Areal and diachronic trends in argument flagging across Slavic

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Abstract
In this pilot study, we examine the variation in the flagging patterns across 10 modern Slavic languages – covering all three major Slavic branches: South, West and East Slavic – and Old Church Slavic. We rely on a database that comprises 825 entries and is based on translation tasks with 46 verb meanings that target verbs with middle-level transitivity prominence. We analyze three main factors: the ratio of flagging alternations (vs. rigid government), transitivity prominence and ratio of nominative marking. We argue that despite high homogeneity in this domain across Slavic, there are clear genealogical and areal trends that explain the distribution of different flagging patterns across Slavic. Thus, when it comes to transitivity prominence, we detected an areal trend that splits Slavic languages into Northeast Slavic (Belarusian, Polish, Russian, Ukrainian) and Southwest Slavic (all other languages), such that the former group shows relatively low and the latter high transitivity prominence. The same split is also seen in the ratio of nominative marking of the subject(-like) arguments, albeit to a minor degree. Here too, Northeast Slavic languages have a lower ratio than the Southwest ones. Finally, we compared Slavic languages to each other with regard to their flagging patterns for the same verb meanings in a cluster analysis based on Jaccard similarity in order to see how Slavic languages relate to each other in this domain. We found that, although, the genealogical relations still largely determine similarities in argument flagging, language contact must have played an important role here as well. Having said this, our sample was not large enough to reach statistical significance for the results obtained and a more large-scale study is necessary to corroborate our findings. For this reason we corroborated our quantitative findings with the qualitative evidence.

Keywords: inner-Slavic variation, argument flagging, case, areal patterns

1 Introduction
Flagging refers to the marking of the semantic and/or syntactic role of arguments by means of inflectional cases or adpositions including their combinations and morphologically intermediate subtypes (Haspelmath 2019). The more traditional terms are *dependent marking* or *Case.*

In this pilot study, we examine areal and diachronic trends of argument flagging of ten modern Slavic languages: Bulgarian, Macedonian, Serbian, Slovenian (South Slavic), Czech, Slovak, Polish (West Slavic), Belarusian, Russian and Ukrainian (East Slavic) as compared with Old Church Slavic, which is our proxy for Proto-Slavic, in addition to the comparative evidence from other ancient Indo-European languages. Our study is primarily explorative and aims at understanding how and why the flagging patterns of erstwhile dialects develop after the split from their common proto-language.

The split of the Slavic languages is quite recent. It must have happened no earlier than 1,300 years ago. Their geographic spread has remained quite compact despite the fact that during approx. the 6th-9th centuries the Slavic-speaking territory in Europe expanded on an

astonishing speed (Nichols 1993, 2020). However, apart from the southwest movement of Ugric (Magyar) tribes into today's Hungary, the persistence of the Daco-Romanian population (see today's Romania) and rather minor-scale migrations of non-Slavic speaking communities (e.g., on the Balkans), the Slavic-speaking territory has not been internally driven apart.

Recency of the split as well as compactness of the Slavic territory must have been responsible for a considerable degree of inheritance and, thus, homogeneity in the flagging patterns of modern Slavic languages. Thus, all modern languages remained accusatively-aligned as was Proto-Slavic and Proto-Indo-European (PIE).[1] The case systems of most Slavic languages are very conservative. For these reasons and given the evidence we provide below (see especially §3.3), inheritance is an important factor determining homogeneity of flagging patterns across the modern Slavic languages. The compactness of the modern Slavic territory allowed for mutual contacts which, in turn, contributed to the maintenance of the same inherited patterns across Slavic. Only two South Slavic languages are somewhat distinct: Bulgarian and Macedonian have lost morphological cases on nouns (reminiscent of neutral alignment). However, their pronouns retained three cases (nominative, accusative and dative) and these two languages, distributively, show accusative alignment, too. The emergence of differential object indexing (term coined in Iemmolo 2011) via clitic doubling is likewise indicative of accusative alignment in these two languages, as is the subject indexing in all Slavic languages.[2]

In addition to the inheritance factor, common innovations also contribute to homogeneity. Thus, the joint abandonment of typologically dispreferred flagging patterns of Proto-Slavic is also responsible for similarity. As a result of these innovations, modern Slavic languages – in contrast to Proto-Slavic – now predominantly rely on unmarked subjects and only on differentially marked objects. By contrast, Proto-Slavic (as well as Proto-Indo-European) marked both arguments of a transitive verb via dedicated nominative and accusative affixes across all NP types and in all inflectional classes (except neuter nouns).[3] This morphologically redundant pattern is rare cross-linguistically and is functionally dispreferred (*inter alia*, Dixon 1979; Handschuh 2014; Creissels 2018). The marked nominative system has been abandoned in most of the Slavic nominal inflectional classes (declensions) in the singular (except for the *a*-stems), while some plural declensions still retain marked nominatives (cumulatively expressing number as well) in some of the languages.[4]

Likewise, the Proto-Slavic flagging system of the direct object was also of a typologically rare type in that it involved no differentiation, i.e., all object types – including inanimate, indefinite, non-anaphoric, non-topical ones, etc. – were explicitly marked by accusative affixes across the board regardless of their likelihood of becoming an object. By contrast, modern Slavic languages adopted and expanded *differential object marking* (DOM) which also has been shown to be more efficient and cross-linguistically the preferred pattern (Sinnemäki 2014; Schmidtke-Bode and Levshina 2018: 527; Haspelmath 2021; see also more generally on DOM in Witzlack-Makarevich and Seržant 2018). In particular, most modern

[1] Note that some researchers suggested active/inactive (Gamkrelidze and Ivanov 1984) and some even ergative alignment of Proto-Indo-European despite the fact that all ancient Indo-European languages such as Vedic Sanskrit, Avestan, Ancient Greek, Tocharian or Old Church Slavic are strictly accusatively aligned in both flagging and indexing. We refrain here from a critical discussion of the spare and quite indirect and only morphological evidence at disposal (e.g. morphological nominative-accusative syncretism with neuter nouns).

[2] Bulgarian and Macedonian differ from each other with respect to some specific rules of object indexing (clitic doubling) and the obligatoriness with which they apply (cf. Friedman 2008). Moreover, although object clitics are primarily hosted by verbs, other hosts in the Wackernagel position are possible too (cf. Corbett 2006: 13).

[3] The nominative affixes of neuter nouns were homonymous with the accusative affixes.

[4] An exception was early Old Novgorodian with the marked nominative singular in both major declensional classes (*o*- and *a*-stems). However later, the marked nominative was abandoned in this variety as well.

Slavic languages have animacy-based differential-object-marking systems such that animate nouns may employ the case marker that is homonymous for accusative and genitive (at least in the singular) while, in the singular, inanimate nouns bear no marker at all or, with neuter nouns, the marker is homonymous with the accusative and nominative (the *a*-declension is an exception). In the course of development, modern East and West Slavic languages expanded this DOM system onto the entire plural declension (to different degrees). Furthermore, a number of West and South-East Macedonian dialects (South Slavic) in contact with Balkan Romance have developed an analytical pattern of differential object marking based on the so-called *na*-accusative (formed by the preposition *na* 'on'; cf. Asenova and Aleksova 2008; Bužarovska 2017). Thus, modern Slavic languages are uniform in adapting differential object flagging in various ways and abandoning the across-the-board object flagging of Proto-Slavic and Proto-Indo-European. This trend is likely to be conditioned by the universal dispreference for across-the-board object flagging (on which see Sinnemäki 2014; Haspelmath 2021).[5]

While the inheritance factor conditioned by the recency of the split of Proto-Slavic as well as the pressure towards more preferred flagging patterns are responsible for a considerable degree of homogeneity of the modern flagging patterns, one of the factors that must have been responsible for divergence is the distinct geographic locations of the modern Slavic languages, as we argue below.

In what follows, we explore the interplay of the inheritance factor, the areal factor and the local factor in the development of the modern flagging patterns. We proceed as follows. First, we present our sampling method and the database which builds on translations based on 46 verb meanings into each language (Section §2). Section §3 is the main part of the paper and is devoted to the changes in the ratio of flagging alternations (§3.1), changes in transitivity prominence (§3.2), homogeneity of flagging across Slavic (§3.3), ratio of nominative marking of the subject(-like) argument (§3.4) and, finally, to establishing a big picture on argument flagging across Slavic in terms of language clusters (§3.5). Section §4 summarizes the results and presents conclusions.

2 The database and the sampling method

In order to explore the diachronic and areal trends in the evolution of flagging patterns of modern Slavic languages, we created a database comprising 11 Slavic languages, i.e. all major modern Slavic languages (Belarusian, Russian, Ukrainian (East Slavic), Czech, Polish, Slovak (West), Bulgarian, Macedonian, Serbian, Slovenian (South)) as well as Old Church Slavic. We use the latter as a proxy for Proto-Slavic, since it is the oldest attested stage of Slavic and comes close to Proto-Slavic.

