifested on the head of the projection immediately below DP correctly accounts for the position of the article in all cases,[7] and also accounts for other aspects of the behavior of DEF. First, the article behaves like a suffix, not a clitic, with respect to phonological processes, such as final devoicing and liquid-schwa metathesis, as seen in (28); note that with the clitic auxiliary *e* 'is', the base word has the same form as it does in isolation, while the definite suffix blocks both devoicing and metathesis. Second, its form is dependent on the phonological form of the host word: for instance, the neuter plural article in (29) is *-ta* or *-te* depending on the final *-a* vs. *-i* vowel of the N or A it is suffixed to. Third, some nouns, like *majka* 'mother' in (30a) are intrinsically definite and take no overt definite marker (or have an exceptional zero form of the definite);

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[7] A reviewer asks whether the coordinated adjectives support a second-position clitic approach. The article occurs on the first of two coordinated adjectives, as in (i).
   (i)   nova**ta** i interesna kniga   'the new and interesting book'
Depending on one's view of the structure of coordinated phrases, this is the head of the highest phrase below D, the higher AP of [AP [& AP]]; thus, the generalization that DEF agreement surfaces on the head of the phrase below D accounts also for this case. Coordinated APs, as well as adjectives with complements like that in (27), raise issues for the Abney-type DP structure assumed below; see fn 5.

compare *majka* to an ordinary noun in (30b). An adjective accompanying a 'mother'-type noun can be articled.

(28) a. grâb/grəp   'back'   Bulg
      b. grâb e/grəp e   '(it) is (a) back'
      c. gârb**ât**/gərbət   'the back'

(29) a. deca**ta**
          children_DEF
          'the children'
      b. mladi**te**   deca
          young_DEF   children
          'the young children'

(30) a. majka(***ta***) mu/negova**ta** majka
          mother_DEF his/his_DEF   mother
          'his mother'
      b. kniga**ta**   mu/negova**ta** kniga
          book_DEF   his/his_DEF   book
          'his book'

The inflectional analysis has been defended in detail by Franks (2001), based on arguments put forth by Halpern (1995) and even earlier by Elson (1976); it has also been proposed apparently independently by Koev (2011). I take it as fully established. Although I do not go into the data here, all of the arguments for inflectional status of the "article" apply equally to Macedonian.

MD extends definiteness inflection to marking not only the highest projection under DP, but optionally lower ones as well. The appearance of multiple "articles" (multiple DEF inflection) poses yet another problem for any account of DEF as a D head, which ends up attached to a host by any type of movement: it is hard to imagine how either raising of a host to D or lowering (prosodic inversion?) of a clitic could result in multiple copies of the D head attached to heads of different projections.

4.3   Quality Focus

The demonstrative in MD constructions has a particular flavor, different from a purely "pointing" demonstrative. The difference is somewhat similar to the difference in English between *that* in (31a), where *that* and *this* indicate different chairs and (31b), where *that* doesn't specify a particular chair so much as emphasize qualities of an already-specific chair and the speaker's attitude toward it. Similarly a demonstrative with an intrinsically definite noun, like a name, in (31c), does not pick out one particular Marcus, but instead emphasizes some quality of this person.

(31)   a.   That chair is more comfortable than this one.
       b.   That horrible chair! We should have thrown it out years ago!
       c.   That Marcus! What a character.

I argue that this meaning derives from a combination of the semantics of demonstratives with that of definiteness (or perhaps specificity). The element of definiteness is not morphologically overt in the English examples (31b-c), but is nonetheless present: the chair and the person are situationally definite, known, and specific in the discourse context. In Bulgarian and Macedonian, this situational definiteness is overtly marked with the definite "article" suffix, in the case of a common noun; (32) corresponds to (31b).

(32)   **Toja** otvratitelni**ja** stol!   Bulg
       that   disgusting_DEF   chair
       'That disgusting chair!'

In Bulgarian and Macedonian, a demonstrative in a non-MD construction (without DEF suffix on the following element) has the normal pointing-demonstrative sense: this *banica* 'pastry', as opposed to a different one, in (33a). With DEF, however, as in (33b), it takes on the meaning of subjective focus on the good (in this case) qualities of a certain specific pastry.

(33)   a.   **Tazi** nejna banica e po-vkusna ot   onazi.'   Bulg
            this   her   banica is more-tasty than that
            'This (one) banica of hers is tastier than that one.'

    b. **Tazi** nejna**ta**   banica e   straxotna!
        this her_DEF   banica is   super
        'That banica of hers is super!'

Demonstratives always have an attention-focusing function. With an otherwise non-definite nominal, this attention-focusing takes the form of specifying: picking out a specific one or specific subset. When paired with an already-specific, definite nominal, this specifying focus would make no sense; instead, the demonstrative focuses attention on something like the unique qualities of the individual.[8] Thus the MD construction in Balkan Slavic is not mere definiteness agreement; the demonstrative and the definite "article" each make a separate semantic contribution. The Q[uality]F[ocus] feature in (25) is a shorthand way of capturing the attention-focusing function of the combination of demonstrative and definiteness. Like phi features, QF is shared by the demonstrative in SpecDP and the null D head. The DEF feature of D is manifested as overt definiteness agreement; QF-marked D optionally induces agreement on subsequent heads as well. I leave a detailed account of how QF licenses this multiple agreement for future research. One possibility is conditioned agreement: it is the QF feature that probes and the definiteness feature is valued as a free-rider; another is conditioned realization of overt agreement by the presence of an additional feature, perhaps formalized through an Agree-Link account, following Arregi and Nevins (2012, 2013).[9]

5 Macedonian vs. Bulgarian

Recall that the two Balkan Slavic languages differ in how far down into the nominal phrase definiteness agreement is able to penetrate: in both Bulgarian and Macedonian, the head of QP, PossP, and one or more APs can be articled, but only in Macedonian can agreement reach into NP and mark the head N. I suggest that this is due to a difference in NP structure between the two languages; specifically the difference in accessibility of

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[8] This interpretation of demonstrative with a (situationally or morphologically) definite or specific nominal seems quite robust crosslinguistically. The semantic effect seen in the English examples in (31) is found also in German, for example.
[9] Thanks to the anonymous referees for these suggestions.

N provides further support for the additional projection posited for Bulgarian but not Macedonian by Franks (2015), labeled AgrP[10] in (34).

(34) a. Macedonian DP: [DP [QP [PossP [AP [NP]]]]]
      b. Bulgarian DP: [DP [QP [PossP [AP [AgrP [NP]]]]]]

Franks' main justification for this extra structural layer is that it allows for a possessive (dative) clitic within the nominal phrase, in the Agr head. Both Bulgarian and Macedonian allow possessive adjectives with a definite article, including in the MD construction with a demonstrative, as in (35). In Bulgarian, a possessive clitic is also possible, both in simple DPs and in MD constructions like (36b). In Macedonian, which lacks the AgrP layer, equivalents of these are ungrammatical.

(35) (**tija**) moi**te** knigi/(**ovie**) moi**ve** knigi   Bulg/Mac
      these my_{DEF} books/these   my_{DEF} books
      'my books, these books of mine'

(36) a. knigi**te**   **mi**   Bulg
          books_{DEF} my
          'my books'
      b. **tija** novi**te** **mi** knigi
          these new_{DEF} my books
          'these new books of mine'

(37) a. *knigi**ve**   **mi**   Mac
          books_{DEF}   my
      b. *(**ovie**) novi**ve** mi knigi
           these   new_{DEF} my books

I suggest that the AgrP layer also insulates the NP from agreement-spreading in MD; that is, it blocks the realization of QF+DEF as a definiteness suffix on N. Somewhat problematically, it does not prevent

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[10] Franks (2015) calls the posited projection KP, but suggests it might be AgrP. Given that KP is normally higher (above DP) and that this projection houses clitics that agree in person, gender, and number features, AgrP seems preferable.

the normal, non-MD definiteness inflection on N, as simple nouns like *kniga* in (38a) do take a definite article suffix.

(38) a. kniga**ta** $[_D \textit{DEF}] [_{AGRP} [_{NP} \text{kniga}_{DEF}]]$
        book$_{DEF}$
        'the book'
    b. *__tazi__   kniga**ta**   *$[_D \textit{DEF.QF}] [_{AGRP} [_{NP} \text{kniga}_{DEF}]]$
        this   book$_{DEF}$

Apparently assignment of definiteness inflection by a DEF.QF D works differently from definiteness inflection by a DEF D, not only in allowing multiple articles (agreement chain) but also in being blocked by AgrP. It is not clear how to formalize this difference in the two types of definiteness inflection; I leave this as a problem for further research.[11]

6 Conclusions

Although MD constructions in Balkan Slavic may seem like a somewhat marginal part of the grammar, being found only in colloquial usage, they provide insight into several aspects of the structure of DP in these languages. They provide support for locating demonstratives in SpecDP, for the inflectional status of articles, and at least hint at a more elaborated DP structure in Bulgarian than Macedonian, perhaps involving an extra AgrP layer above NP. They raise questions of how to formalize definiteness agreement spreading vs. single definiteness inflection. The affective meaning associated with MD is produced by the combination of definiteness (the article) and focus on qualities of an already specified individual or group (the demonstrative). All of these results (and questions) provide a basis for further cross-linguistic investigation of MD constructions.

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[11] DEF.QF definiteness inflection on nouns is impossible also with a possessive clitic:
  (i) * __tazi__ kniga**ta** **mi**/*__tazi mi__ kniga**ta**
        this book$_{DEF}$ my/this my book$_{DEF}$
        (intended: 'this book of mine')

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Grammatical Gender Meets Classifier Semantics: Evidence from Slavic Numerals[*]

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Although in recent years considerable attention has been dedicated to the semantic interpretation of certain suffixes that make up Slavic derivationally complex numerical expressions (e.g., Dočekal 2013, Wągiel 2014, 2015, to appear, Dočekal & Wągiel 2018), thorough research on the meaning of different forms of basic cardinal numerals has not been pursued so far. The goal of this paper is to provide novel evidence revealing non-trivial constraints on the distribution of Slavic marked cardinals, indicating that such forms used as modifiers and predicates are in fact semantically complex expressions involving classifier semantics.

1 Introduction

For a long time, the relationship between gender and classifier systems has been subject to extensive typological investigations. It is commonly

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argued that both systems play a similar role in grammar in that they reflect the classification of the nominal lexicon (e.g., Dixon 1982, Corbett 1991, Aikhenvald 2000). However, one function of classifiers that is commonly assumed not to be shared with grammatical gender is their behavior in languages such as Mandarin, which allow numerals to modify nominals. For instance, as indicated by the contrast in (1), the classifier is required to enable quantification over entities denoted by the noun and its omission leads to ungrammaticality. At first sight, it appears that in this respect no parallel can be drawn between grammatical gender systems and classifier systems. Thus, it is generally assumed that a significant distinction between the two is that classifiers are semantically equipped to designate units of counting, whereas gender is not.

(1) a. sān   běn   shū   b. *sān   shū   (Mandarin)
        three CL   book   three book
        'three books'

In spite of the received view, some recent proposals build on the idea that in fact at least in some cases it is adequate to analyze gender as a grammaticalized classifier system. In particular, recent research on Arabic numerals (Fassi Fehri 2016, 2018) and Bosnian-Croatian-Serbian nouns (Arsenijević 2016) indicates that gender can be interpreted in terms of a mode of quantification. In this paper, I provide novel evidence concerning the relationship between gender morphology and classifier semantics. Specifically, I focus on some non-trivial semantic effects triggered by gender on numerals in Slavic languages. The core evidence comes from the well-studied virile/non-virile alternation of Polish cardinal numerals (Miechowicz-Mathiasen 2011).

The paper is structured as follows. In Section 2, I discuss referential properties of Polish marked and unmarked cardinal numerals. In Section 3, I discuss additional data from other Slavic languages, namely Bulgarian and Slovak. In Section 4, I confront the phenomena observed in Slavic with evidence from classifier languages. In Section 5, I introduce the basic machinery necessary for the analysis, i.e., the intersective theory of cardinal numerals and measure functions. In Section 6, I develop a morphosemantic approach to account for the discussed phenomena. Finally, Section 7 concludes the article.

2 The Virile/Non-Virile Alternation in Polish

Polish marks gender not only on nouns, pronouns, and adjectives, but also on cardinal numerals. The gender system of the language involves an asymmetry between genders represented in the singular, i.e., feminine, masculine, and neuter, and those represented in the plural, specifically virile as opposed to non-virile. Virile includes the personal masculine, while non-virile includes everything else, i.e., impersonal animate masculine, inanimate masculine, feminine, and neuter. Cardinals need to agree with nominals they modify in gender, and thus show either virile or non-virile agreement, see (2).

(2) a. **Pięć**   dziewczyn spało.   (Polish)
         five_{NV} girls_{NV}   slept
         'Five girls slept.'
    b. **Pięciu** chłopców   spało.
         five_V   boys_V   slept
         'Five boys slept.'

Let us begin the examination of the evidence with the discussion of how the distinction is encoded morphologically.

2.1 Markedness
Virile forms of Polish cardinals are both morphologically and semantically marked, whereas non-virile forms are not. For instance, the morphological make-up of the virile cardinal numeral *dwaj* 'two', see (3b), indicates that compared to its non-virile counterpart in (3a) *dwaj* involves an additional element.

(3) a. dw-a   b. dw-a-j   (Polish)
         root-NV.marker   root-stem.marker-V.marker
         'two'   'two'

Furthermore, non-virile expressions are often homophonous with numeral roots. For instance, in the Nominative/Accusative[1] form of the

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[1] For the purpose of this paper, I ignore the issues concerning the Accusative Hypothesis (e.g., Miechowicz-Mathiasen 2011).

non-virile cardinal *pięć* 'five', the marking is silent, see (4b), and the whole numeral is phonetically equivalent to the root in (4a). On the other hand, virile forms are never homophonous with numeral roots and always involve an overt marker, see (4c).

(4) a. $\sqrt{\text{pięć}}$ (Polish)
     root
   b. pięć-∅
     root-NV.marker
   c. pięci-u
     root-V.marker

In the following sections, I explore the correlation between markedness and some non-trivial semantic properties of Polish cardinals indicating that the virile/non-virile alternation cannot be simply reduced to syntactic agreement.

2.2 Semantic Functions of Cardinal Numerals
It has been noted that numerals can have various functions. For instance, Rothstein (2013, 2017) observes that cardinals in English can be used as nominal modifiers and predicates but also function as singular terms. While the meaning of *four* in attributive and predicate position in (5a)-(5b) relates to the meaning of *cats* and *reasons*, respectively, the numerals *six* and *two* in (5c) seem to involve reference to abstract mathematical entities, i.e., name number concepts.

(5) a. The four cats lay on the sofa.
   b. My reasons for saying this are four.
   c. Six is bigger than two.

Since English lacks a rich morphology, examples such as those in (5) might suggest that cardinals live a double life, so to speak. However, a more careful examination of numerals in Slavic languages reveals that in fact the meanings corresponding to (5a) and (5b) are associated with a different structure than the one related to the meaning in (5c). In particular, Polish marked and unmarked cardinals differ in their distribution in a way that is irreducible to formal agreement. While both

virile and non-virile forms can modify NPs, see (6), and occur in predicate position, see (7), they differ in their referential properties.

(6) a. Tych **pięć** dziewczyn przyszło.   (Polish)
         these five$_{NV}$ girls$_{NV}$ came
         'These five girls came.'
    b. Tych **pięciu** chłopców przyszło.
         these five$_V$ boys$_V$ came
         'These five boys came.'

(7) a. Tych dziewczyn było **pięć**.   (Polish)
         these girls$_{NV}$ was five$_{NV}$
         'The number of these girls was five.'
    b. Tych chłopców było **pięciu**.
         these boys$_V$ was five$_V$
         'The number of these boys was five.'

