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From the Editors

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Franc Marušič & Rok Žaucer
Editors-in-Chief

A Listener-Oriented Account of the Evolution of Diphthongs and Changes in the Jers in Kashubian*

Bartłomiej Czaplicki

Abstract: This paper applies the listener-oriented approach (Andersen 1973, 1978; Ohala 1981, 1992) to two diachronic changes in Kashubian: diphthongization and the contextual preservation and loss of the jers. It is shown that acoustic and perceptual factors provide a plausible explanation for the consecutive stages in the evolution of the two phenomena. The Kashubian changes illustrate two major types of the listener-oriented mechanism: changes resulting from hypocorrection and hypercorrection. It is shown that while both mechanisms rely on a phonological reanalysis of ambiguous phonetic properties, the outcome differs in each case: (i) a coarticulatory property is reanalyzed as phonological and (ii) a phonetic element is associated with a phonological source that is distinct from the source assumed by the speaker. While this discussion provides support for the non-deterministic nature of sound change, conditions that promote one type of change while inhibiting the other are identified. In hypocorrective changes, the prior existence of a certain structure in the language facilitates the emergence of this structure in other contexts. Hypercorrective changes, on the other hand, are predicted to occur when a feature with a long acoustic span is involved. Similar processes in other, mostly Slavic, languages are identified and compared with the Kashubian changes, with the aim of filling some gaps in the typology and providing a uniform explanation for these and similar mechanisms of change.

1. Introduction

The listener-oriented approach to change (Andersen 1973, 1978; Ohala 1981) has been successfully used to explain not only diachronic developments, but also recurrent synchronic patterns in unrelated languages. Blevins (2004) argues that the categorical and statistical asymmetries identifiable in linguistic typology find a plausible explanation in common trajectories of sound

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change. Blevins adds that a better understanding of the mechanisms of a listener-oriented change can shed light on the apparent role of markedness. In fact, typological asymmetries may well reflect statistical distributions of patterns directly derivable from common sound changes, rather than markedness principles.

This paper aims to verify the predictions of the listener-oriented approach to change by analyzing two diachronic changes in Kashubian, an endangered language spoken in northern Poland. The Kashubian changes, diphthongization and the loss and preservation of the jers, have not been given a uniform analysis to date and thus the proposed account fills the gap in the typology of listener-oriented mechanisms. In order to get more insight into the perceptual conditioning of the changes, the relevant pathways of evolution are compared with the developments of similar sounds and sound sequences in closely related languages, such as Polish, Russian, Ukrainian, and Upper and Lower Sorbian. Thus the second goal is to situate the Kashubian sound changes in the typology of similar listener-oriented changes described in the literature and to contribute to the discussion of their conditioning factors. Two types of a listener-oriented change are illustrated and analyzed: changes resulting from hypo- and hypercorrection. Both mechanisms in essence rely on a phonological reanalysis of ambiguous phonetic properties. What differs is the result of the reanalysis. It is shown that the two mechanisms may apply consecutively throughout the evolution of a sound pattern, as they often represent two sides of the same coin. Yet the evidence presented in this paper suggests that there are conditions that render one type of change more likely than the other. Hypocorrective changes are facilitated when the emergent structure is already present in the language. Hypercorrective changes, on the other hand, tend to arise when features with a long acoustic span are involved.

This paper is structured as follows. Section 2 defines and illustrates the listener-oriented approach to sound change. Section 3 offers some background information on Kashubian followed by the description of two context-dependent diachronic sound changes in this language. The loss and preservation of jers and diphthongization in Kashubian are afforded a listener-oriented account. Section 4 provides an overview of parallel sound changes in other languages and discusses the similarities and differences in their conditioning. Section 5 focuses on the distinction between hypo- and hypercorrective changes and applies it to the changes under discussion. Section 6 considers an alternative analysis. Section 7 provides the main conclusions. Below I resort to IPA transcription when the phenomenon under discussion is not reflected in native orthography; otherwise native orthography or transliteration is used.

2. Listener-Oriented Change

A listener-oriented change (Andersen 1973, 1978; Ohala 1981; Blevins 2004; Czaplicki 2010, 2013) has its roots in ambiguities in the phonetic signal that arise from coarticulation. Speech is coarticulated and a phonological analysis carried out by the listener must accommodate this fact. Ohala (1989) discusses two mechanisms subsumed under the listener-oriented change, hypocorrection and hypercorrection. During language acquisition coarticulated features are most commonly factored out from the phonological representation by the listener based on their previous experience with the language.

In hypocorrection, the listener fails to factor out coarticulatory effects and chooses a phonological analysis of the ambiguous speech signal that is distinct from that of the speaker. As a result, a sound change occurs. Ohala (1992) uses the example of the emergence of nasal vowels due to the loss of a nasal consonant in Hindi to illustrate the mechanism of a listener-oriented change through hypocorrection. Vowels before nasals are contextually nasalized [ṽN]. The listener exposed to such a sequence is likely to attribute nasalization to the following nasal consonant and phonologize the sequence without the contextual nasalization of the vowel, that is, as /vN/. However, when the final nasal consonant is lost (for example, due to the reduction in the magnitude of the lingual gesture) the nasalization can no longer be analyzed as contextual and must be attributed to the vowel, giving rise to a distinctively nasal vowel, /ṽ/, in the representation of the listener. A listener-oriented change through hypocorrection is commonly set in motion by the loss of the conditioning environment, which leads to a reanalysis of the acoustic signal. When the phonological representations of the listener and the speaker diverge, a sound change has occurred.

Hypercorrection involves features with a long acoustic span, such as rounding, palatalization, and laryngealization. In language acquisition, the listener is faced with the task of associating a phonological property with its source(s). When a phonological property has long acoustic cues, that is, when it spans over several segments, determining its phonological source is far from straightforward. When the listener designates a different segment as the source of the phonological property than does the speaker, a sound change has resulted. Ohala (1989) argues that hypercorrection is responsible for many dissimilatory changes.

A change that has been convincingly claimed to result from hypercorrection is compensatory lengthening (CL). Well-documented cases of CL through vowel loss can be found in the development of Slavic languages. In Late Common Slavic (LCS), ultra-short high vowels /ɪ/ and /ʊ/ (jers) were lost. This loss caused the preceding vowel to lengthen in many dialects. Reflexes of LCS CL have been identified in a number of Slavic languages, including Serbo-Croatian, Slovak, Czech, Polish, Kashubian, Upper Sorbian, Slovenian,

and Ukrainian (Timberlake 1983a, 1983b, 1988). The words transcribed in (1) illustrate Serbo-Croatian CL (Timberlake 1983a: 222; Kavitskaya 2001: 113).

(1)	Old Church Slavic		Serbo-Croatian	gloss
	borʊ	>	bo:r	'forest'
	rogʊ	>	ro:g	'horn'
	medʊ	>	me:d	'honey'
	vozʊ	>	vo:z	'carriage'
	ledʊ	>	le:d	'ice'
	nosʊ	>	no:s	'nose'
	bokʊ	>	bo:k	'side'

Kavitskaya (2001: 115–17) employs the mechanism of hypocorrection to explain CL due to vowel loss: CVCV → CV:C. She makes use of the well-established acoustic evidence suggesting that vowels in open syllables tend to be longer than vowels in closed syllables (Maddieson 1985; Rietveld and Frauenfelder 1987). In the sequence CV_1CV_2 the longer duration of V_1 can be attributed to its syllable affiliation (open syllable) and factored out. As a result, the vowel is phonologized as short: /CVCV/. However, when the conditioning environment is lost, that is, when the final vowel is not recoverable from the signal, the extra length of V_1 in the newly closed syllable cannot be explained by the context and may be phonologized on V_1, giving rise to a phonologically long vowel: /CV:C/. Thus, phonetic, context-dependent length becomes phonological and distinctive.

It is interesting that the necessary conditions for CL varied from language to language and included the quality of the intervening consonant, accent, jer position (internal vs. final), and the quality of the target and trigger vowels. Timberlake (1983a, 1983b, 1988) provides a detailed discussion of the conditioning and geographical distribution of CL in Slavic. For example, in Upper Sorbian, the quality of the intervening consonant did not play a role, as can be seen in (2), where the [ɔ] ~ [o] alternation corresponds to an earlier length distinction. Reflexes of CL are found in the nom.sg., where the final jer was lost, thus creating the conditions for CL. In the gen.sg., on the other hand, CL did not apply, as the final vowel was retained (Kavitskaya 2001: 129).

(2)	Upper Sorbian		Pre-Upper Sorbian	gloss
	gen.sg.	nom.sg.	nom.sg.	
	wɔz-a	woz	*vȍzʊ	'carriage'
	nɔs-a	nos	*nȍsʊ	'nose'
	rɔd-a	rod	*rȍdʊ	'kin'
	plɔt-a	plot	*plotȍ	'raft'
	dwɔr-a	dwor	*dvorȍ	'yard'
	kɔnj-a	konj	*konjì	'horse'

In Old Polish, CL was conditioned by the quality of the following consonant. CL occurred before sonorants and voiced obstruents, as shown in (3a). A voiceless obstruent failed to trigger CL under the same prosodic conditions, as exemplified in (3b) (Kavitskaya 2001: 135).