Our database was obtained from translating 46 verb meanings into each language. These meanings were disambiguated by sentences providing specific contexts.[6] This was necessary in order to make sure that exactly the same reading of the verb meaning is entered into the database for all Slavic languages. The full list of verb meanings is found in (1):

(1) The 46 verb meanings represented in our sample
'adversary float', 'adversary kill', 'damage', 'explain', 'help', 'leave behind', 'pull', 'see', 'tell sth.', 'threaten', 'demand', 'forbid', 'give', 'meet', 'play with', 'possess', 'resist', 'search for', 'serve', 'thank', 'obey sb.', 'defend', 'fear', 'like', 'listen',

[5] In addition, West Slavic languages have developed differential subject marking in the plural, both for NPs and pronouns (cf. Zieniukowa 1981; Laskowski 1986; Mindak 1990; Rappaport 2010; Žigo 2012). This is accompanied by differential subject indexing, inasmuch as verbs in the past tense plural adapt to differentially marked subject NPs according to general agreement rules on clause level. The different patterns are all based on the animacy-hierarchy, or a hierarchy of inherent lexical content (Silverstein 1976).

[6] Similar method has been applied for the collection of the database of two-place predicates BivalTyp from 130 languages of Western Eurasia (https://www.bivaltyp.info/) in Say, ed., (2020).

'move', 'vomit', 'wait', 'avoid', 'bring forward', 'forgive', 'hate', 'name', play games', 'reach', 'beg request', 'feel pain in', 'follow', 'hear', 'look at', 'oppose', 'rule / govern', 'need', 'remind', 'think', 'disturb / hinder'

Our sample primarily involves verb meanings that populate the middle part of the transitivity prominence scale as found in typological works (Tsunoda 1985; Malchukov 2005; Haspelmath 2015; Say 2014, 2017, 2018: 563, 568; Say, ed., 2020). In Haspelmath (2015), *transitivity prominence* is a value from 0 to 1 that predicts the likelihood of a verb meaning to occur with the transitive construction, i.e., with the NOM-ACC flagging in accusative languages like Slavic, based on cross-linguistic evidence. It is computed as the proportion of languages in which the particular verb meaning is found with the transitive flagging pattern. For example, the upper part of the scale comprises such verbs as 'break' (transitivity prominence 1.0 in Haspelmath 2015: 143) or 'kill' (1.0). The transitivity prominence value 1.0 means that these verbs do not occur in constructions other than the transitive in the languages of the world-wide sample in Haspelmath (2015). There are only two verbs in our sample (1) that are very high on the transitivity scale, namely, 'give' (0.98) and 'see' (0.93). Otherwise we have aimed at excluding verbs with a high transitivity prominence from our sample because these verbs are extremely stable and thus may not reveal anything about inner-Slavic variation.

Furthermore, we have also excluded the lower part of the transitivity prominence scale since these verbs are equally resistant to variation. They primarily occur as one-argument predicates and are also quite stable across languages, cf. 'run' (0.05), 'sit' (0.05) or 'jump' (0). These verbs are invariably intransitive in all modern Slavic languages.[7]

Thus, the likelihood that the verbs from the upper and those from the lower end of the transitivity prominence scale would show any variation in argument flagging of Slavic is extremely low. Accordingly, most of the 46 verb meanings in (1) come from the middle part of the transitivity prominence scale; for example 'search for' (0.88), 'name' (0.80), 'help' (0.78) 'like' (0.78), 'tell' (0.78), 'follow' (0.74), 'look at' (0.73), 'meet' (0.70), 'fear' (0.53), etc. The least transitivity-prominent verb we included is 'play' (0.10). We also included some verb meanings that are not treated in Haspelmath (2015), e.g., adversity impersonals with '(adversary) kill' or '(adversary) float'.

In order to make our comparison more rigorous we did not compare simple verb meanings across the Slavic languages but specific sentences that disambiguate the specific readings of these verbs.

Furthermore, since Old Church Slavic does not have any native speakers, we started out by collecting Old Church Slavic sentences from the dictionary Kurz (2006[1966-1997]) for each of the 46 pre-selected verb meanings. In the second step, we selected those Old Church Slavic sentences that represented best the meanings we were aiming at and which had all arguments explicitly expressed. These sentences were translated into Russian with only slight adaptions. Subsequently, the 46 Russian sentences were translated into all ten modern languages, taking into account all possible close translational variants. Thus, we made sure that our database contains only comparable meanings across all languages including Old Church Slavic. In addition to native speakers, we also consulted relevant dictionaries and parallel corpora (the latter especially in case of Belarusian and Ukrainian).

Note that we did not include sentences with negated predicates into the sample, since in some Slavic languages (Polish, East Slavic as well as in Old Church Slavic) flagging is highly sensitive to polarity.

Since each of the 46 verb meanings can sometimes be rendered by different predicates and/or by different flagging patterns (case/adpostion frames), there are more entries than

[7] Internal-object verbs (traditionally *figura etymologica*) such as, for example, *skočiť skok* lit. 'to jump the jump', *bežať beh* lit. 'to run the run' in Slovak (or Czech) have no bearing on this.

meanings. We ended up by having ca. 80 entries per language. In total, the database contains 825 entries. Synonyms for Old Church Slavic were entered as well if the dictionary (Kurz 2006[1966-1997]) indicated them as such.

Note that we did not take into account frequencies of different flagging patterns which would have been too laborious for this study. The translators were advised to take all translational variants into the database as long as they are acceptable by native speakers of the standard variety.

A number of conventions have been made. Thus, we entered only verbal predicates unless there is a non-verbal predicate that can be considered the default, i.e. one of the most frequent choices like Russ. *nužno* or *nado* for 'need'. All entries were tagged for flagging of the main arguments, both for case and preposition (if applicable). In Macedonian and Bulgarian, the case was disambiguated by (clitic) pronouns since nouns no longer distinguish morphological cases. For example, Bulgarian and Macedonian show the dative case with pronouns and the new, prepositional dative marking *na* with nouns.

Table 2.1 provides some examples from the database with the tagging:[8]

Table 2.1: Structure of the database

	Lang.	Example	Predicate	Verb	subj	iobj	dobj
Mnogie ljudi slušali ego 'Many people listened to him'	Czech	*Mnozí lidé ho poslouchali.*	*poslouchat*	Listen	nom	NA	acc
On zaščitil menja 'He defended me'	OCS	*zaštititъ nъi* (Kij 6a 13sq)	*Zaštititi*	Defend	nom	NA	acc
V ėtix veščax vy nuždaetes' 'You need these things'	Polish	*Potrzeba wam tych rzeczy*	*Potrzeba*	Need	dat	NA	gen

(NA – non-applicable; OCS – Old Church Slavic)

It was crucial for our method that the database contains entries on the same set of verbal meanings for each of the languages. Since the selection of these particular verbal meanings from the middle part of the transitivity-prominence scale was to some extent arbitrary, our data can only be meaningfully used for relative and not for absolute claims about Slavic languages. In this study, we only explore relative differences among the Slavic languages on the basis of our sample.

By convention, we aligned all obligees of the necessity modals, experiencers of the experience predicates, inanimate causers of adversary 'kill' and 'float' and possessors in the predicative-possession construction as the first argument (tagged as *subj* in the database in Seržant et al. 2021) and the possessum as the second one (tagged as *dobject* in the database). Note that the accusative of such objects was tagged as *acc2* in contrast to the regular accusative (tagged as acc1) in a transitive clause with the nominative-marked first argument (subject). Furthermore, we excluded clausal arguments in order not to complicate matters too much (cf. the same convention in the valency database ValPal in Haspelmath and Hartmann 2015: 56).

Another convention was to unify the spelling of the cognate prepositions. For example, Russian *ot* 'from', Bulgarian, Macedonian and Polish *od* and Old Church Slavic *otъ* were uniformly rendered as *ot* in the database in order for the automated methods not to treat these as different prepositions.

[8] We also introduced other tags that will not be relevant in this paper.

The entire database is published online in Seržant et al. (2021) and is free accessible.

3 Argument flagging in Slavic

Although modern Slavic languages show a high degree of homogeneity in the flagging of the arguments of bivalent verbs (see §3.3 below), there are, of course, also differences. In the following two subsections, we discuss the variation in the flagging of the object argument along two criteria: the ratio of flagging alternation (§3.1) and transitivity prominence (§3.2). Subsection §3.4 discusses the degree of variation of the subject-like argument and subsection §3.5 presents an overall clustering analysis that takes into account both arguments.

3.1 Ratio of flagging alternation

In this subsection, we examine the degree of available object flagging strategies per verb meaning. For example, the meaning 'wait' is rendered by the verb *čekati* in Serbian, which may govern either the accusative or the preposition *na*:[9]

(2) Serbian

a *Oni* *čekaju* *Zahar-a*
3PL.NOM wait.3PL Zahar-ACC.SG[10]
'They are waiting for Zahar.'

b *Oni* *čekaju* *na Zahar-a*
3PL.NOM wait.3PL on Zahar-ACC.SG
'They are waiting for Zahar.'

By contrast, Macedonian requires accusative marking (seen on pronouns):

(3) Macedonian

Tie go *čekaat* *Zaharije*
3PL 3SG.M.ACC wait.3PL Zahar[M]
'They are waiting for Zahar.'

Thus, it can be said that 'wait' in Serbian has a higher *ratio of (flagging) alternation* than the same verb in Macedonian. We measure this ratio by assigning 2 to Serbian and 1 to Macedonian for 'wait'. Once this procedure has been applied to all verbs of the database, we measure the ratio of alternation for each Slavic language as the mean of the flagging-alternation ratios of all its verbs. Figure 3.1 presents the results:

[9] There is a slight difference between (2a) and (2b). Unlike the former, the latter example indicates that the subjects are waiting for Zahar to do a particular thing. For example, (2b) is not optimal in the context where the subject is waiting for Zahar to show up at the appointed place. Similar variation is also found in Slovenian (Žele 2006: 405).