The crucial data set concerns a non-trivial asymmetry between the two forms in question in numerical contexts. Specifically, only unmarked cardinals can be used to name numbers. For instance, while (8a) can refer to an abstract mathematical object, (8b) cannot. The only available interpretation of the phrase could be paraphrased along the lines 'five in number' where the plurality whose cardinality is given consists of male persons.

(8) a. liczba   pięć   (Polish)
         number   five$_{NV}$
         'the number five.'
    b. #liczba   pięciu
         number   five$_V$

Similarly, marked forms cannot appear in counting lists in which particular numerals designate abstract mathematical objects. Unlike (9a), the series in (9b) fails to refer to number concepts and indicates that the speaker counts male individuals.

(9) a. jeden, dwa,   trzy,   cztery, pięć…   (Polish)
        one$_{NV}$ two$_{NV}$ three$_{NV}$ four$_{NV}$ five$_{NV}$
        'one, two, three, four, five…'
  b. #jeden, dwaj, trzej,   czterej, pięciu…
        one$_V$ two$_V$ three$_V$ four$_V$ five$_V$

Consequently, marked cardinals do not fit contexts that clearly call for numeric arguments such as mathematical statements. For instance, let us consider the well-formed sentence in (10a), where the argument of *dwa razy* 'two times' is required to refer to a number concept. As the contrast between (10a) and (10b)-(10c) indicates, the marked form *pięciu* 'five' cannot refer to abstract mathematical objects, and thus it is infelicitous in this kind of environment.[2]

(10) a. Dwa   razy **pięć**   równa się   dziesięć.   (Polish)
        two$_{NV}$ times five$_{NV}$ equals REFL ten$_{NV}$
        'Two times five equals ten.'
    b. *Dwa   razy **pięciu** równa się   dziesięć.
        two$_{NV}$ times five$_V$ equals REFL ten$_{NV}$

The data show that the distribution of marked forms of Polish cardinal numerals is limited to attributive and predicate positions. On the other hand, unmarked forms can be also used as names of abstract number concepts. However, as we see in the next section, when they function as singular terms, unmarked cardinals exhibit distinctive properties compared to when used as nominal modifiers or predicates.

2.3 Properties of Names of Number Concepts
In Polish, cardinal numerals can be modified by agreeing adjectival modifiers that precede them (see, e.g., Babby 1987, Miechowicz-Mathiasen 2011).[3] For instance, in example (11a), the adjective *dobre*

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[2] An anonymous reviewer worries that the ungrammaticality of (10b) might be due to mixing gender marking across some kind of coordinated structure. However, (i) rules out such a possibility.
  (i) *Dwaj razy   pięciu równa się   dziesięciu.
      two$_V$ times five$_V$ equals REFL   ten$_V$
[3] Apparently, there is some interspeaker variation with respect to whether the agreeing strategy is available. Some speakers of Polish consider examples such as

'good' precedes the unmarked numeral and agrees with it in gender and case. As indicated by the translation of (11a), if the agreement strategy is employed, it is the referent of the cardinal that is modified and not the quantified individuals. In other words, it is the number of cookies that is good, not necessarily the cookies themselves. Crucially, cardinals used as names of number concepts resist such a mode of adjectival modification, as witnessed by the ungrammaticality of examples like (11b).

(11) a. dobre$_i$ **pięć$_i$**   ciasteczek   (Polish)
          good$_\text{NV.NOM}$ five$_\text{NV.NOM}$ cookies$_\text{GEN}$
          'a good five cookies'
      b. *liczba dobre$_i$ **pięć$_i$**
          number good$_\text{NV.NOM}$ five$_\text{NV.NOM}$

Moreover, it is well-known that when used as nominal modifiers, Slavic cardinal numerals can appear within a single phrase with the universal quantifier (cf. Corbett 1978, Gvozdanović 1999, Miechowicz-Mathiasen 2011). For instance, the phrase in (12a) refers to a set of five cookies with *wszystkie* 'all', forcing an exhaustive interpretation. However, cardinals used as singular terms do not allow for universal quantification, as attested by the ungrammaticality of (12b).

(12) a. wszystkie **pięć**   ciasteczek   (Polish)
          all   five$_\text{NV}$ cookies$_\text{GEN}$
          'all the five cookies'
      b. *liczba   wszystkie **pięć**
          number   all   five$_\text{NV}$

To conclude, Polish has a virile/non-virile alternation in cardinal numerals, which is realized morphologically by marked and unmarked forms, respectively. Although unmarked cardinals are felicitous as modifiers and predicates, as well as names of number concepts, when they are used as singular terms, they exhibit distinctive properties. On the other hand, marked forms are only felicitous as modifiers and predicates

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(11a) ungrammatical and only accept APs that agree with the noun to precede the quantificational NP. However, for such speakers, the use of the genitival form *dobrych* 'good' in (12b) is ungrammatical as well.

and fail to refer to abstract number concepts. Thus, they are incompatible with numerical contexts. In the next section, I discuss more Slavic data that corroborate the pattern observed in Polish.

3 Additional Evidence from Slavic

The asymmetry discussed in the previous section is not a Polish idiosyncrasy. Within Slavic, there are also other languages that have developed a gender system with respect to cardinal numerals and exhibit similar distributional constraints on marked forms.

3.1 Bulgarian Cardinals

Let us first consider Bulgarian virile, i.e., masculine personal, cardinals. Those involve special forms for numerals 2-10 ending in *-ma* or *-ima*. In standard Bulgarian, they occur with plural forms of virile nouns, while unmarked cardinals combine with the so-called count form of non-virile nouns (see Cinque & Krapova 2007, Pancheva 2018).[4] Both marked and unmarked forms can be used as nominal modifiers and predicates; see (13) and (14), respectively.[5]

(13) a. Tezi **pet**   ženi   dojdoxa.   (Bulgarian)
          these five$_{NV}$ women$_{NV}$ came
          'These five women came.'
      b. Tezi **petima** mâže dojdoxa.
          these five$_V$ men$_V$ came
          'These five men came.'

(14) a. Ženi-te   sa **pet**.   (Bulgarian)
          women-DEF   are five$_{NV}$
          'The number of women is five.'
      b. Mâže-te   sa **petima**.
          men-DEF are five$_V$
          'The number of men is five.'

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[4] For details concerning a more complicated situation in colloquial varieties of modern Bulgarian, see Pancheva (2018).
[5] I would like to thank Marina Pancheva for her judgments concerning Bulgarian and Pavel Caha for comments regarding the data.

However, like Polish, marked cardinals in Bulgarian are infelicitous in contexts calling for numeric arguments. The contrast in (15) indicates that forms such as *petima* 'five' cannot refer to an abstract number concept required as an input by the numeric predicate *deleno na* 'divided by'. As a result, (15b) is odd.

(15) a. Deset   deleno na **pet**   e dva.   (Bulgarian)
       ten   divided on five_NV is two
       'Ten divided by two is five.'
    b. *Deset   deleno na **petima** e   dva.
        ten   divided on five_V   is two

3.2 Slovak Cardinals

Furthermore, an analogous distinction is also present in Slovak. In particular, Slovak cardinals involve special virile numeral forms ending in *-aja*, *-ia* or *-i*, which are dedicated to virile nouns. Not surprisingly, one finds both non-virile and virile cardinals in attributive and predicate positions; see (16) and (17), respectively.[6]

(16) a. Tie **dve**   ženy   spali.   (Slovak)
       these two_NV   women_NV slept
       'These two women slept.'
    b. Tí **dvaja** muži spali.
       these two_V   men_V slept
       'These two men slept.'

(17) a. Tie ženy   sú **dve**.   (Slovak)
       these women_NV are two_NV
       'The number of these women is two.'
    b. Tí muži   sú **dvaja**.
       these men_V   are two_V
       'The number of these men is two.'

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[6] I would like to thank Dominika Kuruncziová for being my informant on Slovak. According to her judgments, virile forms of numerals ≥5 in predicate position are degraded. For sake of brevity, I ignore this issue here.

Again, like Polish and Bulgarian, Slovak marked cardinal numerals turn out to be infelicitous in contexts requiring expressions referring to abstract mathematical entities. As witnessed by the oddness of (18b), the virile form *dvaja* 'two' cannot be used as a singular term. Hence, its distribution is restricted in the same way as marked numerals in Polish and Bulgarian.

(18) a. Päťkrát   **dva**   je   desať.   (Slovak)
          five.times   two$_{NV}$ is   ten
          'Five times two is ten.'
      b. *Päťkrát   **dvaja**   je   desať.
          five.times   two$_V$ is   ten

To summarize, the pattern observed for Polish in Section 2 is also attested in other Slavic languages that mark gender on cardinals. This fact suggests a deep relationship between gender, morphological complexity, and reference in the domain of numerals. In the following section, I adopt an even broader perspective and focus on the contrast between numerical expressions used as number-denoting terms and modifiers/predicates outside Slavic.

4 Beyond Slavic

So far, I have demonstrated that in Polish, Bulgarian, and Slovak, virile cardinal numerals have a restricted distribution indicating that, unlike their unmarked counterparts, they are definitely not names of numbers. In this section, I relate the data discussed so far with the cross-linguistic evidence, suggesting that Slavic marked cardinals are semantically complex expressions that can be accounted for in terms of classifier constructions.

4.1 Specialized Numerals across Languages
Cross-linguistic research reveals that a number of typologically diverse and genetically distant languages lexically distinguish between two specialized forms of cardinals. In particular, distinct forms of a particular numeral specialized either for nominal modification, i.e., an attributive numeral, or for reference to integers, i.e., a counting numeral, are cross-linguistically common, see Fig. 1 (Hurford 1998, 2001). While

attributive numerals are fit for modification, counting numerals are dedicated to reference to number concepts and as such cannot be used as nominal modifiers. The distinction resembles the contrast between unmarked and marked numerals in Slavic.

LANGUAGE	NUMBER	ATTRIBUTIVE	COUNTING
German	2	zwei	zwo
Maltese	2	żewg	tnejn
Mandarin	2	liǎng	èr
Hungarian	2	két	kettö
Basque	2	bi	biga

Fig. 1: Specialized numerals across languages (Hurford 2001)

Furthermore, there are languages outside Slavic in which there is a similar interaction between gender and referential properties of numerals. For instance, Arabic distinguishes between morphological forms: those that can only be used as modifiers and those that can also function as names of number concepts (Fassi Fehri 2018). The feminine marking on the numeral in (19a) allows it to be used in a numeric context, whereas the masculine form in (19b) results in infelicity in mathematical statements.

(19) a. **ṭaalaṯ-at-un**   t-usawii   ʔiṯnayni zaʔid waaḥid. (Arabic)
          three-FEM-NOM FEM-equals two   plus one
          'Three equals two plus one.'
      b. ***ṭaalaṯ-un** y-usawii ʔiṯnayni zaʔid waaḥid.
          three-NOM equals   two   plus one

It seems that the relationship between grammatical gender, morphological markedness, and the ability of a numeral to refer to an abstract number concept is cross-linguistically widespread and should be treated seriously. In the next section, I focus on a similar phenomenon reported in classifier languages.

4.2 Numerals in Classifier Languages
It has long been observed that cross-linguistically, numerals and classifiers are always adjacent (Greenberg 1972). Specifically, Fig. 2

provides the four attested orderings of numerals, classifiers, and nouns. Notice that this number does not exhaust all possible patterns. The two unattested orderings are NUM-N-CL and CL-N-NUM, where the noun separates the numeral and classifier. The bracketing in Fig. 2 indicates that classifiers form syntactic constituents with numerals rather than with nouns.[7]

LANGUAGE	ORDERING
Vietnamese	[NUM-CL]-N
Thai	N-[NUM-CL]
Ibibio	[CL-NUM]-N
Bodo	N-[CL-NUM]

Fig. 2: Relative orderings of numerals and classifiers (Greenberg 1972)

The typological findings presented in Fig. 2 are further corroborated by the fact that classifiers are often suffixes on numerals, as witnessed in the examples from Yucuna and Bengali in (20a) and (20b), respectively (see Aikhenvald 2000: 105-110 for more data).

(20) a. pajluhua-na   yahui   (Yucuna)
          one-CL   dog
          'one dog'
      b. nôe-ṭa ghoṛi   (Bengali)
          nine-CL clock
          'nine clocks'

Another issue concerns the size of a classifier repertoire. Usually, discussions focus on languages such Mandarin and Japanese, which have large numbers of specialized counter words. However, there are languages with simple classifier systems involving few or even two numeral classifiers. For instance, Telugu has just two classifiers dedicated to counting human and non-human entities, respectively, and are fused with a cardinal (Krishnamurti & Gwynn 1985: 106-107). Similar, in Marathi, there is only a classifier for counting males and one

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[7] A possible exception to the generalization might be Kana, in which classifiers are argued to form a constituent with the head noun (Ikoro 1994).

for counting females (Emeneau 1964: 648). Furthermore, Abkhaz distinguishes between numerals for abstract counting and counting non-human entities on the one hand and those dedicated to counting human individuals on the other. The first are either bare or followed by a suffix, whereas the latter are always marked with a special morpheme (Hewitt 1979: 121). These facts indicate that a language can have a binary classifier system with a classifier dedicated to counting entities of a specific type, e.g., human or male individuals, as opposed to everything else.

Let us now examine the properties of classifier constructions from the perspective of the data discussed so far. It is well-known that in classifier languages such as Japanese, bare numerals cannot be used as modifiers and require a special element typically referred to as a classifier or counter in order to combine with the modified noun, as demonstrated in (21). However, a more subtle observation is that they are also illicit in predicate position (Sudo 2016). For instance, the sentence in (22a), where the bare numeral is used as the main predicate, is considered ungrammatical. On the other hand, when a bare numeral is replaced by a classifier construction, the sentence becomes acceptable, as witnessed by the well-formedness of (22b).

(21)   a. *ichi-no   hana   (Japanese)
            one-GEN   flower
       b. ichi-rin-no   hana
            one-CL-GEN   flower
            'one flower'

(22)   a. *kyoo-no   okyakusan-wa   juu-ni-da.   (Japanese)
            today-GEN   guest-TOP   ten-two-COP
       b. kyoo-no   okyakusan-wa   juu-ni-nin-da.
            today-GEN   guest-TOP   ten-two-CL-COP
            'The number of guests today is twelve.'

In this context, I add a novel observation. Interestingly, although classifier constructions can be used as modifiers and predicates, they do not fit unambiguously numeric contexts. For instance, it is only bare numerals that can be used in a mathematical statement, such as (23a).

When replaced with classifier constructions involving the general classifier *ko*, suddenly the sentence becomes infelicitous, see (23b). Crucially, the predicate *waru* 'divide by' requires numeric arguments.[8]

(23) a. juu waru **ni-wa**   go-da.   (Japanese)
         ten divide.by two-TOP   five-COP
         'Ten divided by two is five.'
     b. *juu-ko   waru   **ni-ko-wa**   go-ko-da.
         ten-CL   divide.by two-CL-TOP   five-CL-COP

The evidence presented above indicates a deep link between grammatical gender and classifiers with respect to a semantic aspect that is usually not assumed to be shared between the two. It appears that in classifier languages, bare numerals function as singular terms denoting abstract concepts, whereas classifier constructions can only be used as modifiers or predicates. This restriction corresponds to the behavior of marked cardinals in Slavic, e.g., virile forms of numerals in Polish. Therefore, I propose that gender on cardinal numerals is in fact a mode of quantification and should be considered as a simple grammaticalized classifier system. In the next section, I introduce the framework within which an account for the observed phenomena is proposed.