(3)	Old Polish			gloss
a.	*domʊ	>	do:m	'house'
	*dõbʊ	>	dã:b	'oak'
	*vozʊ	>	vo:z	'cart'
	*solɪ	>	so:l	'salt'
	*krojɪ	>	kro:j	'style'
	*vodjɪ	>	vo:dz'	'leader'
b.	*sokʊ	>	sok	'juice'
	*bokʊ	>	bok	'side'
	*nosʊ	>	nos	'nose'
	*kostɪ	>	kos't'	'bone'

Kavitskaya (2001: 136), building on Timberlake (1983a, 1983b, 1988), argues that the factor conditioning CL in Old Polish was phonetic length. There is ample evidence that the context of a voiced consonant renders the preceding vowel longer (Kluender, Diehl, and Wright 1988). Therefore, the vowel V_1 in $C_1V_1C_2V_2$ sequences is predicted to be longer when the following consonant, C_2, is voiced than when C_2 is voiceless. In addition, V_1 is subject to open-syllable lengthening, but this process applies regardless of the voicing of C_2 and does not differentiate the two contexts. In line with the mechanism of a listener-oriented change, when the extra length is attributable to an open syllable and the following voiced consonant, it is discounted by the listener. However, when the conditioning context for open syllable lengthening, V_2, is lost, the listener reinterprets the phonetic length as phonological and V_1 becomes distinctively long. This mechanism relies on the finding that vowels before voiced consonants are longer than vowels before voiceless consonants, all else being equal (i.e., when the prosodic conditions are the same). Therefore vowels before voiced consonants are more likely to undergo CL than vowels before voiceless consonants, as confirmed by the conditioning of CL in Old Polish.

In Modern Standard Polish, the reflexes of the Old Polish */o/ and the outcome of CL */o/ are [ɔ] and [u], respectively.[2] In modern orthography <o> spells [ɔ] and <ó> spells [u], as illustrated in (4).

[2] Modern Standard Polish does not show reflexes of CL before nasals. The neutralization of length distinctions before nasals is a process that applied after CL and independently of it. Regional dialects of Polish retain this historical distinction *dóm* 'house'—*dom-u* gen.sg., *kóń* 'horse'—*koni-a* gen.sg. (Timberlake 1983a: 215).

(4)	kroj-u	gen.sg.	krój		‘style’
	sol-i	gen.sg.	sól		‘salt’
	wod-a		wód	gen.pl.	‘water’
	wodz-a	gen.sg.	wódz		‘leader’
	koz-a		kóz	gen.pl.	‘goat’

The quality of the intervening consonant is not the only factor that conditioned CL in Polish. Apart from the expected reflexes of CL before sonorants and voiced obstruents, a handful of words show reflexes of CL before voiceless obstruents, as illustrated in (5) (Timberlake 1983a: 216).

(5)	cnot-a	cnót	gen.pl.	‘virtue’
	stop-a	stóp	gen.pl.	‘foot’
	siostr-a	sióstr	gen.pl.	‘sister’
	robot-a	robót	gen.pl.	‘job’
	sierot-a	sierot ~ sierót	gen.pl.	‘orphan’
	os-a	os ~ ós	gen.pl.	‘wasp’

Timberlake (1983a) argues that CL before voiceless obstruents had prosodic conditioning. Common Slavic (CS) had four distinct accentual patterns: acute and circumflex, either long or short (Timberlake 1983a: 208–9). Prior to the fall of the jers in LCS another pattern of accentuation emerged, the neo-acute pattern. The neo-acute accent arose through the retraction of the accent from originally stressed jers (Timberlake 1983a: 209), and it played a key role in conditioning CL. Timberlake (1983a) presents evidence that words which today show reflexes of CL before voiceless obstruents had the neo-acute accent. He takes it as evidence that vowels under the neo-acute accent were subject to CL irrespective of the quality of the intervening consonant, while vowels under the remaining accents (old acute and circumflex) were subject to CL only when followed by sonorants or voiced obstruents.

Kavitskaya (2001: 158–61) provides a listener-oriented explanation for the different impact of accentuation patterns on CL. She argues that vowels under the neo-acute accent were phonetically longer than comparable vowels under either the old acute or circumflex accents (due to neo-acute lengthening, see Carlton 1991: 198). As a result of this difference, when the final jers were lost, the phonetically longer vowels under the neo-acute accent were more likely to undergo CL than vowels under either the old acute or circumflex accents. In contrast, the voicing of the intervening consonant played a role in conditioning CL when the vowels appeared under the old acute or circumflex accents, that is, when they were phonetically shorter. Thus, phonetic vowel length, which is arguably affected by both the quality of the intervening consonant and the accentuation pattern, is an important factor in explaining the mechanism of CL in Polish. The basic insight of Kavitskaya’s (2001) analysis is that

the phonetic length of a vowel determined its interpretability as distinctively long through CL.

In the next section, we consider two changes in Kashubian that are amenable to an analysis invoking the mechanism of a listener-oriented change, either through hypocorrection or hypercorrection. We return to this distinction in section 5.

3. Kashubian: Background

Kashubian, together with Polish and Polabian (the latter extinct), are Northwest Slavic or Lechitic languages. This endangered language is spoken today mainly in the northwest of Poland (eastern Pomerania). According to data from the 2011 national census, the number of people in Poland who declare Kashubian as their language is just over 108,000 (Główny Urząd Statystyczny 2013).

The vowel system of Central Kashubian is provisionally represented in (6) based on Jocz 2013. Descriptive sources concur that there is considerable dialectal, interspeaker and intraspeaker variation in the realization of vowels (e.g., Breza and Treder 1981: 33ff.; Topolińska 1982; Jocz 2013: 187–88).

(6) The vowel system of Kashubian

i	ɨ	ʉ	u
ɛ	ɵ/ɨ	ə	ɔ
		a	

The vowel represented as /ɵ/ɨ/ in (6), spelled <ô>, is pronounced in Central Kashubian mainly as [ɨ]. The vowel represented by /ə/ is spelled <ë> and is pronounced as [ə], [ʌ], or [ɛ]. The vowels /ʉ/, spelled <u>, and /ɔ/, spelled <o>, and their contextual variants, /wɨ/, spelled <ù>, and /wɛ/, spelled <ò>, will be discussed in section 3.2. In the next section, we focus on the changes that occurred around the time of the loss of historical jers in Kashubian.

3.1. Changes in the Jers

In LCS the jers, /ɪ/ and /ʊ/, were subject to strengthening and weakening depending on the syntagmatic context. Word-final jers and jers before a non-jer vowel were weakened, while jers in the context of another jer in the next syllable were strengthened. The weak jers were eventually lost, while the strong jers were preserved and developed into non-jer vowels, usually /o/, /e/, /a/, or /ə/, depending on the dialect of Slavic (Bethin 1998: 104). This generalization is known as Havlik's Law. In the present analysis, the process is termed jer preservation, but the development crucially involves a merger of the remnants of

strong jers with other short vowels (vocalization, Timberlake 1988), and in this sense it represents a sound change. Following Bethin (1998), Havlik's Law can be represented as a [strong—weak] grouping of two consecutive jer syllables. For example, CS **šĭvĭcĭ*, **šĭvĭca* nom.sg., gen.sg. evolved into Ukrainian *švec'* [ʃvets'], *ševcja* [ʃewts'a] 'shoemaker' (Bethin 1998: 105).

(7)

w	[s	w]		[s	w]	
šĭ	vĭ	cĭ		šĭ	vĭ	ca
ø	e	ø		e	ø	
Ukr. [ʃvets']				Ukr. [ʃewts'a]		

While in general governed by Havlik's Law, the preservation and loss of jers was subject to certain additional constraints that differentiated dialects of LCS. Here attention is given to the conditioning of the preservation and loss of jers in Kashubian. In (8) the relevant items from Kashubian are juxtaposed with their Polish counterparts. The forms are given in the nominative singular and genitive singular or in the genitive plural and nominative singular. Modern orthography is used. The data are taken from Andersen (1970: 64–66, 1988) and from my own fieldwork conducted in central Kashubia during the summer of 2019. For several words in (8) two forms are currently in use in Kashubian. This is mainly due to (i) analogical leveling (e.g., *tidzéń* nom.sg., *tidnia ~ tidzenia* gen.sg.) and (ii) the common use of the genitive plural ending *-ów* for both masculine and feminine nouns (e.g., *córka* nom.sg., *córk ~ córków* gen.pl.) (the latter trait sets Kashubian apart from Polish).

(8)

	Kashubian		Polish		gloss
a.	czep nom.sg.	kp-a gen.sg.	kiep nom.sg.	kp-a gen.sg.	'fool'
	pies nom.sg.	ps-a gen.sg.	pies nom.sg.	ps-a gen.sg.	'dog'
	len nom.sg.	ln-u gen.sg.	len nom.sg.	ln-u gen.sg.	'flax'
	dzéń nom.sg.	dni-a gen.sg.	dzień nom.sg.	dni-a gen.sg.	'day'
	czerz nom.sg.	krz-a gen.sg.	krzew nom.sg.	krzew-u gen.sg.	'bush'
	sen nom.sg.	sn-u gen.sg.	sen nom.sg.	sn-u gen.sg.	'dream'