[10] Slavic languages have animacy-based differential-object-marking systems such that animate nouns may employ the case marker that is homonymous for accusative and genitive (at least in the singular), while inanimate nouns employ markers that are homonymous for nominative and accusative. In what follows, we simply ignore these differences and gloss both types as ACC.

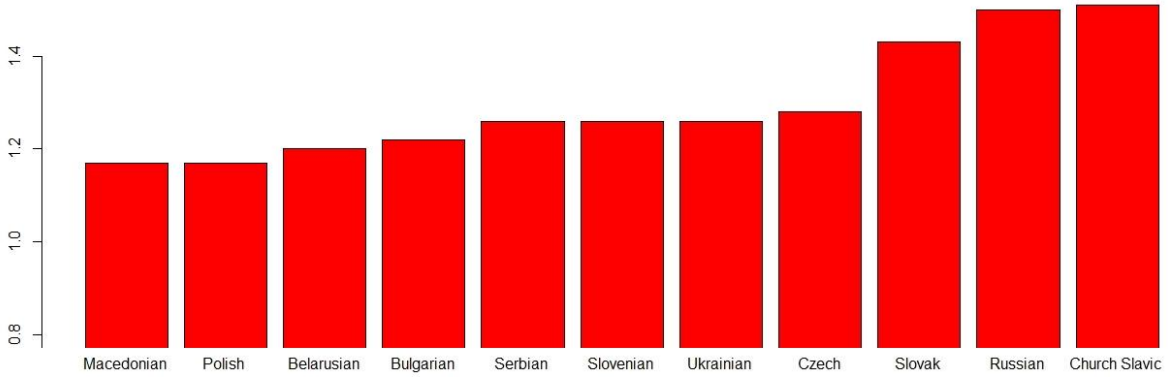


Fig. 3.1: Ratios of (flagging) alternation

The variation ranges from 1.17 in Macedonian and Polish to 1.51 in Old Church Slavic. Thus, Old Church Slavic had the highest ratio of flagging variation of the object while all modern Slavic languages have been tending towards more rigid case government to varying degrees. The alternating government options of Old Church Slavic contributed to the semantic interpretation of the entire clause in a compositional way, very much in spirit of construction-based syntax. We take this as indicative that flagging was more semantic in Old Church Slavic and other attested early stages of Slavic (*inter alia*, Grković-Major 2007, 2010; cf. also Bartula 1954; Chodova 1963). By contrast, rigid government is not susceptible to semantic nuances and flagging itself and carries primarily the syntactic function of marking the arguments of the verb.

For example, the accusative vs. (partitive) genitive alternation was more productive in the older layers of Slavic such as Old Russian (*inter alia*, Borkovskij and Kuznecov 2006[1963]: 427-428; Krys'ko 2006; Malyševa 2008) and Old Church Slavic (Miklosich 1883: 473-476; Bartula 1969: 67), not only in token but also in type frequency. In many contexts, the genitive is no longer possible, for example with verbs meaning 'see'. In modern Slavic languages, in contrast to Old Church Slavic (4), the (partitive) genitive is no longer available:[11]

(4) Old Church Slavic (Blagova et al. 1994: 242; Euch. 1a 12)

zьręšte	*bo zemlę*	*nedvižimy*
see.NOM.PL.PRTC	PRT earth.F.GEN.SG	motionless.GEN.SG.F

'seeing (a part of) the motionless earth'

A single exception is the mirative use of *videti* in Štokavian varieties:[12]

(5)

Vidi	*ti*	*nje*
see.IMPV.2SG	2SG.NOM	3SG.F.GEN

'Look at her!' (indicating surprise by the person's behaviour)

However, in addition to its archaic flagging alternations, Old Church Slavic had already started replacing bare cases with prepositions – a process that expanded in modern languages, especially in the genealogically closely related Bulgarian and Macedonian. This optionality also contributes to the high ratio of (flagging) alternation of Old Church Slavic. For example, 'fear' (*bojati sę*) is found with the old (source) genitive but also with the new, prepositional government with *otъ* 'from' to become the only government in modern

[11] The partitive meaning of the object often yields the meaning of low degree of affectedness.
[12] The genitive was also possible in Slovenian in the 19th c. (cf. examples in Pleteršnik 1894-1895).

Bulgarian and Macedonian. Another innovation that contributed to the high ratio of alternation is the rise of the transitive possession predicate in Old Church Slavic (*iměti* 'have') alongside the ancient dative marking of the predicative possessor (see §3.2).

Russian seems to be conservative in this regard, retaining a number of alternative flagging patterns. However, at the same time, Russian – similarly to other modern Slavic languages (§3.2) – also compensated for the loss of some of the alternations by introducing new alternations, primarily, based on the gradual expansion of the transitive pattern, i.e. of the accusative. Thus, Russian has introduced accusative marking alongside the old genitive marking in a number of verbs, e.g., with *bojat'sja* 'fear' which may either take the original genitive (e.g. *bojat'sja učitel'nicy* 'to fear the teacher (F.GEN)') or the new accusative (*bojat'sja učitel'nicu* 'to fear the teacher (F.ACC)', see Nesset and Kuznetsova 2015a, 2015b).

3.2 Transitivity prominence

In (7), we define transitivity and transitive encoding for Slavic, following the typological definition of Haspelmath (2015: 136; cf. Haspelmath 2011) in (6):

(6) Typological, comparative definition of transitivity (Haspelmath 2015: 136)
'A verb is considered transitive if it contains an A and a P argument. A and P are defined as the arguments of a verb with at least two arguments that are coded like the 'breaker' and the 'broken thing' micro-roles of the 'break' verb.'

Accordingly, we define transitivity in Slavic as follows, given that 'break' takes a NOM-ACC case frame in Slavic:

(7) Morphological definition of transitivity in Slavic adopted in this paper
A verb is considered transitive if its subject argument is in the nominative and its object argument / one of its object arguments is in the accusative case.

Thus, this study does not take transitivity as a semantic notion in the sense of, among others, Hopper and Thompson (1980). Likewise, our definition does not take into account indexing or syntactic properties for reasons of feasibility, and only focuses on flagging. For example, not every accusative object can be promoted into the subject role under passivization, in which case there is a serious deviation from the transitive pattern. Conversely, some Slavic languages (particularly East Slavic and Polish) have a certain amount of bi- or trivalent verbs whose object argument (in the active voice) is exclusively or by default coded in the genitive (e.g., Russ. *trebovat'* 'demand', Pol. *unikać* 'avoid') or in the instrumental (e.g., Russ. *upravljat'* 'administer, govern', Pol. *dowodzić (wojskiem)* 'conduct (an army)'), but which nevertheless behave syntactically like typical transitive verbs (on Polish cf. Żelazko 1975: 13-79; Buttler 1976: 110-129, 163-169; Pisarkowa 1984: 95-97; Sawicki 1988: 25-31, 47-51; Holvoet 1991: §§7, 8, 10; Lesz-Duk 1995: 7-34).[13] We disregard these differences here according to the definition in (7).

In (7) above, we have defined transitivity for Slavic as crucially based on the accusative marking of the direct object and the nominative marking of the subject. Only these accusatives were tagged as *acc1* in our database (Seržant et al. 2021). Accusative-marked arguments of the predicates with a non-canonical case marking (tagged as *acc2*) were thus excluded. This allows us to measure and compare transitivity prominence across Slavic

[13] In other Slavic languages the set of bi- and trivalent verbs with objects in the instrumental or genitive case (regardless of negation) has been radically reduced (if it has not ceased to exist at all) or underlies severe restrictions. As a rule, these cases are replaced by the accusative; cf. Hausenblas (1958), Lamprecht et al. (1986), Gebauer (2007) on Czech, Grković-Major (2007) on Serbian, and Skwarska (2004). In other cases, a PP appeared instead; cf., for instance, Buttler (1976: 134-137), Pisarkowa (1984: 101f., 105f.) on Polish.

languages. Note that we apply the term *transitivity prominence* to both verbs and languages. In both cases, the transitivity value is computed as the proportion between the number of transitive patterns and the total number of patterns available for the verb meaning or in the language. That is, transitivity prominence of a particular verb meaning is computed by dividing the number of transitive case assignments, i.e. of the accusatives, by the total number of flagging options for the same verbal meaning.[14] For example, the meaning 'obey sb.' is found with two verbs in Bulgarian that differ in flagging: accusative (unmarked on nouns) in (8) and dative (marked with preposition *na*) in (9):

(8) Bulgarian

I	*ti*	*slušaj*	*bašta si*
PRT	2SG.NOM	listen.IPFV	father REFL.POSS

'Obey your father!'

(9) Bulgarian

I	*ti*	*se*	*podčinjavaj na*	*bašta si*
PRT	2SG.NOM	REFL	obey.IPFV on(=DAT)[15]	father REFL.POSS

'Obey your father!'

In this case, transitivity prominence of this verb meaning (0.5) is computed as the number of accusatives, i.e. 1, divided by the total number of flagging options for the object, i.e. 2.

By contrast, transitivity prominence of 'hate' in Ukrainian is 1 (= 1/1), the only available object flagging here is accusative:

(10) Ukrainian

Vin	*nenavydytь*	*tebe*	*i*	*tvoho*	*batьka*
3SG	hate.IPFV.3SG	2SG.ACC	and	2POSS.SG.ACC	father.ACC.SG

'He hates you and your father.'