5 Theoretical Background

In the literature on countability, it is standardly assumed that the reason that languages like Japanese need classifiers is that nouns in such languages differ from the nouns in non-classifier languages in that they have mass-like semantics (e.g., Borer 2005, Chierchia 1998, 2010, Rothstein 2010, Li 2011, Scontras 2013). According to a standard approach, classifiers are required to compensate for the semantic deficits of nominal expressions whose denotations are not compatible with the meaning of numerals. At first sight, such a view might seem appealing. However, there is independent evidence suggesting that this is not the case (Bale & Coon 2014). Consequently, an alternative view, which I adopt here, maintains that it is not the semantics of nouns that differs in

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[8] I would like to thank Yasu Sudo and Kazuko Yatsushiro for their judgments concerning Japanese.

classifier languages. Rather, it is the properties of cardinals that require classifiers to allow for modification (Krifka 1995, Sudo 2016). In other words, classifiers are not for nouns, but rather for numerals. Before we explore the consequences of this assumption for the Slavic data, let us introduce some basic machinery to be used in the analysis.

5.1 Measure Functions
Following Krifka (1989), I model quantification in numeral and measure constructions in terms of extensive measure functions, i.e., operations mapping pluralities of individuals or quantities of substances onto real numbers corresponding to the number of individuals or units making up a plurality or quantity. Such measure functions need to be additive and have the Archimedean property. Moreover, assuming the remainder principle ensures monotonicity. Consequently, counting can be modeled in terms of measuring. Given that the measure function LITER maps an entity to a number of liters of that entity, it will return 3 if the quantity of an entity in question corresponds to three liters, see (24a). Similar, one can introduce the measure function # that would yield 3 if a number of individuals making up a plurality it is applied to equals 3, see (24b).[9]

(24) a. $[\![$two liters of water$]\!] = \lambda x[\text{WATER}(x) \land \text{LITER}(x) = 2]$
      b. $[\![$two cats$]\!] = \lambda x[\text{CAT}(x) \land \#(x) = 2]$

Although measure functions are useful tools to account for quantification over entities in modification contexts, one needs to say something more to also capture the predicative and referential uses of cardinal numerals.

5.2 Cardinal Predicates
The approach to the semantics of cardinals developed here builds on the account proposed by Rothstein (2017). Within this system, when used in attributive and predicate position, numerals are cardinal predicates of the same type as intersective adjectives (Landman 2003), see (25a); however, when they are used as names of numbers, they refer to abstract objects of a primitive semantic type *n*. On this view, cardinal predicates

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[9] In fact, here I simplify Krifka (1989)'s original system in which the NU operation (for 'natural unit') is proposed. When applied to a property, NU yields a number of natural units associated with that property.

denote sets of plural entities with a specific cardinality, have standard intersective semantics, and combine with nouns via Predicate Modification. For instance, the phrase *two cats* denotes a set of pluralities that are both in the denotation of *cats* and have the property *two*, i.e., a set of pairs of cats. Furthermore, the fact that numerals are of type $\langle e, t \rangle$ explains why they also occur in predicate position. In addition, Rothstein assumes that cardinal properties are basic, whereas their individual correlates, i.e., names of number concepts, are derived, and postulates type-shifting operations $\cup$ and $\cap$, which allow for switching between the two meanings; see (25b).

(25) a. $[\![\text{two}]\!]_{\langle e, t \rangle} = \lambda x[\#(x) = 2]$
        b. $[\![\text{two}]\!]_n = \cap [\![\text{two}]\!]_{\langle e, t \rangle} = 2$

With the crucial ingredients in place, let us now see how they can be used to account for the observed phenomena.

6 Composition of Cardinals

In this section, I propose a morphosemantic analysis of Polish cardinal numerals that captures their properties discussed in Section 2. The main claim is that morphologically marked cardinals have a built-in classifier, whereas unmarked cardinals do not. They can, however, make use of a covert classifier element in environments involving nominal modification. Such a proposal not only explains the semantic difference between unmarked and marked forms in terms, but also accounts for the cross-linguistic similarities between virile numerals and classifier constructions observed in Sections 2-4.

6.1 Adjustments

Within the framework adopted here, there are several modifications and extensions I make. First of all, for the purpose of this paper and in contrast to Krifka, I assume an atomic mereology associated with count nouns. In other words, I take counting to be defined in terms of measuring the number of atoms making up pluralities of individuals.[10]

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[10] In fact, this is a major departure from Krifka's original theory, which replaces atomicity with the property of QUANTIZED. Although I have argued against atomicity

Second, unlike Rothstein, I assume that the meaning of cardinals as names of numbers is the basic one. In particular, I posit that numerals are complex expressions involving the numeral root, which is an expression of type *n*, the *numeral* head which introduces the gender value, and optionally the classifier element CL, which takes a number and returns a set of atomic individuals whose cardinality equals that number; see (26). Proper counting is guaranteed by the measure function # and the presupposition of atomicity incorporated into the semantics of CL. Such a restriction guarantees the incompatibility of cardinals with mass nouns unless their denotation is shifted to the count domain, e.g., via the Universal Packager or the Universal Sorter.

(26) $[\![\text{CL}]\!]_{\langle n, \langle e, t\rangle\rangle} = \lambda n\lambda x.\text{ATOM}(x)[\#(x) = n]$

In other words, cardinals are born as names of numbers (cf. Scha 1981) and by adding additional structure, can be converted to cardinal properties of type $\langle e, t\rangle$. I assume that in a language such as English, CL has no formal exponent. However, in languages such as Polish, it can be introduced by an overt element, specifically gender morphology. Thus, marked cardinals are equivalent to classifier constructions.

Furthermore, I propose that cardinal suffixes in Slavic, complex numerals such as those in (27a) are number operators of type $\langle n, n\rangle$, which take the denotation of the numeral root and yield a number enlarged via addition or multiplication, (28), which can then be shifted by CL. Notice, however, that the cardinal suffixes incorporate a special presupposition that makes them compatible only with natural numbers. Such a semantics is motivated by the fact that cardinal suffixes are ungrammatical with expressions denoting fractions, as in (27b).[11]

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on independent grounds (Wągiel 2018), this issue is not of great relevance for the phenomena discussed here. Thus, I choose this way of implementing the main idea.

[11] Note that the morphemes *pięć*- and *pięt*- are allomorphs. Similarly, I assume that *-nast-* is the basic form of the cardinal suffix, which alternates with *-naści-* in contexts preceding *-e*.

(27) a.   pięt-naście,   pięć-dziesiąt   (Polish)
           five-teen   five-ty
           'fifteen, fifty'
      b. *pół-naście,   *pół-dziesiąt
         half-teen   half-ty

(28) a.   ⟦-naście⟧ = λn.INTEGER(n)[$n + 10$]
      b.   ⟦-dziesiąt⟧ = λn.INTEGER(n)[$n \times 10$]

Let us now examine how the pieces fit together. In the next sections, I propose derivations accounting for the semantics of Polish unmarked and marked cardinal numerals.

6.2 Deriving Number-Denoting Cardinals
I argue that Slavic cardinal numerals are complex expressions. First, let us consider Polish unmarked cardinals in numeric contexts such as (10a), where they are used as names of abstract mathematical concepts. In general, I take numeral roots to be category-free, as often claimed (e.g., Halle & Marantz 1993). Due to the fact that Polish cardinals can be used not only as modifiers and predicates, but also as names of numbers, and can be modified by agreeing adjectives, I assume that they have some nominal-like properties. Therefore, I posit that a gender value is always associated with the *numeral* head that forges the cardinal. Let us consider the derivation of the unmarked number-denoting numeral *pięć* 'five'; see (29). The category-free root $\sqrt{pięć}$ is a name of the natural number 5, i.e., an expression of a primitive type *n*. Although the *numeral* head has a crucial structural role, i.e., it assigns the [NV] (for 'non-virile') gender value and forms the numeral, it lacks any particular semantic contribution. Thus, the resulting expression is simply the name of the number 5 and, as such, it can be used in numeric contexts.

In the case of a number-denoting complex numeral, such as *piętnaście* 'fifteen', the desired semantics can be obtained by incorporating the node associated with the cardinal suffix in the structure. Specifically, I posit that it is not until the cardinal suffix attaches to the root and yields an enlarged number that the *numeral* head applies, as in the tree in (30), and forms a cardinal expression fit for mathematical statements.
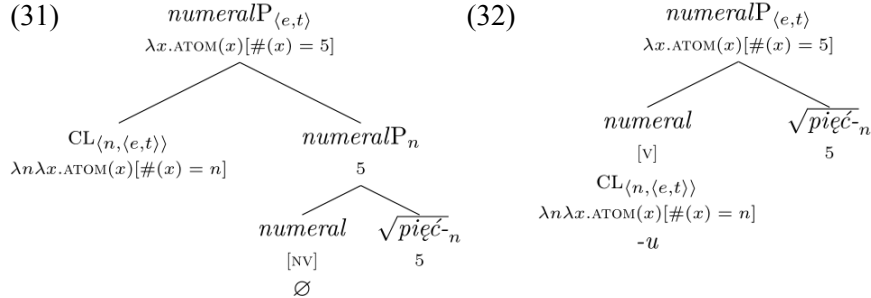
(29)

$$\text{numeralP}_n$$
$$5$$

$$\text{numeral} \qquad \sqrt{pi\acute{e}\acute{c}}\text{-}n$$
$$\text{[NV]} \qquad\qquad 5$$
$$\varnothing$$

(30)

$$\text{numeralP}_n$$
$$15$$

$$\text{numeral} \qquad\qquad n$$
$$\text{[NV]} \qquad\qquad 15$$
$$\text{-}e$$

$$\text{-}nast\text{-}_{\langle n,n \rangle} \qquad \sqrt{pi\acute{e}\acute{c}}\text{-}n$$
$$\lambda n.\text{INTEGER}(n)[n+10] \qquad 5$$
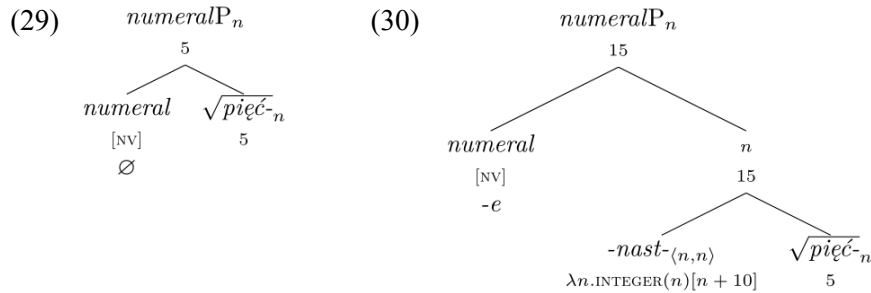
With the proposed mechanism of deriving number-denoting cardinal numerals in place, let us now move to the semantics of cardinal predicates. The next section is dedicated to explaining the difference in the composition of *pięć* and *pięciu* (both 'five').

6.3 Deriving Cardinal Predicates

As we saw in Section 2, unmarked cardinals can also be used as predicates and modifiers. In order to account for that function, I postulate that the structure in (29) can be further augmented with a silent node introducing the CL element, as in (31). As a result, the number 5 is shifted to the set of pluralities of atomic individuals whose cardinality equals 5. Due to its intersective semantics, such an expression can be used both as a nominal modifier and in predicate position. Similarly, extending the structure in (30) would also yield an expression of type $\langle e,t \rangle$ with the only difference being that the cardinality of relevant pluralities would equal 15.

Let us now consider how the derivation of the marked cardinal *pięciu* 'five' differs from its unmarked counterpart. I presume that, like in (31), the root in the tree in (32) is a singular term, i.e., nothing more than an expression of type *n*, and again it combines with the *numeral* head. Only this time the *numeral* head not only assigns the [V] gender value, but it also has a semantic contribution. In particular, it introduces the classifier meaning represented by CL, which shifts the number to the cardinal property corresponding to that number. The resulting expression is of type $\langle e,t \rangle$. As such, it is illicit in contexts calling for numeric arguments, but it can be used as an intersective modifier and in predicate position. In

the case of complex marked cardinals, such as *piętnastu* 'fifteen', the derivation proceeds parallel to what I proposed for (30), with the only difference being that the virile *numeral* head again introduces the classifier semantics.

(31)

$numeralP_{\langle e,t \rangle}$
$\lambda x.\text{ATOM}(x)[\#(x) = 5]$

$CL_{\langle n,\langle e,t \rangle \rangle}$
$\lambda n \lambda x.\text{ATOM}(x)[\#(x) = n]$

$numeralP_n$
5

numeral
[NV]
∅

$\sqrt{pięć}\text{-}_n$
5

(32)

$numeralP_{\langle e,t \rangle}$
$\lambda x.\text{ATOM}(x)[\#(x) = 5]$

numeral
[V]
$CL_{\langle n,\langle e,t \rangle \rangle}$
$\lambda n \lambda x.\text{ATOM}(x)[\#(x) = n]$
-u

$\sqrt{pięć}\text{-}_n$
5

The proposed mechanism is very simple and yet it explains the non-trivial semantic contrast between marked and unmarked cardinals in terms of associating grammatical gender with classifier semantics. Furthermore, an additional advantage of this account is that it allows for a unified analysis of various types of Slavic derivationally complex numerical expressions, such as taxonomic numerals, denumeral group nouns, and multipliers. The only thing that is needed is to specify the exact semantics of classifier elements associated with different suffixes.

7 Conclusion

In this paper, I presented novel data concerning the distribution and semantic properties of Slavic marked cardinals – mainly Polish virile numerals. The key finding is that referential properties of Slavic cardinals depend on grammatical gender and resemble the behavior of bare numerals and classifier constructions in classifier languages. Consequently, I proposed that gender on Slavic cardinals can be analyzed as a simple grammaticalized classifier system. The core evidence concerns the semantic asymmetry between unmarked cardinals, which are born as names of number concepts, and marked virile forms, which are derived as complex expressions involving classifier semantics. The issues discussed here shed new light on important matters concerning countability and the meaning of both nominals and numerals.

Further research should focus on the relationship between gender and reference to abstract number concepts both within and outside Slavic.

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Focus association with *only* in Russian

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This paper explores the behavior of *only* in Russian. I show that *only* must be immediately adjacent to the focused item in Russian, arguing that this requirement is due to syntactic focus movement, triggered by the strong [Foc] feature of *only*. The displacement of an F-marked constituent results in right-adjunction to *only*, yielding an appropriately local feature-checking configuration. Furthermore, I demonstrate that *only* itself is limited to a handful of positions within the structure. Specifically, it must meet two requirements in order to merge successfully. I suggest that *only* is an adjunct strictly to functional projections, which are also phases. Ultimately, my goal is to show that *only* can adjoin to *v*P, CP, and FP (a functional projection in the nominal domain).

1 Facts and preliminary analysis

1.1 Adjacency requirement

It is a well-established fact that (1) and (1) yield distinct truth conditional propositions in English (Rooth 1985). If John introduced Bill and Arnold to Sue (with no further social pleasantries), then (1) would be true, but (1) would be false.[1]

(1) a.   John only introduced [BILL]$_F$ to Sue.

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[1] Henceforth I use brackets and small caps to identify the associates of *only*.

b.   John only introduced Bill [to SUE]$_F$.

Furthermore, it has been observed that English *only* can associate with a constituent inside an island, as in (2) (see Anderson 1972, Jackendoff 1972, Drubig 1994, Krifka 2006, Wagner 2006 for discussion).

(2)   I only introduced [a man [that [JILL]$_F$ admires]] to Sue.

The crucial takeaway from the above is that *only* in English is easy to separate from its associate, whether the latter is relatively local, as in (1), or distant, as in (2). This is very much not the case in Russian. As it turns out, Russian *only* must be immediately adjacent to its associate. This means that the structure in (1) reported for English (and the ambiguity that goes with it) simply does not obtain in Russian at all: the focalized element must modify the F-marked XP.

     Consider first an attempted association into a complex NP in (3), which is akin to English (2), but vastly ungrammatical. Placing *only* after the verb, as in (3), improves nothing; the sentence remains degraded. The only way to render it acceptable is by placing *only* before its NP-associate inside the island, as in (3). Rather unsurprisingly, the extraction of an F-marked constituent out of this complex NPs to adjoin to *only* in the main clause is prohibited, as shown in (4).