(8)	Kashubian		Polish		gloss
b.	marchiew nom.sg.	marchwi-e gen.sg.	marchew nom.sg.	marchw-i gen.sg.	‘carrot’
	cerczew nom.sg.	cerkwi-e gen.sg.	cerkiew nom.sg.	cerkw-i gen.sg.	‘Orthodox church’
	żôdżel nom.sg.	żôgl-a gen.sg.	żagiel nom.sg.	żagl-a gen.sg.	‘sail’
	grëdzéń nom.sg.	grëdni-a gen.sg.	grudzień nom.sg.	grudni-a gen.sg.	‘December’
	tidzéń nom.sg.	tidni-a, tidzeni-a gen.sg.	tydzień nom.sg.	tygodni-a gen.sg.	‘week’
	kòceł nom.sg.	kòtł-a, kòcł-a gen.sg.	kocioł nom.sg.	kotł-a gen.sg.	‘kettle’
	òrzéł nom.sg.	òrzł-a gen.sg.	orzeł nom.sg.	orł-a gen.sg.	‘eagle’
	òseł nom.sg.	òsł-a gen.sg.	osioł nom.sg.	osł-a gen.sg.	‘donkey’
	bãben nom.sg.	bãbn-a gen.sg.	bęben nom.sg.	bębn-a gen.sg.	‘drum’
	bąbel nom.sg.	bąbl-a gen.sg.	bąbel nom.sg.	bąbl-a gen.sg.	‘bubble’
c.	pôlc nom.sg.	pôlc-a gen.sg.	palec nom.sg.	palc-a gen.sg.	‘finger’
	kùńc nom.sg.	kùńc-a gen.sg.	koniec nom.sg.	końc-a gen.sg.	‘end’
	ptôsz-k nom.sg.	ptôsz-k-a gen.sg.	ptasz-ek nom.sg.	ptasz-k-a gen.sg.	‘bird’ dimin.
	dobëtk nom.sg.	dobëtk-ù gen.sg.	dobytek nom.sg.	dobytk-u gen.sg.	‘posses-sions’
	nokc nom.sg.	nokc-a gen.sg.	paznokieć nom.sg.	paznokci-a gen.sg.	‘fingernail’
	òct nom.sg.	òct-u gen.sg.	ocet nom.sg.	oct-u gen.sg.	‘vinegar’

(8)	Kashubian		Polish		gloss
	krzept nom.sg.	krzept-u gen.sg.	grzbiet nom.sg.	grzbiet-u gen.sg.	‘back’
	jabk, jabk-ów gen.pl.	jabk-ò nom.sg.	jabłek gen.pl.	jabłk-o nom.sg.	‘apple’
	krëszk, krëszk-ów gen.pl.	krëszk-a nom.sg.	gruszek gen.pl.	gruszk-a nom.sg.	‘pear’
	gòłąb-k nom.sg.	gòłąb-k-a gen.sg.	gołąb-ek nom.sg.	gołąb-k-a gen.sg.	‘pigeon’ dimin.
	córk, córk-ów gen.pl.	córk-a nom.sg.	córek gen.pl.	córk-a nom.sg.	‘daughter’
	róż-k nom.sg.	róż-k-a gen.sg.	roż-ek nom.sg.	roż-k-a gen.sg.	‘horn’ dimin.
	ówsnom.sg.	ówsgen.sg.	owiesnom.sg.	owsgen.sg.	‘oats’
	stół-k nom.sg.	stół-k-a gen.sg.	stoł-ek nom.sg.	stoł-k-a gen.sg.	‘stool’
	dóm-k nom.sg.	dóm-k-ù gen.sg.	dom-ek nom.sg.	dom-k-u gen.sg.	‘house’ dimin.
	dom-ecz-k nom.sg.	dom-ecz-k-ù gen.sg.	dom-ecz-ek nom.sg.	domecz-k-u gen.sg.	‘house’ double dimin.
	Witk nom.sg.	Witek-a, Witk-a gen.sg.	Witek nom.sg.	Witk-a gen.sg.	‘proper name’
	Dark nom.sg.	Darek-a, Dark-a gen.sg.	Darek nom.sg.	Dark-a gen.sg.	‘proper name’

The Kashubian data in (8a) show that when the stem contains no vowel (other than the historical jer), the jer is preserved and pronounced [ɛ] <e> or [i/ɨ] <é>. In the context of the stem-final voiced consonant (obstruent or sonorant), (8b), the jer is also preserved.[3] However, when the stem-final consonant is a

[3] Andersen (1970: 65), citing Lorentz 1958, adduces *prosba*, *proseb* ‘request’ nom.sg./ gen.pl., *lëczba*, *lëczeb* ‘number’ nom.sg./ gen.pl., and *służba*, *służeb* ‘service’ nom.sg./ gen. pl. as further examples of jer retention before voiced consonants, including voiced

voiceless obstruent, the jer is lost, (8c), counter to Havlik's Law. Polish closely mirrors Kashubian in the distribution of jers in (8a) and (8b), but not in (8c). In Polish, a jer is preserved also before voiceless obstruents. Bearing in mind that the items on the left had a jer-ending +ĭ/ŭ in LCS (today often termed a "zero ending"), it appears that while Polish complies with the general formulation of Havlik's Law, Kashubian adds a condition. A jer was preserved in potential stem-final clusters when the final consonant was voiced and in modern Kashubian it is pronounced as [ɛ] <e> or [i/i] <é>, marked as V in (9). Otherwise, the jer was lost.[4] The quality of the jer, i.e., whether the jer was front or back, was irrelevant for conditioning jer preservation.[5]

(9) Conditioning of the preservation of jers in Polish and Kashubian compared

LCS Cĭ/ŭC + ĭ/ŭ > Polish CVC
LCS Cĭ/ŭC$_{[+voiced]}$ +ĭ/ŭ > Kashubian CVC$_{[+voiced]}$

The proposed explanation of the Kashubian pattern builds on the insights of Andersen (1970), Timberlake (1983b, 1988), and Kavitskaya (2001), outlined in the previous section. Prior to the loss of the final jer, the preceding jer was subject to phonetic open syllable lengthening, which accounts for its greater perceptual salience. In addition, vowels are longer before voiced consonants than before voiceless consonants. This implies that jers were the longest in open syllables and before voiced consonants. They were shorter in open syllables and before voiceless consonants. Final jers were the most susceptible to loss, as confirmed by Łoś (1922: 24). Due to the loss of the final jer, the phonetically lengthened jer in the preceding syllable was reinterpreted as a non-jer vowel, as its length was no longer attributable to open syllable lengthening. The difference between Kashubian and Polish is related to the threshold for the phonologization of phonetic length. In Polish, the durational effects of

obstruents. These older genitive plural forms are useful in demonstrating the full conditioning of jer retention, but are rare in current usage, as they have been effectively replaced by forms in *-ów* in these and other words, i.e., *prosbów*, *lëczbów*, and *służbów*.

[4] The Kashubian words *stółk*, *dómk*, *kùńc*, *ówsˌ* and *różk* in (8c) indicate that the loss of the medial jer caused the preceding vowel /o/ to lengthen through CL when the vowel was followed by a sonorant or a voiced obstruent (though the latter context was less consistent): **stoloko* > *stōłk* > *stuwk* (Timberlake 1988: 236). CL did not apply before voiceless obstruents, e.g., *òct*. The corresponding words in Polish do not show reflexes of CL, as the medial jer was maintained in this context, e.g., *stołek* and *koniec*.

[5] For example, the final jer was front in **mrokovɪ* but back in **orılo*. The preceding jers were preserved in both cases, i.e., *marchiew* and *òrzéł*. As for the target, both the front and the back jer were preserved in the appropriate context. For example, **pısʊ* and **sʊnʊ* developed into *pies* and *sen*, respectively.

open syllable lengthening were sufficient to be reinterpreted as phonological, while in Kashubian the effects of open syllable lengthening had to be reinforced by the effects of the lengthening due to a following voiced consonant. In (10) the three contexts responsible for the fate of jers are ranked according to the effect of phonetic lengthening. Final jers were lost both in Kashubian and Polish, as they were the shortest. Both in Kashubian and Polish, jers were preserved when they were the longest, that is, when followed by a voiced consonant and another jer. Where Polish and Kashubian diverge is in the context of a voiceless consonant, that is, when they showed intermediate phonetic length. In (10) '>' indicates 'longer than', '*ĭ/ŭ*' stands for a historical jer, either front or back, and V stands for a non-jer vowel.

(10) Phonologization of phonetic length of jers in Polish and Kashubian

phonetically longer	C __ $C_{[+voice]}$ĭ/ŭ	>	C __ $C_{[-voice]}$ĭ/ŭ	>	__ #	shorter
Polish	V		V		Ø	
Kashubian	V		Ø		Ø	

Indirect support for this explanation can be found in the role played by stress, another factor that is often implicated in the longer duration of syllables. There is ample evidence that stressed syllables tend to be louder, longer, and have greater respiratory energy than corresponding unstressed syllables, though the weighting of each of these acoustic cues differs from language to language (Ladefoged and Johnson 2011: 111). In Polabian, stress played a role in the preservation of jers and they were preserved in stressed initial syllables even when they were weak, e.g., **kŭto* > *käto* 'who' (Stieber 1979: 51), cf. Kashubian *chto* and Polish *kto*. Thus, phonetic length (and perceptual prominence in general) was most likely among the factors that governed the contextual preservation of jers (and their subsequent change to non-jer vowels) in Kashubian and Polish.

3.2. Diphthongization

This section focuses on diphthongization, a process that is very characteristic of Kashubian and one which differentiates it from Polish. We begin with the description of the targets and triggers of the process and, in section 3.3, propose a listener-oriented account.

The vowel /ɔ/ is realized as [ɔ] after coronals and spelled <o>, as shown in (11a). After labials and velars /ɔ/ exhibits the diphthongized variants [wɔ] or [wɛ], spelled <ò>, as illustrated in (11b) and (11c). The change */ɔ/ > [wɔ], [wɛ] is most commonly termed "diphthongization" in descriptive sources (Breza and Treder 1981: 36–38; Jocz 2013: 86), a less common term being "labialization". The Kashubian data in this section are drawn from Breza and Treder 1981:

36–38, Jocz 2013: 86–121, and my own fieldwork conducted in central Kashubia during the summer of 2019. The IPA is used for transcription below.