We compute transitivity prominence of each language by averaging the transitivity prominence of all verb meanings in the language. The results are presented in Figure 3.2:

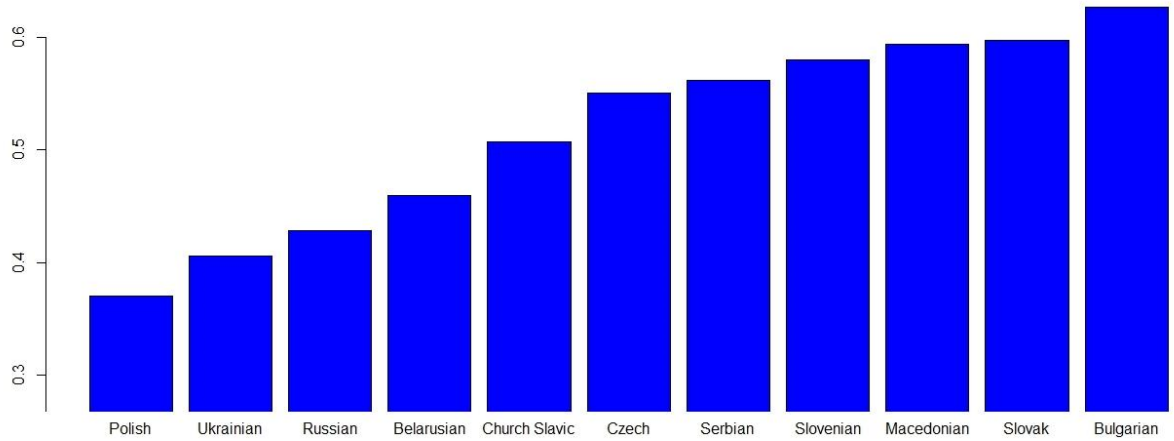


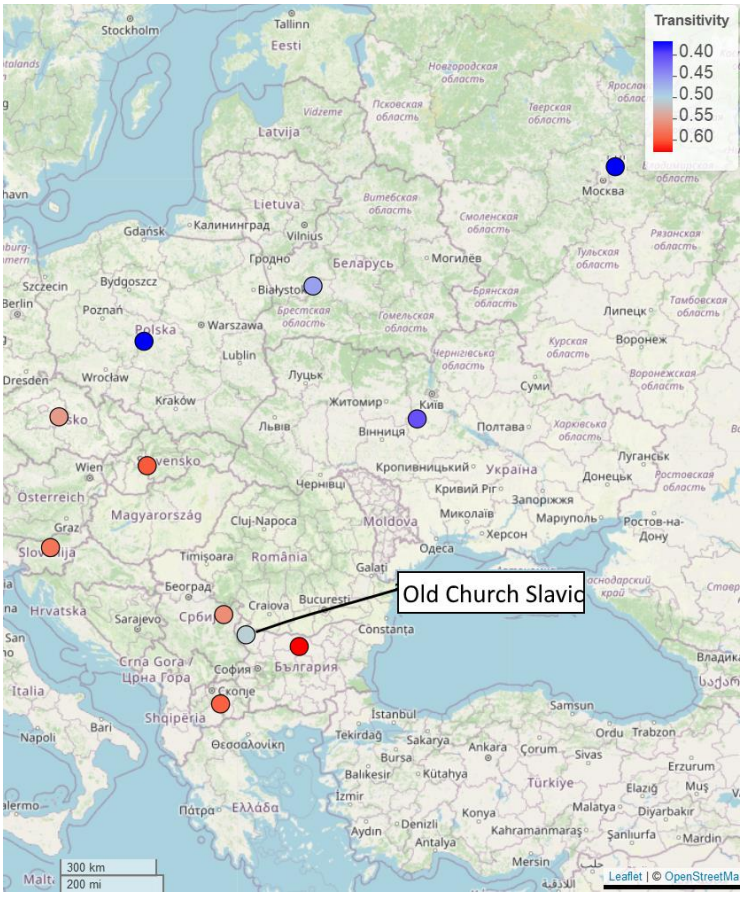
Fig. 3.2: Transitivity prominence of different Slavic languages

[14] Note that the number of accusative assignments may be higher than 1 in those cases where a particular meaning is rendered by two or more different lexical verbs (close synonyms) in the language, each of which take the accusative.

[15] Note that the dative case is seen on clitic pronouns in Bulgarian, but when it comes to nouns, the dative preposition *na* 'on' is used, cf. *podčinjavaj mu se* (obey.IPFV 3SG.DAT.MASC REFL) 'Obey him'.

The transitivity prominence varies from 0.37 in Polish to 0.627 in Bulgarian. The higher the value, the higher the transitivity prominence of the language. Thus, Polish has the lowest transitivity prominence, Bulgarian the highest. Importantly, data collected independently from ours (Say, ed., 2020, Map "transitivity ratios") point to the same result (based on the Hemming distance): Polish patterns with East Slavic (Say (2017) has only data for Ukrainian and Russian) (Say 2017: 734).

Notably, the differences in the transitivity prominence are not randomly distributed. First, we observe genealogical clusters for South and East Slavic. All modern South Slavic languages, in addition to Slovak, occupy the highest ranges of transitivity prominence and thus pattern alike. Likewise, East Slavic languages also pattern all alike, but on the lowest edge of the transitivity scale (Figure 3.2).



Map 1: *Transitivity degree of Slavic languages*

By contrast, the West Slavic languages do not form a cluster here; they are most scattered: while Polish patterns with East Slavic, Slovak goes with South Slavic, and Czech takes an intermediate position on the scale. Thus, it is likely that, in addition to the genealogical factor, there is also the areal factor of language contact. This would explain why East Slavic and Polish form a cluster despite the fact that Polish belongs to a different subfamily. Likewise, this would support earlier claims about South Slavic impact on Slovak (Krajčovič 1974; Nuorluoto 2010; Greenberg 2017: 178-179).

Second, and more generally, there is a clear geographical trend from the less transitive and – given the evidence from Old Church Slavic – possibly more conservative Northeast (East Slavic plus Polish) to the more innovative Southwest starting from Czech to even stronger transitivity prominence in the South Slavic languages Bulgarian and Macedonian, see Map 1.[16]

The comparison with Old Church Slavic shows that the high transitivity prominence of Bulgarian and Macedonian must be diachronically an innovation. South Slavic languages have increased their transitivity prominence in the course of their development (Gortan-Premk 1971: 159; Grković-Major 2009: 67, *passim*; Sobolev 2009). By contrast, East Slavic languages and Polish are more conservative in this regard and have moved towards even less transitivity than Old Church Slavic.

Say (2017: 728) shows that there is a strong negative correlation between the number of cases and the transitivity prominence of the language such that more cases correlate with a

[16] Map 1 was created in R with the map.feature function (Moroz 2017).

lower transitivity prominence and vice versa. Note that non-direct objects can also be marked by various types of adpositions as well and thus still exhibit an intransitive pattern (cf. Say 2014: 139). In any event, the demise of case systems may have a diachronic effect – possibly only temporarily – on the transitivity prominence of the language.

Indeed, the rise of transitivity prominence in South Slavic is in some cases due to the loss of nominal case inflection in Bulgarian and Macedonian, which is, in turn, also areally motivated (Sandfeld 1926/1930; Joseph 2010). Consider the verb *izběgati* 'avoid' in Old Church Slavic:

(11) Old Church Slavic (Kurz 2006[1966-1997]: I: 724; tit. ad Ps 141 Pog Bon.)

jako	*da*	*my*	*navyknemь*	*kymь*	*obrazomь* …	*izběgati*	*z'la*
how	PRT	1PL	learn.1PL	which.INS	way.INS	avoid.INF	evil.**GEN**.SG

'How are we to learn which way to avoid evil (things)?'

This verb takes the genitive in most of the modern Slavic languages (where it exists) as well. By contrast, Bulgarian, Macedonian and Serbian take the accusative with this verb, cf. Bulgarian:

(12) Bulgarian

Te	*go*	*izbjagvat*
3PL	3SG.ACC.MASC-N	avoid.3PL

'They avoid him / this man.'

(13) Bulgarian

Te	*izbjagvat*	*tozi*	*čovek*
3PL	avoid.3PL	DEM.ACC=NOM	man.ACC=NOM

'They avoid him / this man.'