(3) a. * On **tol'ko**   predstavil   čeloveka, kotorogo [ANNA]$_F$ znaet.
         he   only   introduced man   whom   Anna   knows
   b. *On predstvail **tol'ko** čeloveka, kotorogo [ANNA]$_F$ znaet.
   c.   …, kotorogo **tol'ko** [ANNA]$_F$ znaet.

(4) *On **tol'ko** [ANNA]$_F$ predstavil čeloveka, kotorogo t_{NP} znaet.

It is not just a matter of islandhood, as the locality requirement for *only* and its associate is far more stringent in Russian than in English; the focalized XP must surface next to *only*. (5) illustrates precisely this claim. In the paradigm below, the F-marked element cannot be separated from *only* by anything, regardless of whether the intervener is a verb or an XP.

(5) a. *Andrej **tol'ko** ispek   [PIROG]$_F$ dlja   sestry.
         Andrey only   baked pie   for   sister
         Intended: 'Andrey only baked [A PIE]$_F$ for his sister.'
  b. *Andrej **tol'ko** ispek dlja sestry [PIROG]$_F$.
  c. * Andrej **tol'ko** ispek [dlja SESTRY]$_F$ pirog.
  d. * Andrej **tol'ko** ispek pirog [dlja SESTRY]$_F$.

Examples in (6) evince a range of possible grammatical renditions of the same sentence, all of which feature *only* next to its focalized associate. Additionally, (6) shows that the *only*+[XP]$_F$ complex may either precede or follow the verb, as long as this complex itself is intact.[2]

(6) a.   Andrej **tol'ko** [PIROG]$_F$ ispek dlja sestry.
  b.   Andrej **tol'ko** [dlja SESTRY]$_F$ ispek pirog.
  c.   Andrej ispek **tol'ko** [PIROG]$_F$ dlja sestry.
  d.   Andrej ispek pirog **tol'ko** [dlja SESTRY]$_F$.

Based on these facts, I propose that Russian *only* is endowed with a strong [Foc] feature, which is checked by an appropriate focus-bearing XP. The checking relationship between *only* and its associate must be very local, given the adjacency requirement reported above. Hence, a feature checking configuration arises thanks to displacement, whereby a focused constituent moves to *only*. This movement results in right-adjunction to *only* in the manner of (7): to wit, NP adjoins to *only*. The technology for the proposed operation is borrowed from Rudin (1988), who argues for the very same adjunction configuration in Bulgarian multiple wh-questions.[3] She shows that right-adjunction boasts a particular property: once a constituent is formed, it is not splittable by any interveners. I demonstrate below that this prohibition on splitting holds of Russian *only*+XP complexes as well. Finally, the movement itself is understood as A-bar (phrasal) displacement; therefore, XPs, but

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[2] Some speakers find the paradigm in (5) degraded rather than fully unacceptable. Still, they acknowledge a contrast between (5) and (6). Possible variation in judgments – to the extent we can identify it as being systematic – is an empirical point that I leave to future investigation.
[3] The alternative is to posit Richards' (2001) tucking-in configuration, though it is hard to see how it can capture the prohibition on splitting in (11) and (12).

not heads, are eligible to form a complex with *only* (this is not a revolutionary claim; see Wagner 2006).

(7)
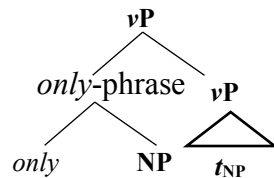
There is one final piece required for the ensuing exposition. Observe that in schematic (7), *only* is rendered as a *v*P adjunct. But even from the baseline facts in (6), it is apparent that the surface position of the *only*-complex is quite lax; it is free to show up either before or after the verb. Despite this ostensible flexibility of the *only*-phrase, I intend to show that *only* is, in fact, very much restricted in the way it may enter the derivation. In particular, I argue that *only* can adjoin strictly to functional projections that are also phases: CP in the clausal domain, *v*P in the verbal domain, and FP in the nominal domain. For now, however, I limit myself to the discussion of *only*'s "genesis", demonstrating that it cannot be merged directly with the NP. This is the focus of Section 1.2.

1.2 Russian ONLY is Not an NP-Adjunct
It is tempting to conclude on the basis of facts in (3) and (6) that *only* originates inside the NP (which would then give us a simple explanation of the adjacency requirement). In this section, I provide three pieces of evidence against this seemingly intuitive analysis. For one, Russian does not tolerate the contexts in which *only* appears between a noun and a preposition. Further, *only* does not pattern with other nominal or adjectival modifiers in relevant respects. Finally, the interpretation of *only+XP* is consistent with the analysis under which *only* is adverbial: it lacks the ambiguity characteristic of English adnominal *only*.

Taglicht (1984) argues that English *only* can adjoin either to NP or VP. Unfortunately, Taglicht's distinction cannot apply to Russian in light of the facts in (8). Russian *only* may not intervene between a preposition and its complement. This contrasts with English (9), where *only* follows

the preposition. In fact, the examples where *only* intervenes between a preposition and a DP in English are abundant. Speakers confirm that the instances in (10) (collected online) all feel quite natural to them. Conversely, the Russian equivalents of (10) are sharply ungrammatical.

(8) a. * dlja   **tol'ko**   sestry
         for   only   sister
     b.   ...vzaimodeistvuet **tol'ko** s krupnymi finansovymi gruppami
          'interacts only with the large financial groups'
     c. *s **tol'ko** krupnymi finansovymi gruppami /s   očen' krupnymi...
                                                 with very large
     d. *s krupnymi **tol'ko** finansovymi gruppami

(9) a.   We escaped with **only** one broken window. [www]
     b.   We **only** escaped with one broken window.

(10) a.   Doctor said I need glasses for only my left eye…
      b.   Living with only the bare essentials has not only provided

Furthermore, *only* is peculiar in comparison to well-behaved modifiers (like *očen'* 'very'), which are traditionally assumed to be constituents of AdjP. The contrast between (11) and (11) showcases the point. While the adverbs in (b) can be easily extracted, *only* in (a) is inseparable from its associate. Its apparent immobility follows from my earlier proposal (i.e., *only* and its associate form a Rudin-style adjunction structure, and, hence, cannot be split). Had *only* been an adjunct to AdjP, we would expect for it to operate exactly like *očen'*, contrary to what we actually observe. The examples in (12) demonstrate that *only* does not pattern with adjectives either: the latter can be extracted, as in (12), but *only* in (12) cannot be. Given that *only* deviates from the conventional nominal modifiers in the extraction contexts, it stands to reason that the mechanism involved in forming a constituent with it must be distinct from the operation that builds a noun phrase.

(11) a. * **Tol'ko** vy   [SVEŽUJU]_F rybu kupili?
             only   you   fresh   fish bought
             Intended: 'Did you only buy the [FRESH]_F fish?

    b. **Očen'ᵢ** ty [*t*ᵢ bol'šuju tsenu] za škury zaprosil. [www]
       very you big price for pelts asked
       'You requested too high a price for the pelts.'

(12) a. *Vy **tol'ko** kupili [RYBU]$_F$?
        you only bought fish
        Intended: 'Did you only buy [FISH]$_F$'?
    b. Vy **svežuju**ᵢ kupili [*t*ᵢ rybu]?
        you fresh bought fish
        'You bought [FRESH]$_F$ fish.'

The final argument for the claim that Russian *only* cannot adjoin to NP stems from the interpretation of *only*-complexes. Taking English *only* and German *nur* as a baseline, I examine how Russian fares with respect to the scope interactions of *tol'ko*-phrases with matrix predicates in embedded clauses.

    As mentioned earlier, English *only* can be an adjunct to a noun phrase or a verb phrase. The former *only* is shown in (13). Observe that this example is ambiguous. By contrast, the VP-adjacent *only* in (14) obligatorily takes surface scope.

(13) I knew that he had learnt **only** [SPANISH]$_F$.   Taglicht (1984)
    a. *knew > only*: I knew he hadn't learnt any other language.
    b. *only > knew*: I didn't know he had learnt any other language.

(14) a. I knew that he had **only** learnt [SPANISH]$_F$.
        ^{OK}*knew > only*; **only > knew*
    b. I **only** knew that he had learnt [SPANISH]$_F$.
        ^{OK}*only > knew*; **knew > only*

Equipped with the insight that the NP-adjacent *only* gives rise to ambiguity (in contrast to the VP-adjoined one, which does not), we can now test Russian for the same effects. Consider (15), with examples modeled after Büring and Hartmann (2001) (who in turn credit von Stechow 1991 for a similar observation in German). (15) looks remarkably similar to English (13). Unlike English, however, Russian (15) lacks a wide scope construal of the *only*-phrase. Moreover, the

speakers who accept extractions out of *čto*-clauses confirm that cases like (15) are likewise unambiguous. Here, the *only*-phrase obligatorily scopes over the matrix verb. In short, Russian *only*-phrase is always interpreted in the clause in which it appears. We now arrive at the following seemingly contradictory conclusion: even though the interpretation facts in (15) replicate the English pattern in (14) with the VP-adjoined *only*, the *tol'ko*-complex itself resembles the NP-adjunction structure of (13). Of course, my account handles the facts in a straightforward fashion: Russian is unambiguous precisely because it prohibits adjunction to NP. If true, (14) is the single underlying option for Russian; adjacency to NP is a consequence of movement to *only*.

(15) a. Ja   žaleju, čto potseloval **tol'ko** [MAŠU]ꜰ.
          I   regret that kissed   only Masha
          'I regret that I kissed only Maria.'
          (i)   √and no one else.
          (ii) #but I don't regret that I kissed Anastasia
      b. Ja **tol'ko** [MAŠU]ꜰ žaleju, čto potseloval.
          I only Masha regret that kissed
          (i)   # and no one else.
          (ii) √ but I don't regret that I kissed Anastasia

In fact, Büring and Hartmann (2001) report on the German facts, reproduced in (16), which are strikingly similar to my Russian data above. (16) is ambiguous in the same way its translated English equivalent is. And it looks just like English (13). However, the ambiguity disappears if the embedded CP is extraposed in the manner of (16). Their takeaway boils down to the following: first, *nur* must be treated as an adverb, and second, as such, it can only adjoin to VP, as schematized in (17), or to CP, as demonstrated in (17). On this account, the ambiguity of (16) follows from the two possible attachment sites for *nur*. Per contra, (16) boasts but one possible position for *only* – on the edge of the embedded CP. This, in turn, predicts the absence of the wide scope reading of *only Gerda* (in compliance with the reported facts).

(16) a. (weil)   ich **nur** [GERDA]_F geküsst zu haben bereue.
           because I   only Gerda   kissed to have   regret
           'I only regret to have kissed Gerda.'
           (i) √ I regret to have kissed nobody but Gerda.
           (ii) √ Gerda is the only person that I regret to have kissed.
       b. (weil)   ich es *t*_{CP} bereue [**nur** [GERDA]_F geküsst zu
           because I   it   regret only Gerda   kissed to
           haben].
           have
           (i) √ I regret to have kissed nobody but Gerda.
           (ii) # Gerda is the only person that I regret to have kissed.

(17) a. [_{VP} **nur** [_{VP} [_{CP} [GERDA]_F geküsst zu haben] **V**]]
       b. [_{VP} [_{CP} **nur** [_{CP} [GERDA]_F geküsst zu haben] **V**]]

It should now be easy to see the points of affinity between Russian and German. In fact, my proposal for Russian *only* is in the spirit of what Büring and Hartmann endorse for German. *Tol'ko* in (15) may adjoin to the lower *v*P, as in (15), or the matrix *v*P, as in (15). However, unlike German and English, Russian imposes an additional requirement: a focused associate must move to *only*. In Section 2, I argue for a more principled explanation of the possible base positions of *only*, showing that it adjoins strictly to phases that are also functional projections.

1.3 Summary
As a general case, Russian requires that the XP_F be adjacent to *only*. *Only* by itself is not eligible to adjoin to NP, since it is illicit as a direct modifier to NP-complements of P, fails to pattern with other modifiers, and induces surface scope. This is summarized in Table 1 below:

Data and generalizations:		Proposal:
(1) Adjacency:	√…*only* XP$_F$… *…*only*…XP$_F$…	XP$_F$ associate must move for [Foc] to form a constituent with *only*
(2) *Only* ≠ NP-adjunct:	[a] *only* cannot appear between P and its complement NP [b] *only*-complex does not pattern with other nominal modifiers [c] *only*+XP is interpreted in the clause in which it appears on the surface (=English preverbal *only*)	*only* adjoins to *v*P; adjacency is accomplished via movement

Table 1. Only adjacency rules in Russian.

2 Analysis

So far, I have argued that Russian *only* is an element generated outside of the NP. Adjacency to *only* is a consequence of syntactic movement: a focus-marked XP right adjoins to *only* in order to check its [Foc] feature. The objective now is to corroborate my earlier hints that the base position of *only* is extremely limited. The ambition is to show that *only* is eligible to adjoin strictly to *v*P, CP, or FP, all of which are functional projections and phases within the verbal, sentential, or nominal domains, respectively. If true, this proposal offers a unified explanation for the behavior of *only* across the domains. First I present evidence that *v*P and CP, but not TP, are eligible hosts for *only*. Then I extend this analysis to the nominal domain based on certain peculiar cases that appear to run counter to the adjacency generalization from Section 1.

(18) (repeated from (6)) presents an immediate conundrum for the advertised analysis. Recall that, once formed, *only*+XP$_F$ can appear either before or after the verb. This flexibility of the *only*-phrase is puzzling, given my claim that TP is not available for *only* (a position [**tol'ko** [PIROG]$_F$] appears to occupy in (18)).

(18) a. Andrej *ispek* **tol'ko** [PIROG]$_F$ dlja sestry.   (=(6))
          Andrey baked   only   pie   for   sister
      b. Andrej **tol'ko** [PIROG]$_F$ *ispek* dlja sestry.   (=(6))

The diagram in (19) marshals possible derivations, which result in the attested word order permutations. My proposal invokes three distinct computational mechanisms. To begin with, the number of adjunction sites for *only* is severely restricted. For now, I am presenting only two options: *only* adjoins to *v*P (Option 1) or, alternatively, to CP (Option 2). The second component is familiar focus movement: the focal associate (NP in (19) below) must move to form a constituent with *only*. The final piece concerns the behavior of verbs. The status of the latter in Russian is subject to some debate: for the most part, the field converges on the analysis under which Vs *do* move. The outstanding questions are: (i) what is the landing site for this movement and (ii) is this movement obligatory? Bailyn (1995) and Gribanova (2013), for instance, argue that Vs in Russian move out of VP, though not as high as T. King (1995) endorses the view that they do raise to T. More recent experimental studies (Kallestinova & Slabakova 2008) indicate that the standard adverb placement test yields ambiguous results for Russian: speakers, apparently, allow postverbal adverbs (which is standardly taken to be symptomatic of verb raising) under certain pragmatic conditions. The point here is that Russian seems to behave in a rather inconsistent way: some diagnostics suggest that it ought to be treated on a par with English (which does not raise V-to-T), others point to the opposite conclusion. In view of this and my data on *only*, I would like to entertain the idea that Russian verbs are subject to optional raising, akin to French non-finite verbs (Pollock 1989). I should emphasize that it is immaterial for my purposes what the ultimate landing site for Vs turns out to be: my proposal is compatible with the analyses under which T or any other projection within the verbal domain (e.g., Asp) above *v*P serve as the target for the raising verbs. Now consider what this accomplishes for my *only*-pattern.