(11)		transcription		spelling	gloss
a.	coronals				
		renɔ		reno	‘morning’
		tɔ		to	‘this’
		dɔbrɨ		dobrô	‘good’ fem.
		sɔstruf		sostrów	‘sisters’ gen.pl.
		rɔbits		robic	‘to do’
b.	labials				
		mwɔva	mwɛva	mòwa	‘speech’
		mwɔkrɔ	mwɛkrɔ	mòkro	‘wet’
		bwɔ	bwɛ	bò	‘because’
		pwɔd	pwɛd	pòd	‘under’
		pwɔlɛ	pwɛlɛ	pòle	‘field’
c.	velars				
		kwɔl	kwɛl	kòl	‘by’
		kwɔɲɛ	kwɛɲɛ	kònie	‘horses’
		kwɔza	kwɛza	kòza	‘goat’
		dzɛtskwɔ	dzɛtskwɛ	dzeckò	‘child’
		gwɔ	gwɛ	gò	‘him’
		gwɔdzɛna	gwɛdzɛna	gòdzëna	‘hour’
		xwɔdzɨ	xwɛdzɨ	chòdzy	‘he walks’
		sxwɔvats	sxwɛvats	schòwac	‘to hide’
		lixwɔ	lixwɛ	lichò	‘weak’

Although both diphthongal variants, [wɔ] and [wɛ], are found after non-coronals in modern Kashubian, the variant [wɛ] is generally more common in Central Kashubian, while the variant [wɔ] is found in the south-east of Kashubia, according to Breza and Treder (1981: 36–37) and Jocz (2013: 97). I include forms with the variant [wɔ], as they usefully document an earlier stage in the development of diphthongs in Central Kashubian.

Diphthongs [wɔ] and [wɛ] as reflexes of */ɔ/ are also found in word-initial position (Breza and Treder 1981: 36; Jocz 2013: 86). Just like in the context of labials and velars discussed above, two variants of diphthongs are found in Kashubian word initially: [wɔ] and [wɛ], the latter being more common in Central Kashubian. The status of the diphthongs as reflexes of */ɔ/ is supported by the Standard Polish cognates of the words in (12): *oni* [ɔɲi], *ojciec* [ɔjtɕɛts], *owca* [ɔftsa], and *oko* [ɔkɔ]. The word-initial diphthongs can be viewed as instances of historical *w*-epenthesis.

(12)	transcription		spelling	gloss
	wɔɲi	wɛɲi	òni	‘they’
	wɔjts	wɛjts	òjc	‘father’
	wɔftsa	wɛftsa	òwca	‘sheep’
	wɔkwɔ	wɛkwɛ	òkò	‘eye’

Reflexes of */vɔ/ are also realized as the diphthongs [wɔ] or [wɛ] (the latter being the principal variant in Central Kashubian) attesting to the loss of the labial fricative, */vɔ/ > [vwɔ] > [vwɛ] > [wɛ], as illustrated in (13). An important consequence of this change is the merger of the resulting [wɔ], [wɛ] (< */vɔ/) with the reflexes of word-initial */ɔ/ illustrated in (12): cf. [wɛda] *wòda* and [wɛftsa] *òwca* (Note that Polish does not show this merger: [vɔda] *woda* and [ɔftsa] *owca*.) The words in (13a) show reflexes of initial */vɔ/ and the items in (13b) illustrate non-initial */vɔ/. Jocz (2013: 100) records a handful of modern pronunciations that reflect an intermediate stage in the development of */vɔ/ > [vwɔ] > [vwɛ] > [wɛ]: [vwɛda], [tfwɛjɛ], and [sfwɛjɛ], though he notes that such realizations are rare in current usage.

(13)		transcription		spelling	gloss
	a.	wɔda	wɛda	wòda	‘water’
		wɔjna	wɛjna	wòjna	‘war’
		wɔsk	wɛsk	wòsk	‘wax’
	b.	twɔjɛ	twɛjɛ	twòje	‘your’ pl.
		swɔjɛ	swɛjɛ	swòje	‘his, her’ pl.

Similar contextual diphthongization is attested for the reflexes of */u/. After coronals, a fronted and optionally unrounded monophthongal variant is the most common, as exemplified in (14a). There is considerable interspeaker and intraspeaker variation in the realization of the vowel after coronals in Central Kashubian: [u ʉ̟ ʉ ʏ y ɨ ɪ i] (Jocz 2013: 115). After labials and velars, the most common realizations of */u/ are the diphthongal [wɨ] or [wʉ], spelled <ù>, as illustrated in (14b) and (c).

(14)		transcription			spelling	gloss
	a.	coronals				
		tʉwɛ	tɨwɛ	tiwɛ	tuwò	‘here’
		trʉp	trɨp		trup	‘corpse’
		tsʉd	tsɨd		cud	‘miracle’
		libjɔ			lubiã	‘I like’
		lʏbju			lubią	‘they like’
		tʃu	tʃiw		czuł	‘felt’
		mjɛjstsʏ			miejscu	‘place’ loc.sg.
		tʃasɨ			czasu	‘time’ gen.sg.
	b.	labials				
		pwɨstsɛts			pùscëc	‘to let’
		bwɨdɛjum			bùdëją	‘they build’
		bwɨtɛn			bùten	‘outside’
		bwʉdɨnk			bùdink	‘building’
		mwɨʃum			mùszą	‘they must’
		fwɨl			fùl	‘full’
		dvwɨx			dwùch	‘two’ gen.
	c.	velars				
		kwɨx			kùch	‘cake’
		gwɨs			gùz	‘button’
		xwɨtkwɛ			chùtkwò	‘quickly’
		kaʃəpskwɨ			(pò) kaszëbskù	‘in Kashubian’
		bzʲəxwɨ			brzëchù	‘belly’ loc.sg.
		bwɛgwɨ			bògù	‘god’ loc.sg.

Reflexes of word-initial */u/ exhibit similar diphthongal realizations (or initial epenthesis of /w/), exemplified in (15).

(15)	transcription	spelling	gloss
	wʉmar	ùmarł	‘he died’
	wɨrvawɔ	ùrwało	‘(it) fell off’
	wɨja	ùja	‘uncle’
	wɨdɨ	ùdô	‘(it) will succeed’
	wɨtʃɛts	ùczëc	‘learn’

Table 1 provides a summary of the most common contextual realizations of */ɔ/ and */u/ in Kashubian. Monophthongal variants are limited to the context of preceding coronals (T). Diphthongal variants are found after labials (P), velars (K), and word initially. In the diphthongal variants, the on-glide is labial (rounded), while the syllabic element can be labial or not.

Table 1. Context-dependent realizations of */ɔ/ and */u/ in Kashubian

context	***/ɔ/**	***/u/**
T ___	monophthong: [ɔ]	monophthong: [ʉ ʏ y ɨ i]
P ___ K ___ # ___	diphthong: [wɔ wɛ]	diphthong: [wɨ wʉ]

3.3. Evolution of Diphthongs

In tracing the origins of the diphthongal variants, we begin with the word-initial position. The vowels /ɔ/ and /u/ developed an on-glide word-initially, as shown in (16). This process will be referred to as initial epenthesis or prothesis.

(16) a. *#ɔ > #wɔ
b. *#u > #wu

In word-medial position, the vowels /ɔ/ and /u/ diphthongized after labials and velars, as schematized in (17) (based on Jocz 2013: 232–35). Subsequently, in Central Kashubian, the diphthongs /wɔ/ and /wu/, including the newly formed word-initial /#wɔ/ < /#ɔ/ and /#wu/ < /#u/, underwent partial delabialization, whereby the syllabic element lost its rounding and was fronted.

(17) a. *Pɔ > Pwɔ > Pwɛ
*Kɔ > Kwɔ > Kwɛ
#wɔ > #wɛ

b. *Pu > Pwu > Pwʉ > Pwɨ
*Ku > Kwu > Kwʉ > Kwɨ
#wu > #wʉ > #wɨ

It is proposed that word-initial epenthesis of /w/ preceded diphthongization for three reasons. First, word-initial /#wɔ/ < /#ɔ/ and /#wu/ < /#u/ along with /wɔ/ and /wu/ after labials and velars were uniformly subject to unrounding and fronting. This means that initial epenthesis most probably occurred before diphthongization. Second, the fronting process failed to apply to the /wɔ/ that resulted from a later change of /ɬ/ > /w/, e.g., *chłop* [xwɔp] 'husband' vs. *kòza* [kwɛza] 'goat'. Third, while many dialects of rural Polish show initial epenthesis of /w/, diphthongization of the vowels /ɔ/ and /u/ after consonants and their unrounding are less common (see also section 4). It thus appears that Polish dialects showing diphthongization after consonants are

a subset of dialects with initial epenthesis, rather than the other way round. Such evidence suggests that word-initial epenthesis of /w/ occurred before diphthongization after labials and velar.

3.4. Diphthongization—A Listener-Oriented Change

The crucial question to be addressed here is why diphthongization occurred after labials and velars, but not after coronals. The proposed explanation makes use of the empirical evidence testifying to the differences in the articulation, acoustics, and perception of CV sequences, with a labial or velar C, as opposed to a coronal C.

There is ample evidence that tongue tip and tongue blade movements are characterized by higher velocities than either tongue dorsum or lip movements (Kuehn and Moll 1976; Browman and Goldstein 1991: 362; Kang 1999). This means that coronal gestures are executed more rapidly than non-coronal gestures, which has important consequences for the acoustic effects of consonants with coronal as opposed to non-coronal places of articulation. Coronal gestures are rapid and, as a result, produce shorter transition cues. Non-coronal gestures are more sluggish and produce longer transition cues (Jun 2004: 63–66). Browman and Goldstein (1991) and Jun (2004) argue that this discrepancy in the length of cues provides a plausible explanation for the different propensities with which coronals and non-coronals trigger or undergo place assimilation in consonant clusters. Coronals are more commonly targets than triggers of assimilation, while for non-coronals the reverse seems to be true. This is related to Browman and Goldstein's (1991: 363–68) finding that the perceived assimilations and deletions are in fact due to the so-called "hidden gestures"—some gestures may be executed as planned, but not be fully perceptible due to masking by other gestures.