In modern Eastern South Slavic (Balkan Slavic), the former genitive marking – originally required by the prefix *iz-* – is lost as functionally the genitive case is entirely lost here. By contrast, the dative case is retained in the declension of pronouns. Accordingly, verbs that originally required dative flagging on (one of) their objects ('help', 'explain', 'give', etc.) also retain the dative marking in Eastern South Slavic:

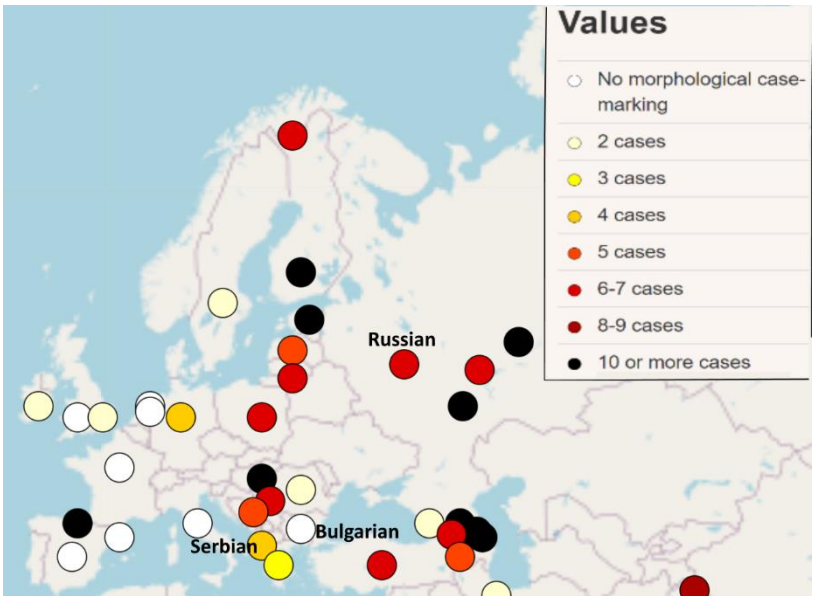
(14) Macedonian

Taa	*mi*	*pomogna*	*so*	*taa*	*rabota*
3SG.F	1SG.**DAT**	help.AOR.3SG	with	DEM.SG.F	work.SG.F

'She helped **me** with this work.'

Finally, the expansion of the transitive pattern is also found in the accusative-dative syncretism in Southern Macedonian dialects (Bužarovska 2001, 2020).

Note that the decrease of the number of morphological cases per language on nouns is not a genuinely Balkan Slavic phenomenon, it is due to a larger macroareal cline from East to West, see Map 2 (Lazard 1998: 106-107; Iggesen 2013).



Map 2: *Number of morphological cases in languages of Europe* (based on Iggesen 2013)

Another factor contributing to the increase of the overall transitivity prominence particularly in South and West Slavic is the expansion of the transitive *have*-type predicative-possession constructions that is lexically based on an aktionsart derivation from *jęti* 'take'. Proto-Slavic – as well as its ancestor Proto-Indo-European – originally relied on the locational strategy to code predicative possession, which was based on the dative marking of the possessor and the existential verb 'to be' (Meillet 1923; Isačenko 1974: 44-45). This strategy was also retained in Old Church Slavic (alongside the *have*-type with *iměti* 'to have, possess') but it entirely disappeared from all modern Slavic languages. All modern Slavic languages – except East Slavic – generalized the *have*-type (Safarewiczowa 1964; Grković-Major 2007; Clancy 2010, 2020).[17] East Slavic has modified the ancient possessive construction with the dative possessor to prepositional possessor marked by the preposition *u* 'at' (15) in accordance with a more general tendency of East Slavic to expand this preposition in the functional domain of the dative (*inter alia*, Seržant 2015b).

(15) Russian

U	*menja*	*jest'*	*den'gi.*
at	1SG.GEN	COP.PRS	money.NOM.PL

'I have money.'

The distribution of the two different predicative-possession constructions in Slavic also follows the macroareal cline seen in Map 3. East Slavic, and especially, Russian follows the cline here. Similarly to the distribution of case loss (Map 2), the trend towards the transitive *have*-type expands from Northeast (Finnic, Baltic and East Slavic languages) to the West and South of Europe, as can be observed on Map 3. Needless to say, this areal effect is the result of various and possibly independent language-contact situations.

[17] Note that the PP *u* 'at' may also denote the *affectee* (sometimes misleadingly referred to as *external possessor*, see Seržant 2016) in East Slavic. Moreover, attested is usage such as in older Serbian (nowadays obsolete), cf. ("Srpska devojka", a folk poem): *U Milice duge trepavice* (at Milica.GEN long.NOM.PL eyelash.NOM.PL) 'Milica has long eyelashes.' Note that this need not be a possessive construction since its meaning is not to convey that *'Milica possesses long eyelashes (somewhere)' but rather to say that 'her eyelashes are long'. Compare the difference in Russian: *U Milicy est' dlinnye resnicy* which is a true possessive construction but which does not yield a meaningful sentence vs. *U Milicy dlinnye resnicy* 'Milica's eyelashes are long' (lit. 'To Milica, eyelashes are long.'). The latter is demonstrably syntactically different from the former (Seržant 2012: 378).

Interestingly, the locational strategy developed and became again obsolete in some Štokavian dialects (West South Slavic) on the basis of the 'have' verb (cf. Piper et al. 2005: 146; Mrazović 2009: 398), cf. (16):

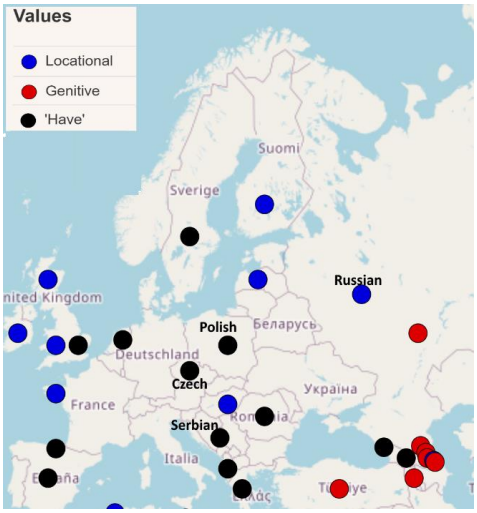
(16) Štokavian (Brozović 2010: 1659; South Slavic; Lug, Herzegovina-Neretvian Canton, place 58)

U	*njih*	*ima*	*ćuko*
at	3PL.GEN	have.3SG	dog.NOM.SG

'They have a dog.'

The loss of this strategy in this South Slavic variety reinforces our claim that an areal effect is at work here.

We now turn to the split among West Slavic languages that range from the lowest transitivity prominence in Polish (0.37) via Czech (0.551) to Slovak (0.598). While Czech and Slovak have otherwise similar flagging patterns (cf. Figure 3.3 below in §3.5), one of the most striking differences between the two is their degrees of transitivity prominence. Many verbs with genitive object marking in Czech take the accusative case in Slovak, e.g., Cz. *nechat* predominantly with genitive 'stop doing something' (Hausenblas 1958: 175) vs. Sk. *nechať* which takes the accusative with the same meaning. This is also true of some other verbs or meanings which are not part of our database, e.g., Cz. *dosahovat* 'arrive at a place' with genitive vs. Sk. *dosahovať* (idem) with accusative.[18] In other cases, the accusative is available alongside the original dative in Slovak, while only the dative case is found in Czech, e.g., Sk. *načúvať* 'listen' (dat/acc), Sk. *počúvať* 'listen' (acc) vs. Cz. *naslouchat* (dat), Sk. *napomáhať* 'bring forward, favour' (dat/acc) vs. Cz. *napomáhat* (dat). Thus, Slovak shows a more extensive spread of the accusative to the detriment of the dative and the genitive case when compared with Czech. Having said this, Czech also attests some expansion of transitivity prominence (Gebauer 2007: 331). Although verbs with the prefix *do-* 'until' originally assigned the genitive, some of these verbs substituted the genitive with the accusative (Stanislav 1973). The recessive nature of the genitive marking has been attested in Czech since the 19th century (cf. Hausenblas 1958: 169). The expansion of the accusative flagging is also found in non-prefixed verbs both in Slovak and Czech, e.g., Cz. *žádat* / Sk. *žiadať* 'request', Cz. *hledat* / Slk. *hľadať* 'search', Cz. *čekat* / Slk. *čakať* 'wait' (cf. Trávníček (1938) for Czech; Stanislav (1973) for Slovak). For all these verbs, the accusative is currently used instead of the former genitive. Still, the expansion of the transitivity pattern is more advanced in Slovak than in closely related Czech.



Map 3: *Predicative possession marking in Europe* (Stassen 2013)

Genitive object flagging is recessive in other Slavic languages as well. Thus, the verbs *čakati* 'wait', *zahtevati* 'request' or *iskati* 'search' are only used with the accusative object flagging in present-day Slovenian, while the original flagging was the genitive as evidenced by the historical IMP corpus of Slovenian.[19] Old Church Slavic exclusively attests the genitive with these verb meanings.

[18] Note that this verb is used in a different meaning in our database, i.e. 'reach', with a different argument coding pattern.

[19] http://nl.ijs.si/imp/index-en.html

While the hotbed of the expansion of the transitive pattern is found in the Southwest of the Slavic area (Map 2), this process is also found in the East Slavic languages, albeit to a minor degree. The genitive marking (alongside the accusative marking) is still widely encountered, e.g., with *ždat'* 'wait', *bojat'sja* (Nesset and Kuznetsova 2015a, 2015b) or *iskat'* 'search' in Russian.

Finally, in contrast to the other Slavic languages, the genitive marking is the almost only option in standard Polish with verbs like 'wait', 'search' or 'listen'. Accusative flagging is quite rare in Polish with *słuchać* 'listen' or *szukać* 'search for' and may only be found in colloquial or regional speech, most frequently with pronouns.[20] Thus, it does not come as a surprise that Polish clusters with East Slavic when it comes to transitivity prominence (Figure 3.2). This finding is supported by an independent quantitative study (Say 2014, 2017, 2018; Say, ed., 2020), which also finds Russian and Polish to have very low transitivity prominence among the languages of Europe (Say 2014: 136, 138, 2018: 577; Say, ed., 2020). The similarity between East Slavic and Polish cannot be motivated genealogically since Polish belongs to the West Slavic branch. It is thus likely to assume that diverse contacts occurring over the last 600 years between Polish and East Slavic languages (i.e. after an earlier split between East and West Slavic) must have contributed to the retention of the original, genitive or dative patterns; see §3.5.