(19)
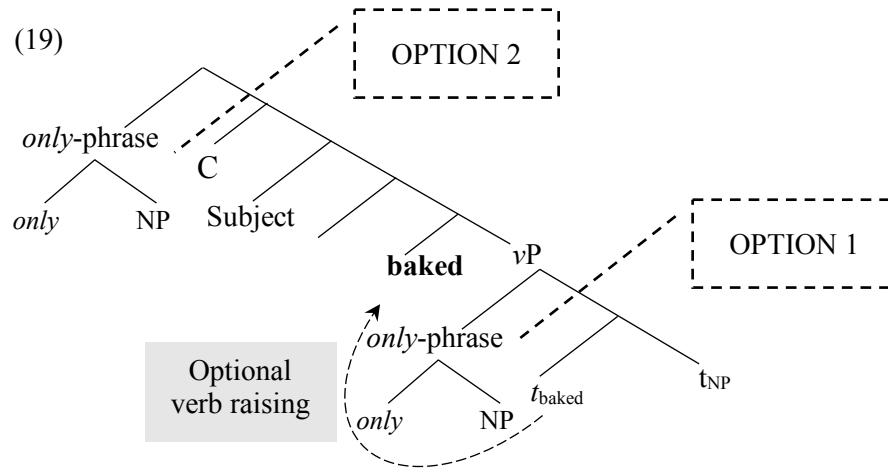
To derive (18), we need to assume Option 1 for the base position of *only*. The NP *pirog* moves to adjoin to it. The verb raises out of *v*P. This yields the surface string, whereby the verb precedes the *only*-complex. The derivation for (18) is entirely analogous to (18), save for the verb: here it does not move, which produces the opposite order (i.e., *only*+NP>Verb).

In short, I am making two claims here. First, there is but one position in the verbal domain for *only*: it can only adjoin to *v*P. Second, the verb in Russian may raise optionally. In the ensuing exposition, I provide evidence in favor of this proposal and demonstrate that CP (rather than TP) is the locus of *only* in the sentential domain. Both points are defended based on the behavior of *only* in embedded Yes/No questions.

To make my argument clear, I briefly detour into the properties of embedded polar interrogatives. In Russian, they are formed by introducing a question enclitic *li*, which imposes a strict one prosodic word (1W) requirement on its host. Depending on the nature of the fronted material, one can get a "neutral" Y/N question or a cleft-like Y/N interrogative. The former is demonstrated in (20): the position before *li* is occupied by the verb, so the result corresponds to the English translation, i.e., a normal embedded Y/N question. By contrast, the examples in (20) give rise to a focus construal of the fronted material akin to the interpretation found in English clefts (see translations). (20) showcases

the 1W requirement: the element preceding *li* is limited to a single word. Hence, the NP-constituent consisting of two prosodic words is illicit in this pre-*li* position.

(20) a. Ja ne   znaju, kupil **li** Ivan mašinu.
          I   NEG   know   bought Q   Ivan car
          'I don't know whether Ivan bought a car.'
      b. Ja ne znaju, Ivan **li** kupil mašinu.
          'I don't know whether it was Ivan who bought the car.'
      c. Ja ne znaju, novuju **li** mašinu Ivan kupil.
          'I don't know whether it was the NEW car that Ivan bought.'
      d. *Ja ne znaju, novuju mašinu **li** Ivan kupil.

In Zanon (2015), I argue for the following. The Q-marker *li* is generated in C^0 (this much seems to be uncontroversial). In examples like (20), the verb moves to adjoin to C, hence serving as a satisfactory host for *li* in PF. On the other hand, XPs move to SpecCP. If the fronted XP contains several stressed elements, *li* must be placed after the first stressed element immediately to its left, as schematized in (21). The latter operation takes place in PF and amounts to a very local rearrangement.

(21) a.... [new car ***li*** ...] → syntax output
      b.... [new ***li*** car]   → PF rearrangement to satisfy 1W of *li*

In other words, in situations like (22) (where X, Y, and Z are prosodic words that bear stress), *li* can only switch positions with Z, as in (22). But this rearrangement produces a configuration that conflicts with the prosodic requirement of *li* (i.e., there is more than one prosodic element before it).

(22) a. Xω Yω Zω ***li***...   b.   *Xω Yω ***li*** Zω ...

I interpret this requirement to move overtly to SpecCP in Y/N questions to stem from obligatory focus movement in Russian, related to the mandatory movement to *only*. If so, we are in a position to offer an interesting theoretical generalization: in overt focus movement languages, a focalized XP-associate must be adjacent to the F-licensing element.

With these preliminaries in place, consider how my proposal for *only* in (19) combines with the analysis of polar interrogatives. Suppose that *only* selects Option 1 from (19) (i.e., it adjoins to *v*P) and the verb moves to *li*, in the manner of (23).

(23)   [CP **… V+li** [TP subject…*t*V [*v*P ONLY *t*V …]]]

I predict that the object, but not the subject, can move to *only* in such situations. That is because there is no position reserved for *only* in the T-domain. This is borne out in (24): in (b) *only* is *v*P-adjoined, so the object can move to it; in degraded (a), *only* must be TP-adjoined to accommodate the subject. Since the latter is distinctly odd, it follows that TP is not a legitimate adjunction site for *only*.

(24)   Ja   ne   znaju...
       I   neg   know
       a.?*posmotrel li   **tol'ko** IVANF étot   fil'm.
          watched   Q   only   Ivan   this   movie
       b. posmotrel li   Ivan **tol'ko** **ÉTOT**F fil'm.
           watched   Q   Ivan only   this   movie

But if *only* cannot adjoin to TP, there must still be a position for it above it, since trivially *only*+subject complexes in (25) exist.

(25)   Tol'ko [IVAN]F posmotrel étot fil'm.
       Only   Ivan   watched   this movie

The contention here is that *only* in (25) instantiates Option 2 from (19): i.e., *only* is adjoined to CP. Let us now scrutinize what Option 2 leads to in the context of "neutral" polar interrogatives, when the verb moves to form a complex head with *li*. If the subject were to move to *only*, as in (26), we run into a PF violation. That is because *li* in this configuration ends up with three prosodic words preceding it: *only*>Noun>Verb. Local PF rearrangement, whereby *li* is placed to the left of the first stressed element in the manner of (21), then cannot derive (24) (exactly as demonstrated schematically in (22)). In other words, moving a subject to

only in the context of V+*li* fails to yield the word order in (24) regardless of the local PF rearrangement with *li* discussed above.

(26)   [CP ONLY+subject **V+li** [TP $t_{subject}$… t_V [$_{vP}$ t_V …]]

Curiously, the asymmetry between subjects and objects, illustrated by (24), disappears in the contexts of constituent fronting, as in (28). This, too, is expected under my account. The subject in (28) moves to *only*, resulting in the structure in (28). In contrast to (26), PF rearrangement is possible here: placing *li* to the immediate left of the stressed element leaves it with exactly one prosodic host: namely, *only*, as demonstrated in (28). Likewise for (27), the object moves to the CP-adjoined *only*. This too necessitates subsequent PF-reordering, as in (28).

(27)   Ja ne znaju...
       I   neg know
   a. tol'ko li IVAN_F posmotrel étot film.
       only   Q   Ivan   watched   this movie
   b. tol'ko li ÉTOT_F fil'm Ivan posmotrel.
       only   Q   this   movie Ivan watched

(28)   a. [CP ONLY + XP **li** [TP …**VERB** [$_{vP}$ …]]
       b. ONLY **li** XP   → PF rearrangement; 1W of *li* is satisfied

Note also that the *only*-complex, once formed, is not splittable in syntax, as demonstrated earlier in (11)/(12), exactly like Rudin's Bulgarian multiple wh clusters. An apparent violation of this is due to a superficial PF-reordering mechanism.

   Until this point, I argued that *only* can adjoin to CP and *v*P. Their obvious commonality, i.e., phasehood, motivates the following generalization: *only* adjoins strictly to phases. My objective now is to extend this insight to the nominal domain. While there is some consensus in the literature regarding the status of *v*P and CP, the precise definition of phasehood in the nominal domain is disputed. I adopt Bošković's (2014) dynamic approach to phases. He argues that the highest phrase in the extended domain of a lexical head functions as a phase. The phasehood of a particular XP hinges on its syntactic context. For

example, within the domain of N, NP, DP or QP can in principle be a phase, depending on the inventory of functional elements in a given language and the specific configurations resulting from Merge. Assuming that Russian has no DP (Bošković 2013), the structure in (29) exemplifies a situation when the NP is the highest phrase in the nominal domain; so, it is a phase here. By contrast, (29) evinces more structure: the FP assumes the role of a phase, since it is now the highest projection in the domain.

(29)   a. [V   [$_{NP}$ Adj N]]   b. [N [$_{FP}$ F [$_{NP}$ Adj N]]]
                $^{\wedge}$phase $^{\wedge}$phase

The same reasoning applies to PPs. Bošković (2014) argues that in P-stranding languages (like English), PPs boast a richer structure than in non-P-stranding languages (e.g., Russian). It follows that a bare PPs fulfill the role of a phase in Russian, as in (30).

(30)   [V [$_{PP}$ P [$_{NP}$]]]
         $^{\wedge}$phase

With these theoretical preliminaries in place, I turn to a peculiar set of examples in (31)-(33), each featuring an apparent violation of the adjacency requirement, whereby *only* is associated with an F-marked element despite the intervener. The utility of this dataset is twofold: first, it serves as an instrument for investigating the contexts under which discontinuous focus association is licit and second, it provides evidence in support of my claim regarding the status of FP as a legitimate adjunction site for *only*. Ultimately, I reconcile Bošković's proposal regarding phases in the nominal domain with my data.

     (31), an instance of head focus, indicates that Russian tolerates the association with a noun in spite of the intervening adjective. Even though (31) looks like an instance of NP-adjunction, (31) (together with my earlier discussion) militate against this treatment: *tol'ko* cannot adjoin to bare NPs. Observe also that the extraction of the head in this situation results in degraded (31), which suggests a link between the impossibility of movement and the availability of discontinuous focus association. Evidently, an element, not eligible for extraction, may serve as a focus

associate to *only* even in the presence of an intervener. So far, we have the following: (i) *tol'ko* cannot adjoin to NP and (ii) the noun itself is not extractable. Therefore, (31) must be a result of movement to the *v*P-adjoined *only*. An additional piece of evidence for this is furnished by the contrast in (31) with an in-situ verb: as expected, the NP containing a focal element must be adjacent to *tol'ko*. Crucially, what moves is the entire NP containing the F-marked head and the intervening adjective (presumably, with a secondary mechanism insuring that the right constitutent is associated with *only*).

(31) a. On znaet   tol'ko [lenivogo PREPODAVATELJA$_F$ fiziki].
           he knows only lazy   teacher   physics
           'He only knows a lazy TEACHER$_F$ of physics.'
           (he does not know a lazy student of physics)
      b.?*On PREPODAVATELJA$_F$ znaet [lenivogo t_N fiziki].
      c. *On znaet [lenivogo tol'ko PREPODAVATELJA$_F$ fiziki].
      d. *On tol'ko znaet [lenivogo PREPODAVATELJA$_F$ fiziki].
      f.   On tol'ko [lenivogo PREPODAVATELJA$_F$ fiziki] znaet.

To establish whether my proposal is on the right track, consider additional contexts of discontinuous focus association. In (32), the F-marked adjective finds itself inside the genitive complement. The adjacency to *only* is disrupted by the accusative head noun, yet the resulting sentence is acceptable. (32) is particularly instructive (especially when compared with (31)): apparently, *only* can be wedged between the accusative noun and the genitive adjective. This, I take to be symptomatic of the structural divergences between the NP [*lenivogo prepodavatelja…*] in (31) and [*studentov pervogo kursa*] in (32). I assume that the former has the structure of (29), but the latter takes shape of (29).[4] If so, the NP of (32) contains an additional functional projection – FP, which apparently can host *only* (cf. (31) with an attempted adjunction to the bare NP). Above, I claimed that a discontinuous focus association is possible if XP$_F$ cannot move. And this is exactly the case in (32): LBE of the genitive adjective is impossible in (b), but focus

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[4] This is a departure from Bošković (2013), who assumes that case assignment by the noun is mediated by the FP only in some (but not all) cases. I opt for uniformity in this respect, suggesting that FP is always present when the noun assigns case.

association with it in (a) can be established. In short, from this dataset, we glean that adjunction of *only* in the nominal domain is not banned in principle: it can proceed as long as the merge site is a functional FP, rather than a bare NP. On the other hand, if *only* is *v*P-adjoined (32) the constituent containing an inextricable focal element must move to it.

(32) a. Ja znaju tol'ko [studentov PERVOGO$_F$ kursa].
          I   know only   students$_{ACC}$ first$_{GEN}$ year$_{GEN}$
          'I only know the FIRST$_F$ year students.'
      b. *Ja PERVOGO$_i$ znaju [studentov t_i kursa].
      c. Ja znaju [studentov tol'ko PERVOGO$_F$ kursa].

(33) supplies the final context. If the NP contains several adjectives, *only* prefers to associate with the higher one, in the manner of (33), but the association with the lower adjective is far from unacceptable, as (33) shows. Some speakers find the extraction of one of the adjectives, illustrated in (33), degraded (I return to this speaker variation shortly). (33) establishes that *only* cannot appear between the two adjectives. For these types of constructions, I adopt Bošković's (2016) structure in (33): assuming that adjectives are NP-adjuncts and *only* does not adjoin to NP, (33) follows. (33) then is derived in the manner of (31) and (32): namely, the entire NP containing both adjectives moves to *only*. We also established earlier that the element eligible for discontinuous association with *only* is the same element that cannot be overtly extracted (shown in (31)/(32)).

Since there is some disagreement over the extraction facts in contexts like (33) (not all speakers find the example bad), it may benefit from additional scrutiny. There is a theory-internal reason to suspect that in (33), the second (lower) adjective indeed cannot move. Bošković (2016) shows that in cases of multiple edges (Specs/adjuncts) of a phase, only the highest one counts as the phasal edge for the purposes of the Phase Impenetrability Condition (PIC). Recall that on Bošković's account, the adjectives in (33) are adjoined to NP. Given his idea of PIC, only the higher one is eligible for movement, since it instantiates the highest edge. The lower one (*Ceylon*) in (33) is blocked by the higher edge (*fresh*) and, hence, is not extractable. Speaker variation hinges on how tolerant a given informant is of the adjective order permutation in

the contexts of NPs with multiple adjectives. Those who accept examples like (33), do not object to a marked adjective order (*Ceylon > fresh*). If so, for such speakers, *Ceylon* can be the highest edge, which is eligible for movement in (33) in compliance with Bošković's conception of PIC. Importantly, all speakers agree that (33) is acceptable (though not preferred). Observe that here, the composition of NP entails the final order *fresh>Ceylon*. The lower adjective is not extractable because of the blocking effect of the higher edge (i.e., *fresh*). Hence, it must be the case that the entire NP, containing an intervening adjective and the F-marked adjective, moves to the *v*P-adjoined *only*.

(33) a. Anna podaet **tol'ko** [SVEŽIJ]$_F$ tsejlonskij čaj.
        Anna serves only fresh Ceylon tea
        'Anna only served [FRESH]$_F$ Ceylon tea.'
     b. $^?$Anna podaet **tol'ko** svežij [TSEJLONSKIJ]$_F$čaj
     c. ?*Anna [TSEJLONSKIJ]$_F$ podaet svežij čaj.
     d. *Anna podaet svežij **tol'ko** [TSEJLONSKIJ]$_F$ čaj.
     e. [[$_{NP}$ Adj1 Adj2 N]]

To summarize, the instances catalogued above yield two generalizations: (i) *only* can be associated with an element over an intervener, if this element is not eligible for overt extractions, and (ii) *only* does not adjoin to NP, but can adjoin to a functional phrase within the nominal domain. I assume that PPs are also ineligible adjunction sites for *only*.