As regards gestural coordination in consonant clusters, Byrd (1996) reports on acoustic and articulatory evidence indicating that gestural overlap in coronal + non-coronal stop clusters is greater than in non-coronal + coronal clusters. Because of their shorter transition cues, tongue tip gestures are more likely to be masked by tongue dorsum or lip gestures than the other way round, all else being equal. Brown (1977) studied Received Pronunciation and found that the most common cases of assimilation involve alveolars assimilating to velars or labials. Blust (1979) investigated cluster phonotactics and provided evidence that coronal + non-coronal clusters are more susceptible to assimilation and metathesis than non-coronal + coronal clusters.

Experimental studies probing perception point to differences in the rate of recoverability of coronals vs. non-coronals. In a perception study of the identification of English voiceless stops, Winitz, Scheib, and Reeds (1972) found that in final VC sequences, vowel transitions into a stop were least informative when the C was a coronal. Vowel transitions into labials and velars were more

informative under their experimental conditions indicating that the transitions into non-coronals are more perceptually salient than those into coronals. Given the convergent evidence from articulation, acoustics, and perception, a plausible claim is that the shorter duration of transition cues for coronals than for non-coronals is a likely explanation for their different phonological behavior.[6]

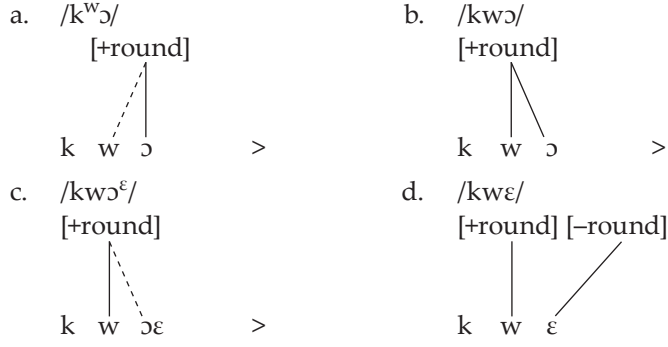
The key component of this listener-oriented explanation of the change $CV_{[+round]} \rightarrow CwV_{[+round]}$, where $V_{[+round]}$ stands for either /ɔ/ or /u/, is phonologization of the C-to-V transition cues as a homorganic glide (additional evidence for this mechanism is given in section 4.2). In the process of language acquisition, a learner is confronted with an ambiguous signal. In this case, the ambiguity is related to the formant transitions from C to $V_{[+round]}$. The sequence is realized with a transition, which, if sufficiently long, is interpretable as a glide, e.g., [C^{w}ɔ] or [C^{w}u]. The listener may attribute the formant movements during the initial portion of the vowel to the influence of the preceding consonant and phonologize the sequence as /$CV_{[+round]}$/, in accordance with the representation of the speaker. However, the listener may also interpret the formant transitions as a glide homorganic with the following rounded vowel. In such an event, the sequences /Cɔ/ and /Cu/ will be internalized as /Cwɔ/ and /Cwu/, giving rise to the phonologization of a diphthong. As outlined above, formant transitions of labials and velars are longer than formant transitions of coronals. Therefore, diphthongization via phonologization of transition cues is more likely to occur in the context of preceding labials and velars than coronals. Returning to Kashubian, the failure of coronals to trigger diphthongization thus receives a plausible explanation: the shorter formant transitions of coronals are less likely to be interpreted as a glide than are the longer formant transitions of non-coronals : T^{w}ɔ > Tɔ vs. P^{w}ɔ > Pwɔ, K^{w}ɔ > Kwɔ.

The representations in (18) outline the evolution of diphthongs in Kashubian. In the first stage, the phonological source of the feature [+round] is the vowel /ɔ/, while the transition from the preceding velar is interpreted as coarticulatory (indicated with the dotted association line), as intended by the speaker. In the second stage, the transition is reinterpreted as an on-glide, giving rise to a diphthong. The listener attributes the feature [+round] to the entire diphthong. In the third stage, the vowel receives an *e*-like off-glide, producing [wɔ^{ɛ}], and the on-glide /w/ is reinterpreted as the phonological source of rounding. This change can be conceptualized as a type of dissim-

[6] Based on such and other evidence, the studies in Paradis and Prunet (1991) argue for a special status of coronals in phonology. They argue that coronals should be underspecified, which would make them easy targets of various phonological processes. Blevins (2004: 127) points out that such an assumption is problematic, as it also predicts that coronals should be common outputs of neutralizations, for example, word-finally. Place neutralizations of non-coronals to coronals, including plosives and nasals, are relatively rare (see Blevins 2004 and citations therein).

ilation. Ohala (1981) and Blevins (2004: 31ff.) argue that the acoustic signal that contains features with extended phonetic cues may be subject to reanalysis through the mechanism of a listener-oriented change. In the course of language acquisition, coarticulated, non-local percepts need to be associated with their sources. If a listener chooses a phonological analysis of such an intrinsically ambiguous speech signal that is distinct from that of the speaker, a sound change occurs. Rounding is among the features characterized by a multisegmental span and is thus susceptible to reanalysis (Blevins 2004: 35). The acoustic signal is intrinsically ambiguous: the source of rounding can either be the entire diphthong, /wɔ/, or the initial component of the diphthong, /w/. A sound change occurs when the listener reinterprets the structure of the diphthong and attributes rounding exclusively to the first component of the diphthong. In the fourth stage of the change, the rounding of the second component is discounted as coarticulatory and factored out from the phonological representation. The syllabic component of the diphthong is reinterpreted as unrounded, thus completing the change of /kɔ/ > /kwɛ/.

(18) Evolution of diphthongs in Kashubian



A reviewer suggests that this case of diphthongization may actually be analyzed as labialization of labial and velar consonants before a rounded vowel. There are two problems with an analysis along these lines. First, it is unclear why the labialization did not take place after coronals. Second, there is no connection between word-initial glide insertion and labialization after labials and coronals. The two processes would seem unrelated. On the assumption of diphthongization, on the other hand, the prior existence of word-initial diphthongs in, for example, *òni* [wɔɲi ~ wɛɲi], is the prerequisite for the reanalysis of longer transitions after labials and velars as an on-glide of a diphthong, in accordance with the claim that hypocorrective changes tend to preserve structures rather than introduce new ones, see section 5.

4. Similar Developments in Other Languages

In order to provide further support for the listener-oriented mechanism used to elucidate the Kashubian changes, we review similar changes that occurred independently in other languages. The changes, which include initial epenthesis, emergence of glides, absorption of glides, and diphthongization, are all subjected to a listener-oriented analysis.

4.1. Initial Epenthesis

Initial epenthesis (prothesis) is commonly found in rural dialects of Polish spoken in Greater Poland (Tomaszewski 1934), in colloquial Czech, as well as in Lower and Upper Sorbian (Stieber 1934; Dalewska-Greń 2002). In Upper Sorbian the vowels [ɔ] and [u] developed prothetic [w] word-initially (spelled <w>), as illustrated in (19). Cognates from Standard Polish, which does not show initial epenthesis, are given for comparison (Dalewska-Greń 2002).

(19)	Upper Sorbian	Standard Polish	gloss
	wobdarjować	obdarować	'to reward'
	wobeschnyć	obeschnąć	'to get dry'
	wón	on	'he'
	worać	orać	'to plow'
	wučić	uczyć	'to teach'
	wucho	ucho	'ear'

Ukrainian shows remnants of the prothesis of */u/ and */o/, which was followed by changes in the quality of both the prothetic segment and the /o/ in certain positions (Rusanovskij et al. 1986: 18, 27; Czaplicki 2007: 26).

(20)					
	a.	*/u/	[ʊu] or [vu]	vúlycja	'street'
				vúxo	'ear'
				vúlyk	'beehive'
	b.	*/o/	[ʊo] or [vo]	voná	'she'
				vonó	'it'
				vohón'	'fire'
	c.	*/o/	[ʊi] or [vi]	vin < OES onŭ	'he'
				vid < OES otŭ	'from'
				viknó < OES okŭno	'window'
				víl'xa < OES olĭxa	'alder'
				vivsá < OES ovĭsa	'oat' gen.pl.
				vivcjá < OES ovĭtsja	'sheep'

The change of /w/ to a labio-dental approximant [ʋ] or a labio-dental fricative [v] can be viewed as an instance of glide strengthening. The development of [ʋi] < */o/ in (20c) merits a closer look. The vowel underwent compensatory lengthening due to the loss of a weak jer, the latter supported by the Old East Slavic (OES) forms also provided in (20c). The compensatorily lengthened vowel was subsequently unrounded, shortened, and raised: [o] > [wo] > [wo:] > [we:] > [we] > [wi] > [ʋi]. Bethin (1998: 100–101), citing Potebnja 1866, discusses supporting evidence for compensatory lengthening from Old Ukrainian texts with spellings such as <воовьця> for *vivcja* 'sheep'. In this part of Late Common Slavic length was lost by the tenth century (Shevelov 1985: 389). But note that the lengthening (and later unrounding and raising) did not apply in the items illustrated in (20b), where the requirement of a weak jer in the next syllable, necessary for CL, was not met.

The Ukrainian developments highlight two listener-oriented mechanisms of change discussed previously: compensatory lengthening and a structural reanalysis of a diphthong. Following Kavitskaya's (2001) account, in Ukrainian the phonetic lengthening in an open syllable of the sequence /CVCV/ was reinterpreted as phonemic due to the loss of a conditioning context, an ultra-short vowel: [C**V(:)**CV] > /CV:C/. The unrounding of [wo:] > /we/ is attributable to a variably diphthongal realization of the vowel before a consonant: [wo:] ~ [wo^{e}]. Such a reanalysis was more likely to affect long vowels, as diphthongal realizations are perceptually more salient in longer than in shorter syllables. The feature [+round] was eventually attributed exclusively to the on-glide of the diphthong causing the phonological unrounding of the syllabic component, [woe] ~ [w^{o}e] > /we/.