To summarize, the increase in transitivity prominence observed in many modern Slavic languages follows a geographical cline from Northeast (Belarusian, Russian, Ukrainian, Polish) to the South and the West (Bulgarian, Czech, Macedonian, Serbian, Slovak, Slovenian) with Balkan Slavic scoring the highest. Since the distribution of transitivity prominences in modern Slavic (Map 1) is neither random nor solely driven by the degree of genealogical closeness, we shall assume that various language-contact situations are responsible for this cline.

We have argued that the southward expansion of transitivity prominence might be reinforced by such areal clines as the loss of nominal case (Map 2) and the expansion of the transitive possession construction (Map 3) which shows similar geographic distribution. Moreover, the expansion of the transitive pattern in Slovak but also in Czech might also have been influenced by German, which equally shows relatively high transitivity prominence (Say 2014: 136).

Importantly, and more generally, this cline independently established within Slavic is part of the larger European trend towards increasing transitivity prominence from Northeast to Southwest, established in Say (2014: 136) on the basis of 29 languages from geographical Europe (from Komi-Zyrian in the East thereof to Basque in its West) (see also Say 2017, 2018: 577).

Furthermore, the diachronic evidence for Slavic – as observed in comparison with Old Church Slavic – suggests that Southwestern Slavic languages have increased the transitivity prominence while East Slavic and, especially, Polish decreased it, see Map 1 and Figure 3.2. Other Indo-European languages likewise increased their transitivity prominence, cf. Say (2014: 136) who observes the same diachronic trend when comparing Modern Greek with Ancient Greek (see also Say 2017: 736, 743). This suggests that high transitivity prominence in the South (and West) of Europe is a local, areal property that was not brought by the Slavic languages moving into these regions but which rather itself heavily affected these languages upon arrival in the Balkans (see also Bužarovska 2001, 2020).

[20] Our database does not allow to take into account different frequencies. For this reason, the decision about whether or not to include the accusative option was to some extent subjective. Since accusative flagging is still quite rare for Pol. *słuchać* 'listen' (cf. *słuchać chorą* 'listen to the sick' in a medical examination (Markowski 2002)), we did not include this option. By contrast, *szukać* 'search for' is listed as allowing both the genitive (the more frequent option) and the accusative (most frequently with pronouns, to be seen in the feminine declension).

3.3 High homogeneity across Slavic despite the aforementioned differences

In this section, we test whether or not the differences among the Slavic languages illustrated so far are statistically significant. For testing the differences in the alternation ratio (Figure 3.1) and the transitivity prominence (Figure 3.2), we ran the Poisson regression model with *glm* in R (R Core Team 2018) with Polish as the baseline. Neither the alternation ratio nor the transitivity prominence reaches statistical significance. Even the distinction between Polish and Bulgarian in terms of transitivity prominence did not reach statistical significance (p = 0.079), the differences between Old Church Slavic and other languages were even less significant.

Obviously, the primary reason for why our data do not reach statistical significance is that modern Slavic languages have not considerably diverged from Proto-Slavic (for which Old Church Slavic is our proxy); the entire family still remains quite homogeneous when it comes to argument flagging, and the differences are not sufficiently numerous. This is despite the fact that we purposefully aimed at those verbs that tend to show more variation cross-linguistically, i.e., those verbs that are likely to be more amenable to changes in argument coding (see §2).

To illustrate the high homogeneity of our database, Table 3.1 below provides the verbs and the number of object flagging patterns they show.

Table 3.1: The number of object-marking patterns across all 46 verb meanings in different Slavic lgs.

verb meanings	number of patterns
'damage' (acc),[a] 'explain' (acc), 'help (dat)', 'leave behind' (acc), 'pull' (acc), 'see' (acc), 'tell sth.' (acc), 'threaten (acc)'	1
'demand', 'forbid', 'give', 'meet', 'play with', 'possess', 'resist', 'search for', 'serve', 'thank'	2
'obey sb.', 'defend', 'fear', 'like', 'listen', 'move', 'vomit', 'wait'	3
'avoid', 'bring forward', 'forgive', 'hate', 'name', 'play games', 'reach'	4
'beg request', 'feel pain in', 'follow', 'hear', 'look at', 'oppose', 'rule / govern'	5
'need', 'remind', 'think'	6
'disturb / hinder'	8

a While there are different meanings of 'damage' (with different case assignments), our database features only one particular meaning 'to destroy (e.g., a church)'.

Eight out of 46 verb meanings (the first row in Table 3.1) do not show any differences in object marking pattern at all and are consistently transitive across all Slavic languages. Thus, more than 17% of our verb meanings do not show any variation across Slavic at all. Another ten verb meanings (the second row) alternate only between two flagging options. For example, the possessee of 'possess' may either be coded by the accusative (*have*-strategy) or by the nominative (the locational strategy), but even this class does not significantly contribute to variation within Slavic. For example, the verb 'possess' is invariably transitive outside of East Slavic (see also ex. (16) above). Likewise, 'give' allows the (partitive) genitive case alongside the default accusative marking of the direct object (the theme) only in East Slavic and Polish. Another type of alternation is found with those verbs that recently started allowing accusative instead of the former genitive (e.g. 'search for', 'wait' (third row), 'listen', 'need' (the last but one)). This variation, by contrast, affects many Slavic languages (§3.2).

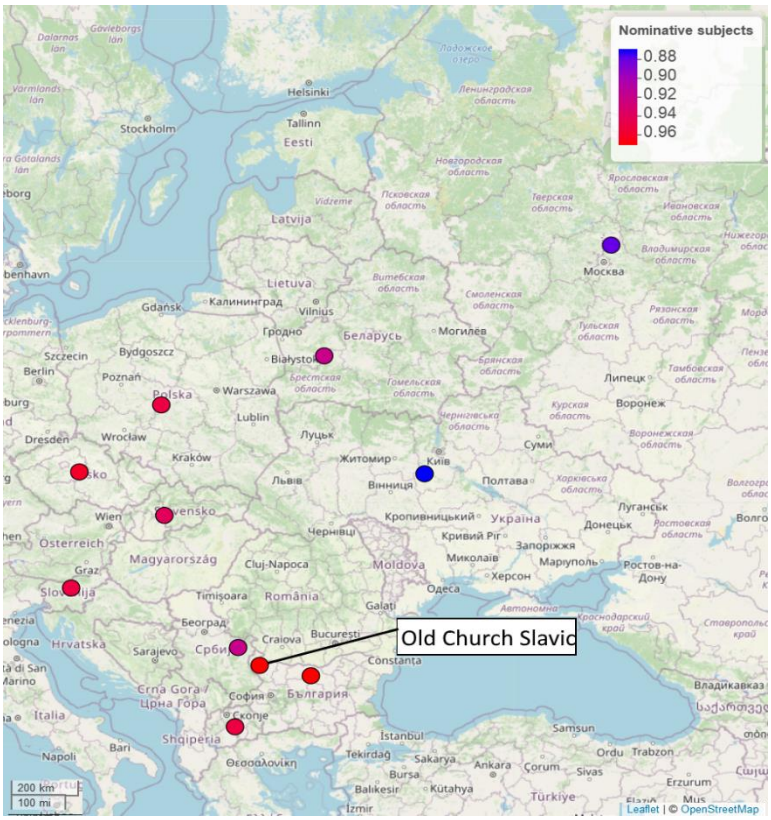
The high degree of homogeneity of Slavic even with less stable verb meanings is an important finding of this study.

Finally, the high degree of diachronic stability and homogeneity of transitivity prominence is an important result per se, as it means that transitivity prominence did not change above statistical significance despite a number of restructurings of the original Proto-Slavic flagging system – especially in Eastern South Slavic, which lost all six nominal cases found in Old Church Slavic and developed object indexing instead. Above (§1), we have mentioned the recency of the split as well as geographical compactness of modern Slavic as factors that contributed to homogeneity. In addition, we may tentatively suggest that transitivity prominence in general is diachronically relatively stable, certainly more stable than case inflection that instantiated it (see also Say 2014: 160, 2017: 743).

3.4 Ratio of nominative marking of the subject-like argument

In the previous subsections (§§3.1-3.3), we have examined the variation in object flagging. In this section, we focus on the encoding of the subject or the subject-like argument. Recall from §2 that the subject-like arguments include experiencers of the experience predicates, obligees of the necessity modals, inanimate causers of adversary 'kill' and 'float' as well as the possessors of the predicative-possession predicates. Modern Slavic languages allow only a small subset of verbs that require a non-nominative flagging on the subject-like argument. However, there are some minor differences across Slavic languages too.

First, South Slavic languages score the highest with respect to the average number of nominative flagging in the database. This is in concord with their general tendency to rely more on the transitive pattern (nominative-accusative) than do other Slavic languages (recall Figure 3.2). Map 4 illustrates this.



Map 4: Nominative marking of subject-like argument across Slavic

We computed the ratio of nominative marking of subject-like arguments as the proportion between the number of the nominative marking (i.e. either 1 or 0) and the total of all other available marking options for the subject-like argument. This has been done for each particular verb meaning in each language. Subsequently, these values were averaged per language and put on a heat map, see Map 4.