Recall now that under Bošković's account, which I adopt, NPs and PPs are phases in Russian. The question is how to reconcile (ii) with the claim with that *only* adjoins strictly to phases. The problem is easy to overcome. Suppose that Russian imposes an additional requirement for merging *only*: *only* has to adjoin to a phase and the latter must be a functional projection. I argued that in (32), the noun takes FP as its complement. FP here is a phase (because it is the highest phrase in the nominal domain); and, crucially, it is a functional projection whose *raison d'être* is to mediate the assignment of genitive. With my new caveat, this FP is a legitimate host for *only*.[5] Therefore, we have three

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[5] There is one speculation worth considering. Suppose that English is the same as Russian when it comes to *only*: i.e., *only* adjoins to phases that are also functional

possible merge positions for *only*: CP in the clausal domain, *v*P in the verbal domain, and FP in the nominal domain. All three are phases and, crucially, functional projections.

The remaining issue involves counterexamples to the generalization that the F-marked element must be adjacent to *only* (as in (31)-(33)). I showed that in in each case of felicitous non-adjacency to *only*, the focalized element cannot be extracted, which I take to mean that a larger phrase containing this element must be pied-piped to *only*. The question is, what restrictions obtain for this type of movement? Observe that each instance in (31), (32), and (33) shares a common property: the intervener and the focalized constituent are dominated by the same phrase. The latter constitutes the first minimal unit that is eligible for movement. So, while the F-marked element itself cannot move, it can tag along with the first movable XP, provided the latter is sufficiently small and contains the intervener.

In other words, there are limits imposed on the weight of the moving constituent. This "weight" requirement is understood in terms of minimal pied-piping (see Chomsky 1995, Stateva 2002, Bošković 2004 on minimal pied-piping), a mechanism that must meet precisely the conditions described above. That is, (i) the intervener and the focalized element must be dominated by the same XP and (ii) this XP must be the minimal mobile element, dominating the immobile focalized constituent.

For instance, in (31), the F-marked noun and its intervener (the adjective) are dominated by the NP. This NP is the minimal element that can move (in contrast to the head; cf. (31)). So, there is no choice but to move this entire NP to *only*.
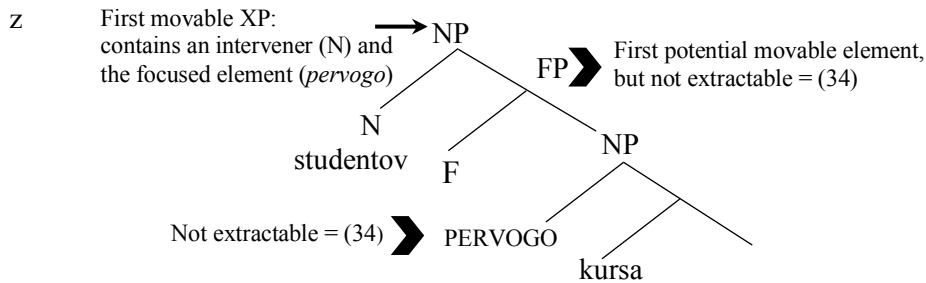
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projections. In English, a DP is a phase and a functional projection, so *only* is eligible to merge with it. The same holds of PP; under Bošković's (2014) analysis, English PP has more (functional) structure than Russian PP, which then enables *only* to adjoin to the highest functional projection within the P-domain. This could explain why English *only* can adjoin to what looks like a noun phrase in contrast to Russian. If this is right, then the difference between English and Russian amounts to availability of overt movement for focus.

The context in (33) is amenable to the same treatment. Because the lower adjective cannot be extracted, the only possible way to get as close as possible to *only* is by pied-piping the minimal XP, which contains the intervener and this adjective. NP is the minimal mobile XP here.

In (32), the overt extraction of the genitive marked complement out of FP is impossible (repeated in (34)). Crucially, the extraction of the genitive FP, the first potential movable element in (34), is also unacceptable. Therefore, the higher NP is the first movable phrase that contains both the intervener and the focalized element, as shown in (34).

(34) a. *Ja PERVOGO znaju [studentov *t* kursa].
      b. *Ja [$_{FP}$PERVOGO KURSA] znaju [studentov t_{FP}].
      c.

z   First movable XP:
      contains an intervener (N) and   NP
      the focused element (*pervogo*)   First potential movable element,
                                         FP   but not extractable = (34)

                          N
                 studentov   F   NP

         Not extractable = (34)   PERVOGO
                                              kursa

5 Conclusion

I considered the behavior of Russian *only* in some detail, offering new empirical observations that set *tol'ko* apart from its English counterpart. The crucial finding involves an adjacency requirement: Russian *only* must appear next to its focalized associate. I argued that *only* can be introduced into the structure as an adjunct to phasal functional projections only: CP, *v*P, and FP in Russian. Driven by the [Foc] feature-checking requirement, a focalized element moves to form a constituent with *only* in the syntax. On the basis of *only*'s behavior in embedded Y/N questions, I argued that *only* cannot adjoin to TP. Ditto for NP: in contrast to English, *tol'ko* cannot be an NP-adjunct because it may not appear between a preposition and an NP, does not pattern with other nominal and adjectival modifiers, and fails to induce a scope reading

congruent with NP-adjoined *only*. On the other hand, unlike a bare NP, a genitive assigning FP inside a noun phrase can function as an adjunction site for *only*. In situations when the focused constituent is ineligible to move, the entire XP containing this associate must be pied-piped to *only*. The latter operation, however, is severely constrained: a pied-piped constituent must be minimal. A more substantial theoretical contribution of this paper concerns overt focus movement languages, of which Russian is one. One may hypothesize that adjacency to *only* is symptomatic of syntactic movement for focus. If so, the prediction is that the adjacency to *only* is expected to be obligatory in languages argued to have syntactic focus movement.

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Russian *za*-Headed Time Adverbials:
A Frame-Based Account of Scopal Behaviour

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The attachment of *za*-headed prepositional time measure phrases (MPs) in Russian is considered to be closely related to telicity, parallel to *in*-adverbials in English. However, it has been noted that (i) it is not clear which definition of telicity should be used for Russian (and other Slavic languages) and (ii) under most definitions, time adverbial attachment cannot serve as a test for telicity. In particular, *za*-headed MPs can be used with some atelic verbs and cannot be used with some telic verbs. In this paper, we propose a formal account that allows us to predict the possibility and scope of *za*-headed adverbial attachment in Russian.

1 Introduction

A common criterion for distinguishing atelic and telic phrases in English is their compatibility with time measure phrases (MPs) preceded by *for* versus *in*. In (1a), *(Anna) walked* is atelic and is compatible with a *for an hour* time MP. In (1b), *(Anna) walked to the park* is telic and is compatible with a *in an hour* time MP.

(1) a. Anna walked for an hour.　　(atelic)
　　b. Anna walked to the park in an hour. (telic)

In Russian, *for*-MPs are expressed by accusative noun phrases (such as *čas* 'hour') while *in*-MPs correspond to prepositional phrases headed by *za*, e.g., *za čas* 'in an hour'. Parallel to English, the attachment of an accusative time MP is considered to mark the atelicity of the verb/verbal phrase:[1] in (2a), the reading event is conceptualized as a process without an endpoint and its duration is provided by the accusative noun phrase *des'at' minut* 'ten minutes'. Similarly, the attachment of a *za*-MP is traditionally regarded as a telicity test; see (2b), where the event of reading the book is viewed as completed, and the time it took to reach the completion[2] is expressed by the PP *za des'at' minut* 'in ten minutes'.

(2) a. Anna   čitala[IPF]   des'at' minut.
       Anna   read[PST.SG.F]   ten[ACC] minute[PL.GEN]
       'Anna read for ten minutes.'
    b. Anna dočitala[PF]   knigu   za des'at'   minut.
       Anna *do*.read[PST.SG.F]   book[SG.ACC]   *za* ten[ACC] minute[PL.GEN]
       'Anna read/finished reading the book in ten minutes'

Example (2b) illustrates a correlation between prefixation (here with *do*-: *čitat'* 'to read' → *dočitat'* 'to finish reading'), perfectivity, telicity, and the possibility of a temporal *za*-headed MP. However, the correlation is not as clear as it seems at first glance, e.g.:

- Filip (2003) and Filip and Rothstein (2005) show that prefixes are not markers/operators of perfectivity/telicity;
- Filip (2000) provides examples of perfective verbs that are atelic, if telicity is understood as quantization in the sense of Krifka (1998);

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[1] Note that there is no consensus in the literature on the question at which point the telicity feature appears in Slavic languages. Some assume that telicity, as in English, is a property of a VP (Mehlig 2008, a.o.), while others (Filip 2008 and elsewhere) argue that Slavic languages differ in this respect and that telicity is a property of the verb.

[2] Due to the presence of the prefix *do*-, the verb refers to an event of finishing reading the book and triggers an inference that this event did not start with the beginning of the book (reading the whole book would be best referred to by *pročitat'* 'to read through'). More on the semantics of the prefix *do*- can be found in Kagan (2015) or Zinova (2017); see also Zinova and Filip (2014) for a discussion of the inference status.

- Borik (2002) argues that neither does perfectivity imply telicity, nor can perfectivity be defined in terms of telicity;
- Paducheva and Pentus (2008) provide examples where the possibility of *za*-MP attachment does not align with telicity.

In this paper, we are primarily interested in the observation that it is neither obligatory for a telic verbal description to be compatible with a *za*-headed temporal PP, nor does the compatibility indicate that the predicate denotes single completed events (a common telicity criterion).

The prefix *po-* with its *somewhat/for some time* interpretation (called *delimitative* or *attenuative* in the literature) is a case in point of the former fact. For instance, the verb *počitat'*[PF] 'to read for some time' is perfective and denotes bounded reading events, but it is only compatible with accusative temporal adverbials, as illustrated by (3). In (3a) the perfective verb refers to a reading event that lasts for five minutes (as indicated by the accusative MP *pjat' minut* 'five minutes') and stops,[3] whereby most probably,[4] the end of the book was not reached. As is shown by (3b), it is not possible to express the duration of the reading event in this case by a *za*-headed time MP (for more examples, see Borik 2002: 55-56).

(3) a. On počital[PF]   knigu   pjat'   minut.
         he *po*.read[PST.SG.M] book[ACC] five[ACC]   minute[PL.GEN]
         'He read the book for five minutes.'
    b. *On počital[PF]   knigu   za pjat'   minut.
         he *po*.read[PST.SG.M] book[ACC] *za* five[ACC] minute[PL.GEN]

Examples of exceptions in the other direction are given by secondary imperfective (4) and basic imperfective verbs[5] with non-progressive

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[3] The sentence cannot be continued with *i prodolžil čitat'* 'and continued to read', without introducing another event.

[4] See Zinova (2017) and Zinova (2019) for a preliminary account and motivation for regarding the 'for a short time' and 'without reaching the culmination' components as inferences resulting from pragmatic competition and not as a part of the meaning.

[5] The latter is exemplified by (i). We do not discuss such cases in this paper and we assume that coercion is necessary in order to obtain a habitual/iterative interpretation in case no overt derivational markers are present.

interpretations (which can be iterative or habitual and which we analyse together using the label *repetitive* throughout the current paper, or a statement of fact, which is not discussed here). In (4), the verb *pročityval* 'used to read' is an imperfective verb that contains a prefix *pro-* and an imperfective suffix *-yva-*. It refers to an unbounded series of reading events and allows the attachment of the MP *za dvadcat' minut* 'in twenty minutes', which in this case refers to the duration of each event in the series.

(4) On pročityval^{IPF} novyj nomer žurnala   za dvadcat'
    he *pro*.read$_{IMP.PST.SG.M}$ new issue magazine *za* twenty
    minut.
    minute
    'He used/was able to read a new issue of the magazine in 20 minutes.'

Of course, such examples as (3) and (4) are not new. What is, to the best of our knowledge, absent in the vast amount of literature on telicity, is a formal account that would predict the (in)compatibility of a given verb with various time MPs. In this paper, we would like to shift the focus from whether or not (under the assumed definition) telicity aligns with *za*-headed time MP attachment. Our goal is to provide an approach that would allow us to formally predict the possibility and scope of such an attachment on the basis of clearly defined computable features.

2 Telicity and Time Measure Phrases

As has been noted by Susan Rothstein (2008: 3), "[t]here is an intuitive agreement that telic predicates are completed or inherently bounded, but what exactly that means is very much under debate". Indeed, definitions of telicity differ dramatically from one paper to another. Here we will point out different options explored in the literature with respect to the cases of interest, but we do not aim to provide a full overview of the topic. Let us start with a simple assumption (described as the *common*

(i) Vasya begal^{IPF} marafon   za tri   časa.
    Vasya run$_{PST.SG.M}$ marathon$_{SG.ACC}$ *za* three$_{ACC}$ hour$_{PL.ACC}$
    'Vasya used/was able to run the marathon (ran it multiple times) in three hours.'

view in Filip 2003: 65): perfective verbs are telic. As we illustrated in (3) and (4), under this assumption, the possibility of a *za*-MP attachment cannot be predicted from perfectivity/telicity of the given verb.

One way out of this that saves the telicity/time adverbial connection with respect to cases like (3) would be to postulate that bounded events that are obtained by an attachment of the prefix *po-* under delimitative interpretation are not telic. This is proposed, e.g., by Paducheva and Pentus (2008: 210), who write that "delimitatives can be said to be terminative, but atelic".[6] This proposal is, however, not entirely clear, as before that, the authors state that "Terminativity is a property of a word form or even an occurrence. Meanwhile telicity is a property of an ASPECTUAL PAIR." Such a statement brings with it all the complications associated with the notion of aspectual pairs that we do not explore here (see Janda 2007 for arguments in favour of a cluster model and not a pair model of the Russian verbal system).

Another important point of view is expressed, e.g., by Filip (2008), who classifies attenuative/delimitative *po*-prefixed verbs as telic.[7] This is explained by the fact that the event of reading in (3a) is maximal with respect to the temporal ordering criterion imposed by the prefix *po-*. It is, however, not maximal with respect to the length of the book, which is not the relevant parameter in this case. If this view is accepted, then again the possibility of a *za*-headed time MP attachment cannot be predicted from the telicity of the verb.

Yet another stand is taken by Mehlig (2008: 257), who describes *po*-prefixed verbs such as *počitat'* 'to read for a while' as a "perfective delimitative procedural verb which results from perfectivizing an imperfective verb which is aterminative by means of the prefix *PO*-delimiting the situation denoted temporally". For Mehlig (2008: 260), predications are telic when they are *absolute-terminative*: denoting

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[6] Borik (2002) also proposes that perfective verbs with temporal prefixes *po-* and *pro-* are atelic, but does not introduce a third class to broaden the telic/atelic distinction.

[7] Note that this does not hold for Filip (2003), where telicity is defined via quantization.

situations with a definite inherent endpoint, independently of the aspect. Within such an approach, not all telic predications are compatible with *za*-headed time MPs (e.g., *pisat' dissertaciju*, listed as telic).

On the basis of this brief overview, we conclude that there is no agreement in the existing literature about how to define telicity with respect to Russian. Moreover, despite the general parallelism with English *in*-adverbials, there is no working explanation of how the structure of the event denoted by a given verbal phrase is related to the (in)compatibility with *za*-MPs, especially for cases exemplified by (3) and (4). The most promising option with respect to the *po*-prefixed verbs is the proposal by Paducheva and Pentus (2008), if the criterion for telicity is reformulated. The second part of the problem, related to the examples such as (4), seems to require some flexibility with respect to the attachment of the MP. In what follows, we propose an account that integrates these suggestions.

3 Data to be modelled

In this section we present some data that allows us to explore how the attachment of *za*-MPs depends on the interpretation of derivational affixes. The challenge is in predicting the relevant features under different interpretations of complex verbs that are not listed in the dictionaries.

Consider the imperfective verb *peregrevat'sja* 'to overheat/be overheating' that contains the root *gre-* 'heat', the prefix *pere-* (excessive interpretation), and the imperfective suffix *-va-*. This verb has a progressive interpretation (see (5), where the motor is in the process of overheating) and a repetitive interpretation (repeated event of overheating, see (6)) interpretation.