4.2. Emergence of Glides Through a Reanalysis of Transitions

Reinterpretation of formant transitions as glides is a well-documented sound change, as illustrated in (21). Complex VC transitions may give rise to a homorganic glide reinterpreted as a component of a complex nucleus (diphthong) (21a) or as a coda glide (21b). As (21c) shows, CV transitions can be reanalyzed as a glide forming a complex onset together with the initial consonant. Blevins (2008: 84–87) observes that the quality of the glide is predictable from the immediate phonetic context, that is, from the percept of the VC and CV transitions.

(21) Homorganic glide/vowel evolution (Blevins 2008: 86, citing Hock 1991: 119–20)

	language	sound change	examples	gloss
a.	American English	ʃ > jʃ, ʒ > jʒ	mæʃ > mæjʃ mɛʒɻ > mɛjʒɻ	'mash' 'measure'
b.	Old French	ɲ > jn > in	*plaɲit > plaint *poɲu > poing	'complains' 'fist'
c.	Lithuanian	pʲ > pj	*pʲautʲi > pjauti	'cut'

4.3. Absorption of Glides Through a Reanalysis of Diphthongs

The logical opposite of the emergence of glides through a reanalysis of transitions is the reinterpretation of a glide as a transition and its consequent "absorption" by the neighboring consonant. A case in point is provided by the evolution of English diphthongs. Stampe (1972) observes that in modern English the diphthong [aw] does not occur before labials and velars. He offers a historical explanation. The historical source of the diphthong [aw] is [uw]. The glide of the diphthong [uw] was reinterpreted as a VC transition into the following labial or velar, giving rise to the short [u], which in many dialects was later centralized and lowered to [ʌ] or [ə]. The absorption did not occur before alveolars and the [uw] later changed to [aw] through the Great Vowel Shift. The length of transitions conditioned the different interpretations of the diphthong before coronals and non-coronals. The shorter transitions of alveolars are less likely to be reanalyzed as glides than are the longer transitions of velars and labials. As a result, **ūt* is now [awt], but **ūp* is now [ʌp] (not *[awp]) and **dūvə* is now [dʌv] (not *[dawv]).

Similar developments have been found in Hausa (Parsons 1970; Hyman 1973). In Hausa the long /ii/ and the diphthong /ai/ do not occur before dental and palatal consonants, while the long /uu/ and the diphthong /au/ do not appear before labial and velar consonants. Hyman (1973: 335–36) argues that the Hausa restrictions on the occurrence of long vowels and diphthongs can be explained by invoking a historical mechanism similar to the one used for the English case discussed above. The back glides of [uw] and [aw] (realizations of /uu/ and /au/) were absorbed into the following labials and velars. The front glides of [ij] and [aj] (realizations of /ii/ and /ai/) were absorbed into the following dentals and palatals. Thus, the percept of VC transitions determined the target of absorption.

4.4. Diphthongization Involved in the Change of *e* > *o* in Slavic

The following discussion of the evolution of diphthongs in Slavic languages is mainly based on Andersen 1978. It provides fertile ground for testing the mechanisms of a listener-oriented change and drawing parallels with the Kashubian data. Modern Polish and Russian display /o/ ~ /e/ alternations in similar contexts, as illustrated in (22). The data are taken from Andersen 1978: 1 and given in IPA transcription.

(22) a. Polish

bzo̯za	'birch'	bzɛ̯zina	'birch grove'
zo̯na	'wife'	zɛ̯ɲskʲi	'female'
jɛ̯zɔrɔ	'lake'	pɔjɛ̯zɛ̯zɛ	'lake front'
plɔtka	'rumor'	plɛɛtɛ	'to gossip'

b. Russian

bʲerʲóza	'birch'	bʲerʲéznʲik	'birch grove'
zóni	'wives'	zénskij	'female'
ozʲóra	'lakes'	zaozʲérʲje	'area beyond a lake'
plʲótka	'whip lash'	plʲétʲ	'whip lash'

The appearance of the /o/ ~ /e/ alternations in the same contexts points either to their shared origin or parallel evolution. The contemporary /o/ ~ /e/ alternations can be traced to Common Slavic */e/. The /o/ is a result of a sound change that applied in certain dialects of Slavic. Different Slavic languages show different reflexes of the change, which indicates that the change applied in Slavic dialects to some extent independently and at a different time (Andersen 1978). The context for the */e/ > /o/ change required reference to the quality of both consonants flanking the vowel: the preceding consonant had to be palatalized, while the following consonant had to be non-palatalized. The schematic representation in (23) refers to Russian. The Polish conditioning of the change will be refined below.

(23) Russian

e > o / [+palatal] ___ [–palatal]

Reflexes of this change are also found in Ukrainian, but the conditioning of the change is not homogeneous across different dialects. There is an interesting difference between dialects of northern and southern Ukraine. In the north the change *e* > *o* applied regardless of the quality of the preceding consonant, while in the south it was restricted to the context of the preceding

/ʃ ʒ tʃ j/.[7] This difference gave rise to divergent reflexes of CS **e* after labials and dentals in northern and southern dialects of Ukrainian, as illustrated in (24a). After /ʃ ʒ tʃ j/ there is no difference between northern and southern Ukraine, as shown in (24b) (Andersen 1978, citing Filin 1972: 199ff.).

(24)		NUkr.	SUkr.	CS	gloss
	a.	sʲóli	séla	sela	'villages'
		tsʲópli	téplyj	teplŭjĭ	'warm'
		dalʲóka	daléko	daleko	'far'
	b.	utʃora	utʃora	vitʃora	'yesterday'
		ʒonati	ʒonatyj	ʒenatŭjĭ	'married'

Jakobson (1929/1962: 71ff.) provides an insightful explanation for this difference. In Proto-Russian, consonants were palatalized before front vowels and non-palatalized (velarized) before back vowels. Over time, this contextual palatalization became phonemic largely due to the loss of jers. There is evidence that the emergence of distinctively palatalized consonants happened around the same time as the *e* > *o* change (Jakobson 1929/1962: 71–72; Andersen 1978: 9–10). The context of the following /e/ did not have uniform effects on preceding consonants across dialects of Ukrainian. In the north, /e/ was responsible for palatalization of all consonants. In the south, palatalization triggered by /e/ was restricted to preceding /ʃ ʒ tʃ j/. Dentals and labials were depalatalized before /e/. Thus, the context for the *e* > *o* change given in (23) is applicable both to the northern and southern dialects of Ukrainian: the preceding consonant had to be palatalized. The difference is related to the details of palatalization: in the south, palatalization before /e/ was restricted to /ʃ ʒ tʃ j/; it did not affect dentals and labials. Whereas in the north, all consonants were palatalized before /e/ (Jakobson 1929/1962: 71ff.).

Russian shows an additional restriction of the *e* > *o* change. The change occurred in stressed syllables, as the contemporary alternations in (25) indicate.

(25)	stressed	unstressed
	ozʲóra 'lakes'	ózʲero 'lake'
	sʲóla 'villages'	sʲeló 'village'

In Polish the /ɛ/ > /ɔ/ change was restricted with respect to the place of articulation of the following consonant: the latter had to be coronal, in addition to being non-palatalized. The change did not apply before labial and velar

[7] To be precise, the discussed change occurred in weak position, that is, when the vowel escaped the context of compensatory lengthening due to the elision and eventual loss of jers (Filin 1972: 199ff.).

consonants. Compare Polish and Russian in (26) where it is shown that Russian had no similar place restriction.

(26)

Polish		Russian	
ɲɛbɔ	'sky'	nʲóbo	'palate'
tɕɛpwɨ	'warm'	tʲóplij	'warm'
lɛgw	'lay down'	lʲóg	'lay down'
tɕɛkw	'ran'	tʲok	'ran'

Polish diverges from Russian in another important aspect. The change of *e* > *o* was paralleled by the change of *ě* > *a* (*ě* traditionally stands for yat', a long open front vowel). This change is reflected in the /ɛ/ ~ /a/ alternations in Polish, but not in Russian.

(27)

Polish		Russian		CS	
vjara	vjɛzɨtɕ	vʲéra	vʲérʲitʲ	věra	věriti
'faith'	'believe'	'faith'	'believe'	'faith'	'believe'
klatka	klɛtɕitɕ	klʲétka	klʲétʲ	klětŭka	klětĭ
'cage'	'bungle'	'cage'	'cage'	'cage' dim.	'cage'

The formulation in (28) depicts the sound changes together with their conditioning in Polish which led to modern alternations of [ɛ ~ ɔ] and [ɛ ~ a].

(28) Polish

change		alternation
e > o	/ [+palatal] ___ [–palatal, +coronal]	[ɛ ~ ɔ]
ě > a		[ɛ ~ a]

An account of the changes *e* > *o* and *ě* > *a* in Slavic languages should be able to explain why they applied (i) after palatalized consonants, (ii) before non-palatalized consonants, (iii) before non-palatalized coronal consonants (in Polish), and (iv) in stressed syllables (in Russian).