Under the disclaimer that the differences between the languages are not statistically significant, we may tentatively draw the following cautious conclusions. First, there is again a clear areal and genealogical trend here such that East Slavic shows the lowest ratio of nominative marking (differently in Say, ed., 2020, Map "X ratios"). These languages have the highest number of case frames with a non-nominative flagging on the subject-like argument. By contrast, Bulgarian has the lowest number. The only two verb meanings that allow the non-nominative flagging of the subject-like argument in Bulgarian is *bolja* 'to ache, feel pain' (the experiencer is marked by the accusative case) and 'to like' (*haresva*). The latter may

either be coded by the nominative or dative experiencer. Likewise, adversity impersonals with the causer in the instrumental case – illustrated here by an example from Ukrainian in (17) – are considerably less productive outside East Slavic; nor are we aware of any instances of these in Old Church Slavic, which seems to rely on the transitive pattern here (see ex. (19) below). Adversity impersonals are active constructions with the causer marked with the instrumental and the patient with the accusative case (Babby 1994; Mustajoki and Kopotev 2005), cf. (17):

(17) Ukrainian

Joho	*vbylo*	*blyskavkoju*
3SG.ACC	kill.PST.SG.N	lightning.INS.SG

'Lightning killed him.'

Outside of East Slavic, adversity constructions with an instrumental causer occur only in Polish and are almost non-existent in Slovak; in South Slavic they do not occur at all (Schlund 2020: 41-42). Though, even in Polish, this construction with an explicit instrumental causer is much less frequent than in East Slavic. This is true in terms of token frequency, as research with parallel corpora shows (Schlund 2020: 47-48), but also in terms of type frequency (Schlund 2020). The two adversity meanings in our database ('The boat got carried away by the wind' and 'Lightning killed him') cannot be rendered by this construction in either West or South Slavic languages; instead, these attest the transitive pattern for these two meanings; cf. (18) from Slovak:

(18) Slovak

Zabil	*ho*	*blesk.*
kill.PST.3SG	3SG.ACC	lightning.NOM.SG

'Lightning killed him.'

Likewise, Old Church Slavic employs the transitive pattern, as the following example (19) shows, whereas Russian would have preferred the INS-ACC adversity impersonal for this meaning (20b).

(19) Old Church Slavic (Euch. 34a 5; Kurz 2006[1966-1997]: I, 115)

bliskъ	*izъmetъ*	*zrakъ*
lightning.NOM.SG	throw.AOR.3SG	eye.ACC.SG

'lightning struck out (his) eye'

The transitive construction (19) would be somewhat infelicitous in Russian (20a) while the adversity construction (20b) is idiomatic with this input:

(20) Russian

a

?*Molnija*	*vybila*	*emu*	*glaz*
lightning.NOM.SG	hit.PST.SG	3SG.DAT	eye.ACC.SG

'lightning struck out (his) eye'

b

Emu	*vybilo*	*glaz*	*molniej*
3SG.DAT	hit.PST.SG	eye.ACC.SG	lightning.INS.SG

'lightning struck out (his) eye'

Given only the evidence *ex negativo* for Old Church Slavic we cannot be entirely sure that the adversity construction did not exist in this language. However, crucially, the fact that the

transitive construction (19) was the only one attested with this lexical input can be taken as sufficiently indicative that Old Church Slavic did not have a productive adversity construction to the extent East Slavic languages do.

Diachronically, the high ratio of nominative marking is a conservative feature in Slavic since Old Church Slavic does not attest non-nominative flagging even with the verb 'to ache, feel pain' (*boléti*), which takes a non-nominative experiencer in all modern Slavic languages. Instead, this verb requires the nominative marking on the experiencer and the locative marking on the body part (see Seržant and Bjarnadóttir (2014) on the diachronic account for Russian). This option is ungrammatical in the modern Slavic languages. It follows that modern South Slavic languages are conservative and modern East Slavic languages are innovative in this respect, West Slavic languages taking an intermediate position with Polish, again, being closest to East Slavic.

Thus, our data do not seem to confirm an allegedly inherited nature of the so-called non-canonical subjects and earlier inactive alignment retained in modern Slavic languages (*pace* Barðdal et al. 2012; Barðdal and Smitherman 2013; see methodological criticism in Seržant 2015a). Quite to the contrary, our evidence suggests that there is a reverse trend from stronger nominative marking towards introducing more non-nominative subject-like arguments. This trend is particularly strong in East Slavic and in the Circum-Baltic area (Seržant 2015b), which two of the three East Slavic languages (Russian and Belarusian) as well as Polish belong to. Likewise, quantitative data on other Indo-European languages also suggest an increase of non-nominativeness from earlier languages to modern languages, cf. the figures on Modern Greek (5-6% of all verbs in Say, ed., 2020) vs. Ancient Greek (below 3%).

Moreover, we may conclude that the distribution of the nominativeness ratios is not random and that it is not determined genealogically since Old Church Slavic does not attest non-nominative subject-like arguments with our verb meanings. Accordingly, the areal trend is primarily driven by innovation and language contact here.

3.5 Argument-flagging clusters within Slavic

In this section, we aggregate the variation. In order to reveal mutual influences in argument flagging, we have explored how Slavic languages cluster among each other with regard to flagging. While the previous subsections focus on the flagging patterns of one argument (the object or the subject), in this section, we compare the entire case frames, i.e. flagging of the subject, object and, where applicable, indirect object. Table 3.2 illustrates the verb meaning 'leave sth to sb' in Slavic. It can be observed that, except for Czech and Slovak, all other Slavic languages have the same flagging pattern: NOM-DAT-ACC.[21] They thus would cluster together if only this verb meaning were taken into consideration.

Table 3.2: Case frames and verbs for 'leave sth to sb'

Belarusian	*pakinuc'*	nom	dat	acc
Bulgarian	*ostavja*	nom	dat	acc
Czech	*nechat*	nom	dat	acc
Czech	*nechat*	nom	*pro*	acc
Macedonian	*ostavi*	nom	dat	acc
Polish	*zostawić*	nom	dat	acc
Polish	*pozostawić*	nom	dat	acc
Russian	*ostavit'*	nom	dat	acc
Serbian	*ostaviti*	nom	dat	acc

[21] Bulgarian and Macedonian show the dative case with pronouns and the new, prepositional dative marking *na* with nouns.

Slovak	*nechať*	nom	dat	acc
Slovak	*nechať*	nom	*pre*	acc
Slovenian	*zapustiti*	nom	dat	acc

In order to compute the mutual-similarity index for all pairs of languages with respect to all verb meanings, we counted the proportion of shared flagging patterns (Jaccard similarity), i.e. the number of shared flagging patterns for each language pair was divided by the total of the flagging patterns of the pair taken jointly (R function *dist*, Meyer and Buchta 2019). In the next step, with Jaccard similarity values as the input, we performed hierarchical clustering analysis via *hclust* (R Core Team 2018). The result is plotted in Figure 3.3:

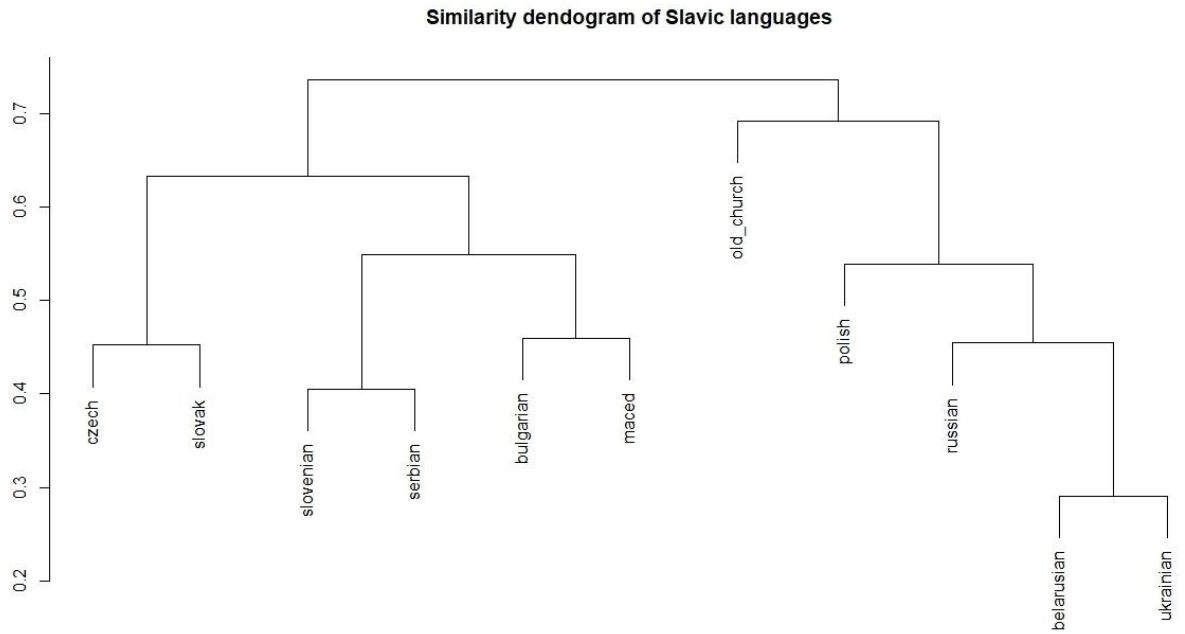


Fig. 3.3: Similarity dendrogram of Slavic languages

The dendrogram should be interpreted as follows. Those languages that form a close cluster – i.e. have the highest number of identical flagging patterns – are represented as branching sisters (e.g. Belarusian and Ukrainian). Languages outside of the node have less intersecting flagging patterns, etc. On the basis of this, the following observations can be made.