(5) Motor peregrevalsja^{IPF},   v   kabine teplo bylo licu, ja
      engine *pere*.heat$_{PST.SG.M.REFL}$ in cabin   warm be   face I
      zadremal.
      za.nap$_{PST.SG.M}$
      'The engine was getting overheated, my face was warm in the cabin, I
       started to doze off.'
                              (G. Ja. Baklanov. *Žizn', podarennaja dvaždy* 1999)

(6) Letom dvigatel' peregrevaetsja^{IPF},   zimoj   pereoxlaždaetsja^{IPF}.
　　summer engine   *pere*.heat$_{PRES.3SG.REFL}$ winter *pere*.cool$_{PRES.3SG.REFL}$
　　'In summer the engine overheats and in winter it gets too cold.'
　　　　(Galina Davydova, Aleksandr Popov. Moe prizvanie. *Junost'*, 1977)

In case of the progressive interpretation, the attachment of a *za*-MP is not possible (parallel to the case of English *in*-adverbial; see (7)). However, in the case of the repetitive, such an attachment is allowed, as illustrated by (8),[8] whereby the *za*-MP scopes under the time frame adverbial *tri dnja* 'for three days'. Note that the verb in this case is imperfective and the event description is atelic according to any possible definition.

(7)*Motor peregrevalsja^{IPF} *za 5 minut*, v   kabine teplo bylo
　　engine *pere*.heat$_{PST.SG.M.REFL}$ *za* 5 minute in cabin   warm be
　　licu, ja zadremal.
　　face I   *za*.nap$_{PST.SG.M}$

(8) Letom   dvigatel' peregrevalsja^{IPF} tri   dnja podrjad *za 5*
　　summer   engine   *pere*.heat$_{PRES.3SG.REFL}$ three day$_{PL}$ in.a.row *za* 5
　　minut, zimoj   postojanno pereoxlazˇdalsja^{IPF}.
　　minute winter constantly *pere*.cool$_{PRES.3SG.REFL}$
　　'In summer the engine got overheated in 5 minutes for three days in a row and in winter it constantly got too cold.'

As was proposed by an anonymous reviewer, one could try explaining the data provided above by evoking the episodic/generic distinction. According to the reviewer, (5) could be episodic and would not sanction

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[8] As some Russian speakers said that sentences like this sound unnatural to them, here is a corpus example that illustrates such an attachment under the same interpretation:

(i)　Svoj   pervyj dlitel'no rabotajuščij svetodioid (do   ètogo oni
　　my   first   long   working   luminodiode (before that they
　　peregrevalis'   za minuty)   ja sobral   27 marta
　　pere.heat$_{PST.PL.IMP.REFL}$ *za* minute$_{PL.GEN}$ I assemble$_{PST.SG.M}$ 27 March
　　1991 goda.
　　1991 year
　　'I assembled my first long-working luminodiode (before that they always got overheated in minutes) on March 27, 1991.'
　　　　　　(Irik Imamutdinov. Innovacionnyj gnev samuraja, *E kspert*, 2015)

the attachment of the *za*-adverbial, whereas (6) would be generic and thus the *za*-adverbial would be sanctioned. We claim that the episodic/generic distinction does not help solve the puzzle: if (6) is in the past tense (as in (8)), the sentence has both habitual and episodic interpretations (the additional MP *try deja podrjad* `three days in a row' in (8) ensures an episodic interpretation) and this interpretation change does not affect the possibility of adverbial attachment.

Now let us consider a perfective verb that is obtained by an additional prefixation step: *poperegrevat'sja* 'to stay overheated for some time/to be overheated'. This verb can refer to an event of overheating that lasted for some time (delimitative interpretation, exemplified by (9)) and to an event of overheating that happened to all of the objects (distributive interpretation; see (10)).

(9) A   to   tak vot   poperegrevaetsja,   a   potom
    but that   so here *po.pere*.heat$_{\text{PRES.SG.M.REFL}}$ but then
    perezagružat'sja   načnet sam, a   èto   ne xorošo.
    pere.za.load$_{\text{IMP.INF.REFL}}$ start itself but this not good
    'And so, well, it will overheat for a while, and then it will start to reboot on its own, which is not good.'   (otvet.mail.ru)

(10) Vpročem, ja vsë   ravno ležu   posle Kaliguly (opjat'
     in fact   I all   equal lay$_{\text{PRES.1.SG}}$ after Kaligula$_{\text{GEN}}$ again
     vse potravilis',   poperegrevalis').
     all *po*.poison$_{\text{PST.PL.REFL}}$ *po.pere*.heat$_{\text{IMP.PST.PL.REFL}}$
     'In fact, I am anyway staying in bed after Kaligula (again everyone got poisoned and overheated).'   (taurelven.livejournal.com)

However, only the latter interpretation is possible in combination with a *za*-adverbial (11), which in this case takes wide scope (an event of overheating of all the people lasted for one day).

(11) a. *A   to   tak vot   poperegrevaetsja,   za   minutu…
        but that   so here *po.pere*.heat$_{\text{PRES.SG.M.REFL}}$ *za* minute$_{\text{SG.ACC}}$
     b. (opjat' vse potravilis',   poperegrevalis'   za   den')
        again all *po*.poison$_{\text{PST.PL.REFL}}$ *po.pere*.heat$_{\text{IMP.PST.PL.REFL}}$ *za* day$_{\text{SG.ACC}}$
        '...(again everyone got poisoned and overheated during the day).'

In Section 4, we present the framework used for the analysis and in Sections 5 and 6, we show how the examples provided above can be accounted for by means of introducing two features (terminativity and boundedness) instead of using the notion of telicity.

4 The Framework

4.1 Frame Semantics
In order to capture the subtle differences in meaning that are responsible for the above-mentioned possibilities of combination with *za*-MPs, we need a rich and precise representation of lexical semantics. To this end, we choose semantic frames.

Frames emerged as a representation format of conceptual and lexical knowledge (Fillmore 1977, Barsalou 1992, Löbner 2014). They are commonly presented as semantic graphs with labelled nodes and edges, as in Fig. 1, where nodes correspond to entities (individuals, events, ...) and edges correspond to (functional or non-functional) relations between these entities. In Fig. 1, all relations except *part-of* are meant to be functional. This allows for a fine-grained decomposition of meaning and should not be confused with FrameNet frames, although the former can help to capture the structural relations of the latter (cf. Osswald & Van Valin 2014).
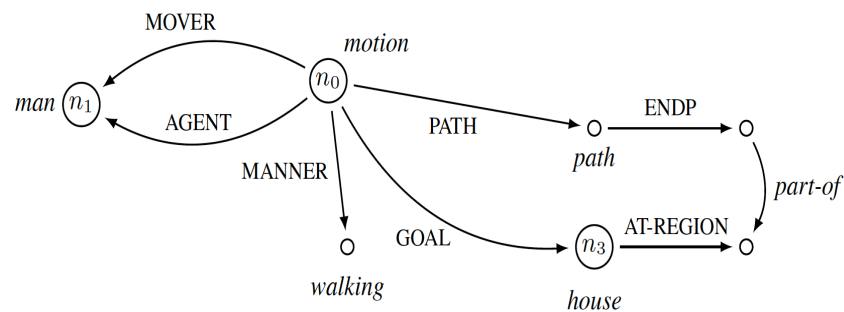
Fig. 1: Frame for the meaning of *the man walked to the house*
(adapted from Kallmeyer & Osswald 2013)

Frames can be formalised as extended typed feature structures (Petersen, 2007, Kallmeyer & Osswald, 2013, Lichte & Petitjean, 2015), involving a finite set of types *motion, man, walking, path, …*, a finite set of attributes (partial functions from frame nodes to frame nodes) AGENT, PATH, MANNER, ENDP, …, and a finite set of relations, for instance *part-of*. Frame nodes are typed where we assume that a node can have more than one type. We assume some of the frame nodes are accessible via unique labels. In Fig. 1, for instance, the label n_0 uniquely points to the *motion* node of the frame, while label n_1 points to the *man* node. As mentioned above, frame nodes can be connected via functional attributes or via non-functional relations. We require, however, that every node in a frame is reachable from some labelled node via an attribute path, i.e., via a sequence of functional attributes.[9]

Besides concrete frames, there is a frame signature that constrains the general form of semantic frames. Within this signature, it is possible to define subtype relations (e.g., every *motion* is an *event*), incompatibilities of types (e.g., nothing can be of type *event* and *path* at the same time), requirements for the existence of attributes for nodes of certain types (e.g., a *motion* always has a MOVER) etc. More examples are given below.

Frames can be specified as models of a suitable logical language. There are different choices possible here. Since we want to allow for quantification within our frame logic, we extend the frame logic from Kallmeyer and Osswald (2013) with quantifiers ∀ and ∃, defined in the standard way. Satisfaction of logical formulas is then defined with respect to a specific frame, i.e., a graph, as in Fig. 1, with variables mapped to frame nodes. Formulas can contain free variables, which are taken to be a kind of labels that denote a specific node in the frame. Besides this, variables can of course also be bound by quantifiers in the usual way.

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[9] This condition is important for restricting the computational complexity of unification, i.e., of merging two frames.

The formulas in the logic that do not involve logical operators have a syntax specific to our frame logic. They are defined over sets of possible types, attributes and relations, and a set of variables. A list is given in Table 1. Note that the formula $x : \phi$ allows movement to the node labelled x in the frame and then ϕ has to be satisfied there.

formula		interpretation (truth conditions) wrt a node v and a variable assignment g
τ	where τ a type	v is of type τ
x	where x a variable	x is mapped to v by g, i.e., $g(x) = v$
$x : \phi$	where x a variable, ϕ a formula	there are subsequent edges labelled with the attributes in p that lead from v to a node that satisfies ϕ
$x \triangleq y$	where x and y are variables	$g(x) = g(y)$
$p \triangleq q$	where p and q are attribute paths	p and q, starting from v, both lead to the same node
$r(x,y)$	where x and y are variables, r a frame relation	$g(x)$ and $g(y)$ stand in a relation r

Table 1: Definition of frame descriptions

The following formula captures the frame of Fig. 1, where n_0, n_1, and n_2 are free variables, i.e., labels that uniquely point to nodes in the frame.

(12)
$$n_0 : motion$$
$$\wedge \ \text{AGENT}(n_1 \wedge man) \wedge \text{AGENT} \triangleq \text{MOVER}$$
$$\wedge \ \text{GOAL}(n_2 \wedge house) \wedge \text{MANNER } walking$$
$$\wedge \ \exists x, y : [\text{PATH}(path \wedge \text{ENDP } x) \wedge n_2 : \text{AT-REGION } y \wedge part\text{-}of (x,y)]$$

Aside from allowing us to describe frames like Fig. 1, our logic can also be used to express general constraints on frames, thereby characterising the underlying type hierarchy including attribute requirements for frames. Examples are given in (13) ($\top$ is a special type, the most general type, which is a supertype of everything else, while $\bot$ expresses

unsatisfiability).

(13) a. $\forall x[x : motion \rightarrow x : event]$

(every *motion* is an *event*)

b. $\forall x[x : (event \wedge phys\_obj) \rightarrow x : \bot]$

(*event* and *phys_obj* are incompatible)

c. $\forall x[x : motion \rightarrow x : \text{MOVER } \top]$

(every *motion* has an attribute MOVER)

4.3 Lexicalized Tree Adjoining Grammars

Our analysis models the mechanisms at the syntax-semantics interface involved when combining a *za*-MP with the construction headed by a (possibly prefixed and suffixed) verb. For syntactic modelling and syntactic composition, we choose *Lexicalized Tree Adjoining Grammar* (LTAG Joshi & Schabes 1997, Abeillé & Rambow 2000). A LTAG consists of a finite set of *elementary trees*. Larger trees can be derived via the composition operations *substitution* (replacing a leaf with a new tree) and *adjunction* (replacing an internal node with a new tree). An adjoining tree has a unique non-terminal leaf that is its *foot node* (marked with an asterisk). When adjoining such a tree to some node *v*, in the resulting tree, the subtree with root *v* from the old tree ends up below the foot node.

In order to capture syntactic generalizations, the non-terminal node

Fig. 2: *every dog barked*

labels are enriched with feature structures (Vijay-Shanker & Joshi 1988). Each node has a top and a bottom feature structure (except substitution nodes, which have only a top). Nodes in the same elementary tree can share features. Substitutions and adjunctions trigger unifications: In a substitution step, the top of the root of the new tree unifies with the top of the substitution node. In an adjunction step, the top of the root of the adjoining tree unifies with the top of the adjunction site and the bottom of the foot of the adjoining tree unifies with the bottom of the adjunction site. Furthermore, in the final derived tree, top and bottom must unify in all nodes.

Our architecture for the interface between TAG syntax and frame semantics builds on previous approaches that pair each elementary tree with a semantic representation consisting of a set of formulas from our frame logic. These formulas can contain holes and can be labelled. That is, we apply *hole semantics* Bos (1995) to the frame logic introduced above and link these underspecified formulas to the elementary trees. To avoid confusion, we use variables n_0, n_1, n_2, ..., e_0, e_1, ... as frame variables and we reserve l_0, l_1, l_2, ... for labelling logical formulas when applying hole semantics. Composition is then triggered by the syntactic unifications arising from substitution and adjunction (Gardent & Kallmeyer 2003, Kallmeyer & Joshi 2003, Kallmeyer & Romero 2008), using interface features on the syntactic trees.

As a basic example, consider the derivation given in Fig. 2. The *every* tree adjoins to the root of the *dog* tree and the derived tree substitutes into the subject slot of the *barked* tree. The *barked* tree is paired with a frame description that characterises a frame labelled *e* as a *barking* frame with an attribute AGENT. This formula is labelled (l_2) and the formula holding at the AGENT node is not specified yet: we have hole $|4|$[10] instead that needs to be filled later by some further specification of the agent. The interface features tell us that whatever comes in via unification at the I feature of the subject node has to be plugged into this hole. Furthermore, the second interface feature signifies that if we add a quantified NP to the subject slot, the relevant minimal scope (feature MINS) is the whole formula

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[10] Holes are represented as boxed variables within figures.

labelled l_2. The *dog* tree contributes a simple formula with a type specification *dog*, and it provides this formula (via its label l_1) to the MINS interface feature, for the minimal restrictive scope of an embedding quantifier. The quantifier *every* contributes universal quantification while introducing the variable x in order to be able to refer to the nodes the formula quantifies over. This variable is passed to the embedding verb via the interface feature I, which allows it then to insert it into the hole $|4|$. Because of the MINS features on the NP nodes, we obtain the following scope constraints: under the restrictive scope (hole $|5|$) of the quantifier, we have to embed at least the formula we find at the nominal tree the quantifier adjoins to (constraint $|5| \triangleleft^* |2|$); under the nuclear scope (hole $|6|$), we have to embed at least the formula we find in the NP argument slot filled by the NP (constraint $|6| \triangleleft^* |3|$). The former will be the *dog* formula labelled l_1 and the latter will be the *barking* formula l_2.

The syntactic unifications, when performing adjunction and substitution, lead to $|4| = x$, $|2| = l_1$, $|3| = l_2$. As a result, when collecting the different formulas, we obtain the underspecified representation in (14a). In order to disambiguate this, we have to find mappings from holes to labels that respect all subformula constraints. Applying such a mapping amounts to plugging labelled formulas into the holes in order to construct a formula without any remaining open holes. In (14a), the only possible disambiguation is $|5| \rightarrow l_1$, $|6| \rightarrow l_2$, which leads to (14b).