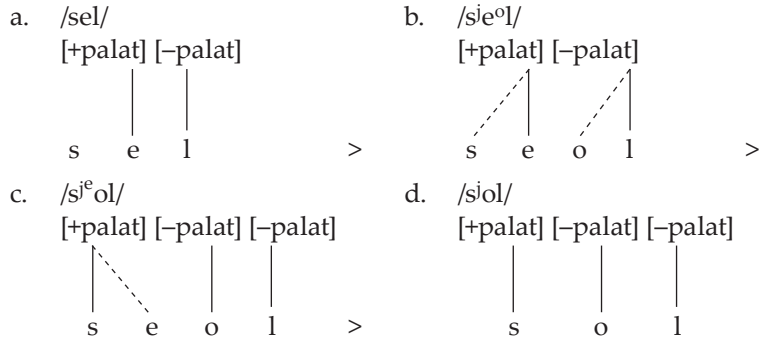
Andersen (1978) presents evidence suggesting that the change involved a stage of diphthongization. The evolution of modern Russian [sʲóla] 'villages' and [tʲóplɨj] 'warm' is shown in (29).

(29) CS *sela* > Old Russian *sʲéla* > *sʲéola* > Modern Russian *sʲóla*
CS *teplŭjĭ* > Old Russian *tʲéplŭjĭ* > *tʲéoplɨj* > Modern Russian *tʲóplɨj*

In Old Russian the vowel /e/ causes coarticulatory palatalization of the preceding consonant. Because it is followed by a non-palatalized, velarized

consonant, the vowel is diphthongal, with an /o/ off-glide, [e^{o}]. Through a hypocorrective change, the off-glide is phonologized as part of the diphthong /eo/ by the listener. However, at this stage the listener is faced with ambiguities in the acoustic signal. The resulting diphthong [eo] can be analyzed in two different ways: either [e] is the syllabic element and [o] is the off-glide, or [e] is the on-glide and [o] is the syllabic element. The former analysis coincides with that of the speaker, while the latter entails a phonological reanalysis of the diphthong by the listener. Andersen (1978) argues that there is a perceptual bias favoring the latter interpretation. The [o] portion of the diphthong is more perceptually salient because the lower second formant entails "a greater concentration of acoustic energy within a relatively narrow frequency range" (Andersen 1978: 19). Once the second component of the diphthong has been reinterpreted as syllabic, the initial portion of the diphthong may be subject to reanalysis. Bearing in mind that palatalization of consonants was already phonemic at this stage (Jakobson 1929/1962: 71–72), in [s^{j}éola] the initial portion of the diphthong could be interpreted as a C-to-V transition and accordingly "absorbed" into the preceding consonant through a hypercorrective change. This explains why the change happened after palatalized consonants: the front /e/ could not be reinterpreted as a transition from a non-palatalized consonant. As a result, the word was phonologized as /s^{j}óla/ and a reanalysis on the part of the listener had occurred. This account explains both the before and after restrictions on the context of the change and is schematically represented as the four stages in (30). Dotted lines indicate that the segment is "parasitically" (i.e., coarticulatorily) linked to a feature that has its phonological source in another segment. At the root of this mechanism lies a reinterpretation and misattribution (from the perspective of the speaker) of features with extended acoustic cues by the listener.

(30) Change of e > o in Russian



Recall that in Polish the *e* > *o* change failed to occur before non-palatalized labials and velars (e.g., Polish [ɲɛbɔ] vs. Russian [n^{j}óbo]). As mentioned in sec-

tion 3.4, coronals have shorter transition cues, while the transition cues of labials and velars are significantly longer. It is likely that the diphthong [eo] occurred before both coronals and non-coronals in Polish, just like in Russian. The difference between the two languages is related to the selective reanalysis of consonant transition cues. The [o] off-glide is more likely to be reinterpreted as V-to-C transition cues into a consonant with longer transition cues, such as a labial or a velar, than into a consonant with shorter transition cues, such as a coronal. In other words, non-coronals are more likely to "absorb" the [o] portion of the diphthong than coronals, precluding the phonologization of diphthongs. The [o] off-glide is less prone to be attributed to the short transitions into a coronal and is thus less likely to be "absorbed". This means that the [o] off-glide is more salient before coronals than non-coronals and is, therefore, more likely to find its way into the phonological representation in this context. This difference in the phonologization of diphthongs between Polish and Russian indicates that despite similar acoustic and perceptual conditions, a sound change is non-deterministic or not goal-oriented. The seeds of the change might have been uniformly present, but the phonologization proceeded under different conditions in the two languages.

Diphthongization was restricted to stressed syllables in Russian. Andersen (1978: 14) attributes this restriction to the longer duration of stressed syllables than unstressed syllables. Diphthongs developed in both stressed and unstressed syllables. However, diphthongal realizations were more salient in stressed syllables than in unstressed syllables because of their overall longer duration and greater intensity. As a result, the more perceptually salient diphthongal realizations in stressed syllables were more likely to be phonologized as such than were diphthongs in unstressed syllables.

4.5. Diphthongization Involved in the Change of *o* > *e*

In Lower Sorbian diphthongization of /o/ > /wo/ > /we/ > /e/ took place after labials and velars and is in this aspect similar to the Kashubian case discussed in section 3.4. What makes the Lower Sorbian diphthongization different from the Kashubian counterpart is the additional relevance of the following context. In Lower Sorbian diphthongization and unrounding /o/ > /wo/ > /we/ did not occur when the following consonant was labial or velar; it was restricted to the context of a following coronal, as schematized in (31) (though this restriction was later somewhat relaxed) (Stieber 1934).

(31) o > wo > we > e > i̯ / [–coronal] ___ [+coronal]
polo > pwolo > pwelo > pelo > pi̯lɔ 'field'

The preceding context receives an explanation similar to the one provided for Kashubian: the longer transition cues into the vowel of labials and velars

are reinterpreted as a homorganic glide. The following context resembles the restriction of the *e* > *o* change in Polish: it occurred before coronals. It should be noted that Lower Sorbian shows the reverse change, *o* > *e*. The context required for the change *o* > *e* is reminiscent of the change *e* > *o* in Polish and Russian in that the context for the change *o* > *e* was also double-sided. But the feature involved was different: [+palatal] ___ [–palatal]. The Lower Sorbian change is $P^{w}oT$ > PwoT > PweT and $K^{w}oT$ > KwoT > KweT. The proposed explanation invokes a reanalysis of the source of rounding. Non-coronals flanking the vowel have long transitions: *$P^{w}o^{w}K$ and *$K^{w}o^{w}P$. The delinking of the feature [+round] from /o/ in $P^{w}o^{w}K$ and its attribution to either or both of the transitional glides is unlikely, as /o/, being in the center of the acoustic span of this feature, is the most likely source of rounding. In contrast, in $P^{w}oT$, the rounding can be attributed to the on-glide, as it does not extend to the shorter transition into the following coronal. An additional restriction that blocked a reinterpretation of the vowel between non-coronals might have been structural. Phonologization of the two long transitions as glides was unlikely, as a triphthong would result, /wow/, and triphthongs are not found in Lower Sorbian.

As a result of the reattribution of the feature [+round] to the glide, the syllabic element of the diphthong was unrounded (though not in all dialects). Subsequently, the on-glide was lost leaving behind the unrounded monophthong /ɛ/ or /ɨ/. The realizations of */o/ vary in modern Lower Sorbian dialects, as the data in (32) demonstrate (Faßke 1990).

(32) pólo [pɨlɔ] ~ [pɛlɔ] ~ [pʊlɔ] ~ [pɔlɔ] ‘field’
kóza [kɨza] ~ [kɛza] ~ [kɔza] ‘goat’

Nitsch (1939) mentions that diphthongization of /o/ > /wo/ is also common in rural dialects of Polish. He notes that the process occurs after all consonants, though he adds that it is more common after labials and velars than after coronals. Polish does not show the unrounding of the syllabic component.

4.6. Evolution of Rounded Vowels: A Summary

Table 2 on the following page provides a summary of the developments of rounded vowels /ɔ/ and /u/ in the Slavic languages discussed. The table shows a continuum of languages from the most conservative on the left to the most innovative on the right with respect to the evolution of /ɔ/ and /u/. Each language was subject to the change indicated underneath, as well as the changes to the left. Standard Polish does not show any relevant changes of the vowels. Rural Polish shows initial epenthesis. Ukrainian is included here to illustrate the subsequent process of glide strengthening. Kashubian 1 shows the emergence of diphthongs after labials and velars, found in the southeastern dia-

Table 2. The evolution of the rounded vowels /ɔ/ and /u/ in Slavic

St. Polish	Rural Polish, Ukrainian*	Kashubian 1	Kashubian 2	Lower Sorbian
#ɔ	#ɔ > #wɔ	$P^{w}ɔ$ > Pwɔ	Pwɔ > Pwɛ	Pwɛ > Pɛ
#u	#u > #wu	$K^{w}ɔ$ > Kwɔ	Kwɔ > Kwɛ	Kwɛ > Kɛ
		$P^{w}u$ > Pwu	#wɔ > #wɛ	
	*Ukr. … #wɔ > #ʊɔ	$K^{w}u$ > Kwu	Pwu > Pwɨ	
	… #wɔ(:) > … > #ʊi		Kwu > Kwɨ	
	… #wu > #ʊu		#wu > #wɨ	

lects of Kashubian today. Kashubian 2 shows the unrounding and fronting of the second component of the diphthong (also in word-initial position) and represents Central Kashubian today. Lower Sorbian illustrates the loss of the on-glide, which completes the development of /ɔ/ > /ɛ/ after non-coronals.

5. Hypo- and Hypercorrection Theory Applied to Diphthongization and Changes in the Jers

We return to Ohala's distinction between listener-oriented changes due to hypocorrection and hypercorrection, introduced in section 2. Hypocorrection involves a reanalysis of a phonetic property as phonological, while hypercorrection occurs when the listener associates a feature with a different phonological source than does the speaker.