First, the clusters in Figure 3.3 mirror the degree of genealogical closeness, which means that genealogical relations are one of the main factors conditioning correlations in argument flagging. Thus, Slovenian clusters with Serbian, Bulgarian with Macedonian and both pairs form a common branch, thus corresponding to the genealogical and areal subbranch of South Slavic. Likewise, Czech clusters together with Slovak (both West Slavic), while Belarusian clusters with Ukrainian and both, somewhat more remotely, with Russian (East Slavic).

However, there are also exceptions: Polish (West Slavic) and Old Church Slavic (South Slavic), both showing an external but close relationship to East Slavic. Indeed, the linguistic history of Polish is quite different from other West Slavic languages. It has long-standing mutual contacts with Russian, Belarusian and Ukrainian (*inter alia*, Moser 1998; Wiemer 2003; Grenoble 2015). It is thus not unexpected that argument flagging of Polish is influenced by East Slavic and vice versa.

Second, it follows from Figure 3.3 that East Slavic and Polish are closest to Old Church Slavic when it comes to flagging. This can only mean that these languages are the most conservative Slavic languages regarding flagging, since any close genealogical relation with Old Church Slavic (which is a South Slavic language) can be safely excluded for either

of them. For example, consider the object flagging strategies of 'govern, rule': Russian (*pravit'*), Belarusian (*kiravac'*), Ukrainian (*pravyty*) and Polish (*kierować, rządzić*) require the old instrumental or (as with Pol. *panować*) the new prepositional flagging *nad* 'above'. By contrast, the other two West Slavic languages (Czech and Slovak), in addition to the new prepositional government *nad* 'above', take the dative and no longer the instrumental case.[22] Interestingly, the instrumental government in Polish and in East Slavic is not a pattern borrowing. It represents the original Common Slavic government as is witnessed by Old Church Slavic, i.e. the instrumental case. There are more correlations between East Slavic, Polish and Old Church Slavic of this kind. This suggests that – in addition to contact-induced convergence – Polish and East Slavic have retained the original flagging patterns more faithfully than other Slavic languages. Yet, the retention of the same properties in geographically neighbouring languages as opposed to non-retention in geographically more distant languages is likely to be motivated by language contact as well (Seržant, forthc.a, forthc.b).

At the same time, third, despite long-standing contacts between Ukrainian and Polish (as well as between Belarusian and Polish) that appear so pervasively in the lexicon (*inter alia*, Shevelov 1952; Richhardt 1957; Łesiów 1998), case and prepositional government seem to be less affected here so that the distance in the genealogical relation between Polish and the two East Slavic languages plays out stronger in Figure 3.3 – Polish clusters only at the node of East Slavic.

Fourth, Belarusian and Ukrainian are more closely clustered with each other than with Russian, although all three languages belong to the same subbranch. This does not seem to be genealogically motivated since Ukrainian and Belarusian are no more related among each other than to Russian, as is suggested, for example, by Shevelov's genealogy (1953: 93) in Table 3.3:

Table 3.3: Dialect continua that have formed modern East Slavic languages

11th c.	Novgorod-Suzdal'	Polock-Rjazan'	Kiev-Polesie	Galicia-Podolia
16th c.	Russian	Belarusian	Ukrainian	

(Shevelov 1953: 93)

It is thus more likely that there is another factor at play in addition to the genealogical factor that have influenced a stronger mutual similarity of Ukrainian with Belarusian than with Russian. This factor is language contact. Ukrainian and Belarusian have introduced common innovations in flagging that are not found in Russian for the given meanings. For example, the object of the verb meaning 'think' may be coded either with accusative (only the question word in Belarusian *što* 'what' and Ukrainian *ščo* 'what') or, most frequently, with the preposition *pro* 'about'. The use of this preposition is likely to be an innovation in these two languages as it is not found with this verb in Old Church Slavic. By contrast, Russian employs the preposition *o* 'about' here as the main option, while *pro* without a regional connotation is only possible to a limited extent with this verb in standard Russian.[23]

Another common – only Belarusian-Ukrainian innovation – is the flagging of the experiencer of the verb meaning 'to ache'. Only these two languages allow dative marking in addition to prepositional flagging with *u* 'at' in Ukrainian (as in Russian):

(21) Belarusian

[22] The original instrumental case is still attested for *vládnuť* in Slovak and *vládnout* in Czech with the meaning 'to be dominant, prevail, rule' in the idiomatic expressions *nevďak vládne svetom* (Sk.), *nevděk vládne světem* (Cz.) 'ingratitude rules the world'.

[23] Thus, this preposition cannot be used in Russian to render the meaning of 'think' that we collected in our database, namely, 'What do you think?' without a strong regional connotation.

Im *balicь* *sėrca*
3PL.DAT ache.PRS.3SG heart.NOM.SG
'They have heartache.'

(22) Ukrainian
Ïm *bolytь* *serce*
3PL.DAT ache.PRS.3SG heart.NOM.SG
'They have heartache.'

This is another common Belarusian and Ukrainian innovation. The possibility of there being also some influence of Baltic is an open question. Compare Lith. *skaudėti* 'to ache', which has two flagging patterns with this verb meaning: either the same as in Belarusian and Ukrainian (see Seržant 2015b), or the body part is marked with accusative. In Old Church Slavic, this verb meaning (coded by the verb *bolěti*) requires the nominative case of the experiencer and the locative case of the affected body part (see also Seržant and Bjarnadóttir 2014). The Belarusian and Ukrainian pattern is thus clearly an innovation.

4 Conclusions

In this pilot study, we have examined the variation in the flagging patterns across 10 modern Slavic languages covering all three major Slavic branches: South, West and East Slavic. Our goal was to examine and identify diachronic and areal trends that constrain the argument flagging patterns of modern Slavic. Before we recapitulate the main results, a note of caution is in order. Since the differences between the languages did not reach statistical significance – which in itself is an indication of high homogeneity in this domain across Slavic – our results are preliminary and should be corroborated on the basis of a considerably larger data set than ours (825 entries).

First, by comparing flagging-alternation ratios across Slavic, we found that Slavic languages have consistently reduced the number of available case frames for each verb, Old Church Slavic attesting the highest flagging-alternation ratio. The reduction of the alternation ratio in favour of rigid, uniform government is particularly strong in Polish, Macedonian and Bulgarian, whereas Slovak and Russian are less rigid with respect to object flagging.[24]

While flagging alternations in Old Church Slavic were often related to slightly different meanings – compare, for example, the alternation between the accusative and the partitive genitive –, this is different in Slovak. Here, the somewhat higher flagging-alternation ratio is not only due to the retention of the original Slavic patterns for each verb but is primarily due to the gradual expansion of the transitive pattern. The transitional stage, at which both, the original and the new, accusative flagging are possible, boosts the flagging-alternation ratio of this language. However, in contrast to many flagging alternations found in Old Church Slavic, the Slovak alternations are not semantically driven but result from the expansion of the transitive pattern.

Second, when it comes to transitivity prominence, we have established an areal trend that splits Slavic languages into Northeast Slavic (Belarusian, Polish, Russian, Ukrainian) and Southwest Slavic (all other languages) such that the former group shows relatively low and the latter relatively high transitivity prominence. This trend has been established on large-scale cross-linguistic data that was collected independently from our study in Say (2014, 2017, 2018). Interestingly, this split is also seen in the ratio of nominative marking, albeit to a minor degree. Here, too, Slavic languages on the northeast have a lower ratio than the ones on the southwest. However, the diachronic underpinnings are different with these properties:

[24] Note that we did not take into account the genitive alternation conditioned by the negative polarity in languages such as Polish.

While the high transitivity prominence of South Slavic is an innovation, the high nominativeness ratio of South Slavic is, conversely, an archaism.

We have argued that the eastward decrease in transitivity prominence and in the ratio of nominative marking might be partly supported by such macro-areal clines as more morphological cases in the East of Eurasia as opposed to less or no cases in the West and the Southwest of it. Likewise, the macroareal trend with the preference for the locational possessive strategy in the East and the preference for the *have*-strategy in the South and West must have also played a role here.

Finally, we compared flagging patterns across Slavic languages in a cluster analysis based on Jaccard similarity in order to see how Slavic languages relate to each other when all arguments are taken into account at once. While the genealogical relations still largely determine similarities in argument flagging, the effect of language contact percolates here as well. Thus, Ukrainian and Belarusian cluster closer than each of them with Russian, although all three languages genealogically belong to the same subbranch. This is due to some innovations in flagging that these two languages share with each other but not with Russian. Since common innovations are hardly accidental in general, it is likely to assume that these innovations are due to more intense language contact between these two languages.

Furthermore, we found that Polish is closer to East Slavic than to other West Slavic languages when it comes to flagging. Thus, Polish patterns with East Slavic with respect to its nominativeness ratio as well as with respect to transitivity prominence. This suggests that language contact must have played an important role here. Indeed, historically, Polish had strong contacts with all three East Slavic languages. Finally, note that Polish patterns with East Slavic not so much with respect to innovations but rather with respect to the inherited patterns. It seems thus that language contact has a preserving, conservative effect here.

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