(14)   a. $\forall x[x : |5| \rightarrow |6|]$, $l_1 : dog$, $l_2 : e : (barking \wedge \text{AGENT } x)$, $|5| \triangleleft^* l_1$,

        $|6| \triangleleft^* l_2$

    b. $\forall x[x : dog \rightarrow e : (barking \wedge \text{AGENT } x)]$

5   Types and constraints

Given the controversy in the literature about the notion of telicity, we assume two features instead of one that are, on the one hand, semantically motivated and, on the other, predictable from the derivational process. Let us start with shifting the traditional notion of telicity to an architecture that includes two features: *terminativity* and *boundedness*. While the latter term is commonly encountered in the literature, the former is not as well-

known. As we have already mentioned above, it is used by Paducheva and Pentus (2008) and Mehlig (2008), but in different senses. For us, the departure point here is the proposal by Corre (2015), who employs the term *terminativity* to extend the notion of telicity by including verbs that contain the prefix *po-* (in its delimitative/attenuative interpretation). It also seems to correspond to telicity in the sense of Filip (2008), although the definition is based on other terms and the question whether the two notions apply to exactly the same set of verbs needs to be explored separately.

We will call an event *terminative* if it contains a final stage (attribute FIN is present at the event node) or if it is a part of another terminative event. Otherwise it is *non-terminative*. An event description is *bounded* if it contains a final stage such that the degree associated with it is a concrete value or a bound variable. In other cases it is *non-bounded*. Such feature architecture allows three combinations: {*non-terminative, non-bounded*}, {*terminative, non-bounded*}, and {*terminative, bounded*}, as *bounded* events are by definition *terminative* (constraint (f)). The following general background constraints ensure correct typing within the relevant domain:

(15) a. $\forall e[e : progression \rightarrow segment\text{-}of\,(e, e)]$
   b. $\forall e[e : iteration \rightarrow \exists e_1, e_2\,(segment\text{-}of(e_1, e_2) \wedge segment\text{-}of(e_2, e)\\ \wedge \neg e_1 \triangleq e_2)]$
   c. $\forall e[e : non\text{-}bounded \rightarrow (e : iteration \vee e : progression)]$
   d. $\forall e[e : iteration \rightarrow \neg e : progression]$
   e. $\forall e[\exists e'(e' : iteration \wedge segment\text{-}of(e, e') \rightarrow e : terminative]$
   f. $\forall e[e : bounded \rightarrow e : terminative]$
   g. $\forall e[e : terminative \rightarrow e : \text{FIN } \top]$
   h. $\forall e[e : non\text{-}bounded \rightarrow \neg e : bounded]$
   i. $\forall e[e : non\text{-}terminative \rightarrow \neg e : terminative]$

These constraints are intended to be combined with semantic contributions of individual elements, as proposed by Zinova (2017). Due to the lack of space and our interest only in certain features of the representations, the full derivations are not provided here. Crucial for the moment are the properties of the representations obtained after the attachment of the prefixes *pere-* and *po-* as well as the imperfective suffix.

The prefix *pere-* is traditionally analysed as extremely polysemous (with 11 usages in Švedova 1982). We consider only the excess/crossing the border usage that is relevant for the examples above. It arises when the scale provided by the verb or the context is an open scale with a distinguished point, in case of the verb *peregrevat'sja* 'to overheat', this point (on the temperature scale lexically specified by the verb *gret'* 'to warm up') is the temperature of overheating for the relevant object. The prefix then establishes a mapping from the initial stage of the event to a point on the scale, the distinguished point, and from the final stage of the event to a point on the scale that is above the distinguished point. The resulting event is thus bounded (and terminative).

The second prefix of interest is *po-*. The two interpretations encountered in the examples above are related to different available scales: a cardinality scale (either overtly specified by the context or enforced by the repetitive use of the imperfective suffix), a distributive interpretation of the prefix arises. In this case, the prefix maps the initial stage of the event to cardinality 0 and the final stage to the cardinality of the relevant set. The resulting event description is again bounded. In other cases, *po-* introduces initial and final stages of the event, but does not map them to any specific points on the scale. This amounts to a terminative and non-bounded event description.

The imperfective suffix, according to Zinova (2017), is associated with a repetitive interpretation (corresponding to the traditional habitual usage) and a progressive interpretation (constraint (c)). When the suffix is attached under a repetitive interpretation, a new event is created such that its segments are events of the type denoted by the derivational base. They must be terminative (see constraints (b) and (e)), whereas the new event is an unbounded non-terminative sequence with a pre-selected cardinality scale. If the interpretation of the suffix is progressive (constraint (a) above), the new event created by its attachment is terminative, as it is a segment of a bounded event denoted by the derivational base.

Under such assumptions, the representations of verbs in (5), (6), (9), and (10) obtain the following relevant properties. The frame for the imperfective verb *peregrevat'sja* 'to overheat/be overheating' can be

either of type *iteration* (habitual interpretation, segments are of type *bounded*) or *progression∧terminative* (progressive interpretation, a segment of a *bounded* event). The frame for the verb *poperegrevat'sja* 'to stay/be overheated (for some time)' can be of type *iteration ∧ bounded,* as in the iteration case, the cardinality scale leads to the distributive interpretation of the prefix *po-*, or *progression ∧ terminative*, as in case of the progressive interpretation of the suffix, the prefix *po-* can only be interpreted delimitatively. Let us now show how the constraints associated with the *za*-MP and the proposed feature architecture allow us to explain the observed facts.

6 Analysis

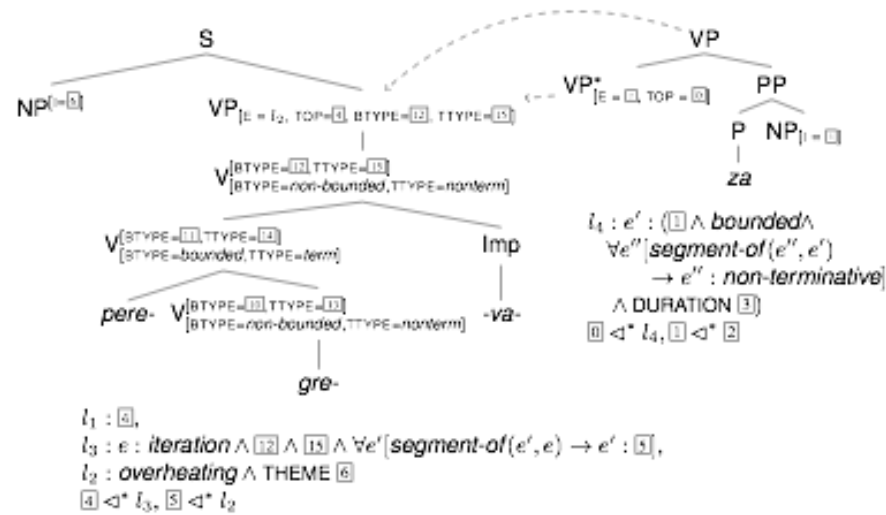We propose that a *za*-MP can modify either the topmost or an embedded

Fig. 3: Tree-frame pairs for combining a *za*-PP with the verb in (8)

bounded event as long as it is not a segment of an embedding *terminative* event. This is captured in the frame description on the right of Fig. 3, which is paired with the auxiliary tree for adding a *za*-MP modifier to the VP node.

The frame description roughly tells us that the modification leads to a bounded event (variable *e*) such that all its segments are non-terminative and it is of duration |3|, where |3| will be determined by whatever is substituted into the NP inside the PP. This new event has to be included into the modified frame description in such a way that it is contained in the formula describing the topmost event (interface feature TOP) and that it refers at least to the node where the most deeply embedded event (interface feature E) is described. This is expressed by the underspecified scope constraints $|0| ⊲* l_4$ and $|0| ⊲* |2|$ respectively. Note that in the case of a less complex verbal structure (no embedded events), the analysis is reduced to a requirement for the event to be *bounded* (according to the proposed definition).

Concerning the boundedness of an event described by a complex verb, we want it to be fixed depending on the outermost morphological component. [11] The corresponding type is then passed to the event description in the frame. For instance, *pere-* creates a complex bounded event, which can be turned into an unbounded event by an imperfective suffix. If no such suffix is added, the event remains bounded. We model this with a feature BTYPE on the syntactic tree that can be changed by prefixes and suffixes and that otherwise percolates upwards. The value obtained in the VP node is passed as a type into the semantic frame description. The second feature TTYPE functions similarly and encodes (non)terminativity. Fig. 3 shows this on the left for *peregrevalis'* 'overheated' under a repetitive interpretation. LTAG's top-bottom unification yields |12| = *non-bounded*. The resulting frame description when combining the verb with a *za*-MP is given in (16).

(16)
$l_1 : \boxed{4}$,
$l_3 : e : (\textit{iteration} \land \textit{non-bounded} \land \textit{non-term} \land \forall e'[\textit{segment-of}(e', e) \rightarrow e' : \boxed{5}])$,
$l_2 : \textit{overheating} \land \text{THEME } \boxed{6}$
$l_4 : e' : (\boxed{1} \land \textit{bounded} \land \forall e''[\textit{segment-of}(e'', e') \rightarrow e'' : \textit{non-terminative}]$
$\qquad \land \text{DURATION } \boxed{3})$
$\boxed{4} ⊲* l_4, \boxed{1} ⊲* l_2, \boxed{4} ⊲* l_3, \boxed{5} ⊲* l_2$

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[11] We follow Filip and Rothstein (2005) in assuming that boundedness is determined by derivational affixes and cannot be changed once the verb enters syntax.

According to the scope constraints, we can either disambiguate $|4| \rightarrow l_4$, $|1| \rightarrow l_3$, $|5| \rightarrow l_2$ (wide scope of the PP) or $|4| \rightarrow l_3$, $|5| \rightarrow l_4$, $|1| \rightarrow l_2$ (narrow scope of the PP). The former, however, leads to a type mismatch since signifies that the frame described here is both *bounded* and *non-bounded*. Therefore only the narrow scope is possible.

If an additional prefix *po-* is attached (= adjoined) on top of the repetitive interpretation of the verb, as in (10), the highest BTYPE value would be *bounded*, and this type would be passed to the semantics as the type of the iteration event. Modification with the *za*-MP would target the higher iteration event since the lower one is a segment of a *bounded* (and thus *terminative*) event. In case the prefix *po-* is attached to the progressive interpretation, the BTYPE of the higher event is *non-bounded* and the TTYPE is *terminative*, so both wide (the event is not bounded) and narrow scope (embedding event is terminative) interpretations are blocked and a *za*-MP cannot be attached.

7 Purely Syntactic Approach?

Judging by the examples provided above, one can try[12] to explain the data using the notion of *lexical* and *superlexical* prefixes (see, e.g., Schoorlemmer 1995, Babko-Malaya 1999, Borik 2002, Ramchand 2004, Romanova 2004, 2006, Svenonius 2004a,b, Tatevosov 2007, 2013, a.o.). According to Svenonius (2004b: 229), superlexical prefixes are distinguished by the fact that they do not allow the formation of secondary imperfectives, can occasionally stack outside lexical prefixes, never inside, select for imperfective stems, attach to the non-directed form of a motion verb, and have systematic, temporal, or quantizing meanings, rather than spatial or resultative ones.

Although predominant in the literature, this distinction is problematic, as discussed rather briefly in Kagan (2015) and extensively in Zinova (2017). One of the main reasons for the criticism is that there is no pair of criteria that would apply to the same set of prefixes, which leads to different classifications in each paper on the topic. This strongly indicates

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[12] This was suggested by an anonymous reviewer.

that if there is a distinction, it is not categorical.

Nevertheless, let us for the moment assume that the distinction is sharp and sketch an idea of the analysis that would use this distinction (as suggested by an anonymous reviewer). According to this view, superlexical prefixes occupy a higher position in the tree; therefore, it is possible to explain the narrow scope of a *za*-MP by assuming that the adverbial attaches before the habitual marker. To pursue this view, one would have to also assume the following:

- the position occupied by the imperfective suffix when it is interpreted habitually (HAB) is higher than that of the imperfective suffix that is interpreted progressively (PROG) – note that only one of the two positions can be occupied);
- there are two positions where a *za*-headed adverbial can be attached:
  o higher than PROG and lower than HAB;
  o higher than all prefix positions.

With this, we obtain the architecture shown in (17), whereby only one of the positions for *za*-MPs and one of the HAB/PROG positions can be occupied. Such an architecture (assuming that telicity singles out the class of verbs that are identified as bounded in our analysis) would indeed allow us to account for the examples presented so far.

(17) *za*-MP (superlexical prefixes (HAB (*za*-MP (PROG (lexical prefixes (stem))))))

Now consider the same verb as above, but without the imperfective suffix. In this case, prefixes *po-* and *pere-* are stacked, resulting in *poperegret'sja* 'to get overheated (for all)'[13]. The predictions of our approach and of the syntactic alternative vary in this case: for us, narrow scope of the adverbial is not possible, as the embedded bounded event would be a segment of another bounded (and thus terminative) event. For a syntactic approach, nothing should prevent the narrow scope of the adverbial when it attaches in the lower slot "not knowing" about the later derivation steps. It turns out that only higher scope of a *za*-MP is possible in this case.

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[13] This verb may sound worse than the alternative containing the imperfective suffix, but there are plenty of verbs of this kind, some of them being more natural. For example, the verb *povybrosit'* 'to throw out all of' can be even found in the corpora.

Let us consider one more example that was provided by an anonymous reviewer, who suggested that in some cases, there is a possibility of the lower attachment of the adverbial despite the presence of another prefix. Think about the following scenario: *John works at a factory that produces toy cars. His job is to screw wheels on in exactly 40 seconds, not more. Suddenly, the rules change: now he only has 30 seconds for this operation. John tries hard to meet the new requirements for a few days, finds out that this is not doable and quits his job.*

(18) I   vot gde-to dnej   pjat Dzhon poprivinchival^{PF}
     and   so about day$_{PL.GEN}$ five Dzhon PO.PRIscrew$_{IMP.PST.SG.M}$
     kolesa,   za 30 sekund,   da i   uvolilsja.
     wheel.$_{PL.ACC}$ *za* 30 second$_{PL.GEN}$ but and   quit
     'And so John spend about five days screwing on wheels in 30 seconds and quit.'

Even if the lower attachment is possible (according to an anonymous questionnaire posted in a social network, 17 out of 31 respondents accepted the sentence under the provided scenario), it requires the presence of another time MP (non-prepositional). If it is absent, the sentence (19) is unambiguously interpreted as referring to a single event of screwing on the wheels that lasted for 30 seconds.

(19) On poprivinchival^{PF} kolesa   za 30 sekund.
     he PO.PRIscrew$_{IMP.PST.SG.M}$ wheel.$_{PL.ACC}$ *za* 30 second$_{PL.GEN}$
     'He screwed on the wheels in 30 seconds.'

In our analysis, the low attachment of a *za*-MP is blocked in (19) and what is left to explain is the possibility of (18) for some speakers. Crucially, (18) can be interpreted as 'John tried to screw the wheels on in 30 seconds, but he did not necessarily manage to do so'. What we think is going on in cases like this is an application of an additional semantic operation before the attachment of the prefix *po-*. This operation allows the verb to shift its meaning from repetitive (which, according to our analysis, is associated with a cardinality scale) to something like 'occupation', which can undergo further delimitation along the time scale. Note that this is licensed not by the *za*-MP attachment, but by the whole scenario and the presence of the noun phrase *dnej pjat'* 'five days

(approx.)' that is only compatible with the delimitative interpretation of the prefix *po-*. After the shift operation is performed, an additional layer is created and the attachment of the prefix *po-* does not influence the properties of the event that is a segment of an iteration, allowing the low attachment of a *za*-MP.

8 Conclusion

In this paper we proposed an analysis of *za*-headed time MP attachment to complex verbs in Russian. Using frames, LTAG, and two features (terminativity and boundedness), we are able to predict the possibility and scope of such an attachment. In comparison to the bottom-up approach we sketched in Section 7, our analysis does not rely on a distinction between various types of prefixes. Due to the absence of agreement in the literature regarding telicity (i.e., how it should be defined for Russian), we talk about bounded and terminative descriptions; for most authors, the term *telic* would refer to one of those types. Our architecture allows us to spare additional structural assumptions, and both features (terminativity and boundedness) can be at any point derived from the semantic description. In our view, the evidence against a binary lexical/superlexical distinction is strong enough in order to favour an account that does not rely on it.

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