An explanation involving hypocorrection can be applied to changes in the jers in Kashubian and diphthongization in Kashubian and Russian. As repeated in (33a-i), phonetic length due to an open syllable and the following voiced consonant is reanalyzed as phonological when the final jer is lost. In the diphthongization in (33a-ii), long C-to-V transitions out of labials and velars are reanalyzed as an on-glide, e.g., $p^{\bar{w}}ɔ > pwɔ$, (partly) inducing the phonologization of a diphthong. In the Russian change illustrated in (33a-iii) V-to-C consonant transitions, where the C is velarized, are reanalyzed as an off-glide of a diphthong.

The mechanism of hypercorrection can be used to motivate the various stages in the development of Kashubian, Russian and English diphthongs. As repeated in (33b-i), diphthongization in Kashubian included a stage when [+round] was factored out from the syllabic component of the diphthong and attributed solely to the on-glide, *wɔ > wɛ*. The Russian case, repeated in (33b-ii), shows that an entire segment has been factored out. In the sequence of a contextually palatalized consonant followed by the diphthong [eo], e.g., [s^{j}eo],

palatalization can either be attributed to the vowel [e], in accordance with the representation of the speaker, or to the consonant, leading to a sound change. In the latter case, the initial portion of the diphthong [eo] can be reanalyzed as a transition from the palatalized consonant to the back vowel [o] and factored out from the phonological representation, [sʲeo] > /sʲo/. The initial portion of the diphthong is thus absorbed by the palatalized consonant. The prerequisite for this reanalysis was the existence of distinctively palatalized consonants in LCS. Finally, the English example in (33b-iii) shows that the glide in [uw] has been reinterpreted as a VC transition before labials and velars and factored out from the phonological representation.

(33) A typology of hypocorrective and hypercorrective changes

a. Hypocorrection		
i. Kash.	$C\check{\imath}/\check{u}C_{[+voiced]}\check{\imath}/\check{u} > C\varepsilon C_{[+voiced]}$ $C\check{\imath}/\check{u}C_{[-voiced]}\check{\imath}/\check{u} > CC_{[-voiced]}$	phonetic length reinterpreted as phonological
ii. Kash.	$p^{w}\text{ɔ}l\varepsilon > pw\text{ɔ}l\varepsilon$	CV transitions reinterpreted as phonological
iii. Russ.	$s^{j}e^{o}la > s^{j}eola$	VC transitions reinterpreted as phonological
b. Hypercorrection		
i. Kash.	$pw\text{ɔ}l\varepsilon > pw\text{ɛ}l\varepsilon$	a phonological element attributed to a different source
ii. Russ.	$s^{j}eola > s^{j}ola$	a phonological element reinterpreted as CV transitions
iii. Eng.	uwp > up (> ʌp)	a phonological element reinterpreted as VC transitions

The changes in (33) highlight an important issue related to the listener-oriented approach to change. Hypo- and hypercorrection involve the opposite mechanisms: (i) a phonetic property is reinterpreted as phonological, and (ii) a phonological property is reinterpreted as coarticulatory and factored out. This suggests that each of the two mechanisms of change is equally likely to occur in a particular case. While it is true that language change is essentially unpredictable, Ohala (1989) argues that there are important conditions that determine the likelihood of each mechanism. A hypocorrective change is facilitated by the loss of the environment that condition the phonetic property. For example, the loss of final jers gave rise to the phonologization of phonetic length on preceding jers in Kashubian. Blevins (2004: 153–55) elaborates

on this point and adds that hypocorrective changes are more likely to preserve structure than introduce new elements. Speakers of a language with pre-existing vowel length contrasts are more likely to phonologize phonetic length than speakers of a language without length distinctions simply because they are more sensitive to vowel length distinctions. Diphthongization after labials and velars in Kashubian in (33a-ii) was set in motion by the earlier initial epenthesis *#ɔ > #wɔ*. The latter change led to the emergence of diphthongs in the language, thus paving the way to the phonologization of diphthongs after non-coronals.

As hypercorrective changes involve reanalysis of the phonological source of a phonetic effect, the most likely features to undergo such changes are those with extended phonetic cues. The fact that rounding and palatalization are among such features provides support for the account involving a shift of the phonological source of rounding from the syllabic component to the on-glide of a diphthong in Kashubian in (33b-i), the shift of the phonological source of palatalization from a vowel to the preceding consonant in Russian in (33b-ii), and reinterpretation of a glide as a transition into a labial or velar consonant in English in (33b-iii). As these cases of diphthongization indicate, hypo- and hypercorrective changes may follow in succession. A hypocorrective change may be directly followed by a hypercorrective change, or the other way round. This is to be expected, given that sound change is largely unpredictable, even though its seeds are universally present.

6. An Alternative Analysis

Admittedly, many of the changes discussed above can be analyzed by invoking rules or constraints referring to natural classes defined in articulatory or acoustic terms, as is done in many generative accounts of sound change (e.g., Kiparsky 1995). For example, the emergence of diphthongs after labials and velars in Kashubian (*pɔ > pwɔ*, *kɔ > kwɔ*) can be loosely stated as in (34), where rounded vowels receive an on-glide after labials and velars (G stands for a glide, C for a consonant, and V for a vowel). This formalization is problematic as it is not clear why the diphthongization occurs after labials and velars to the exclusion of coronals.

(34) Kashubian diphthongization—first attempt

G	C	V
ø → [+rounded]	/[–coronal] ___	[+rounded]

In an attempt to reduce the arbitrariness of the statement in (34), one could appeal to the acoustic feature [grave], where [+grave] segments are defined by the concentration of energy in the lower frequencies of the spectrum (Jakob-

son and Halle 1956). Segments marked [+grave] include labial consonants, velar consonants, and back vowels. Thus, with the aid of the feature [grave] the segments involved in the Kashubian diphthongization form a natural class. The rule receives the improved formulation in (35).

(35) Kashubian diphthongization—second attempt

$$\begin{array}{ccccc} & & G & C & V \\ \text{ø} & \rightarrow & [+\text{grave}] & / [+\text{grave}] \_\_ & [+\text{grave}] \end{array}$$

While the rule in (35) adequately captures the affinity of the segments involved in the process, it is still unclear why the diphthongization (or glide insertion) occurred in the first place. An explanation that appeals to the reduction of markedness as the driver of the process is difficult to maintain without running the risk of being ad hoc. In other words, although formulations such as (35) attain descriptive accuracy, they have limited explanatory and predictive power. The proposed listener-oriented approach is preferable, as it is based on empirically verifiable articulatory, acoustic and perceptual evidence.

7. Conclusion

It has been shown that the listener-oriented approach to change provides an insightful explanation for historical processes that resulted in synchronic alternations in modern Kashubian. The conditioning of these changes finds an explanation in acoustic and perceptual factors. In the case of the preservation of jers, phonetic length resulting from an affiliation with an open syllable and the context of a following voiced consonant is phonologized when the conditioning context is lost. As regards diphthongization, the relatively long formant transitions of non-coronals are phonologized as on-glides of diphthongs. The failure of other contexts to trigger similar changes has also received a plausible perception-based explanation. For example, insufficient phonetic length resulted in the loss of jers before voiceless consonants and the C-to-V transitions after coronal consonants were not long enough to be phonologized as an on-glide of a diphthong by the listener.

The Kashubian changes have been situated in the larger context of similar changes in other languages, providing further support for the proposed explanations. A typology of listener-oriented changes has emerged, where phonetic factors **to some extent** determine the probability that a given change will occur. For example, the longer the phonetic duration of a vowel in a particular context, the more susceptible the vowel is to the phonologization of length when the conditioning context is lost. The longer the formant transitions of a consonant into and out of a vowel, the more likely it is that a diphthong will be phonologized.

Finally, the discussion has provided support for the non-deterministic nature of sound change. As both hypocorrection and hypercorrection are usually involved in language acquisition, the seeds of change are universally present. Whether a given change will occur or not cannot be fully predicted, as change is not goal-oriented or teleological. Yet, there appear to be conditions that induce certain types of change. For example, in hypocorrective changes, the prior existence of a certain structure in the language facilitates the emergence of this structure in different contexts: The pre-existence of word-initial diphthongs prompts their phonologization word-internally. Hypercorrective changes are predicted to occur when a feature with a long acoustic span is involved. It has also been shown that hypo- and hypercorrective changes are often interspersed in the evolution of a phenomenon, as both mechanisms rely on resolving ambiguities in the phonetic signal, though in opposite ways.

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What's in a Russian Aspectual Prefix? A Cognitive Linguistics Approach to Prefix Meanings*

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Abstract: This article analyzes Russian aspectual prefixes from the perspective of cognitive linguistics. First, a general schema is advanced that involves a trajector, a landmark, and a relation connecting the two. Second, it is argued that there are conditions on the trajector involving an observer and a domain of accessibility and that the trajector of the prefix is not necessarily the same as the trajector of the verb. Third, landmarks are shown to come in four types, involving the image schemas POINT, LINE, PLANE, and CONTAINER. Fourth, the PATH image schema is demonstrated to represent the prototypical relation between trajector and landmark, although the prefix *po-* represents an important exception to the generalization that prefixes encode a PATH. Fifth, it is shown that motion verbs provide strong empirical evidence for *po-* as a pathless prefix. Finally, it is proposed that the aspectual meaning of prefixes is the result of metaphorical extension of their basic spatial senses. Taken together, the article presents a small inventory of conceptual building blocks and advances the hypothesis that these building blocks are sufficient to describe all the meanings of the aspectual prefixes in Russian.

1. Introduction: Problem and Contribution

Few topics have received more attention in Slavic cognitive linguistics than aspectual prefixes, which have been studied extensively from the earliest years of cognitive linguistics (Janda 1986; Dickey 2000; Shull 2003; Janda et al. 2013, to mention only four monographs). Typically, studies couched in a cognitive linguistics framework do not propose single abstract invariant meanings that cover all uses of a prefix but rather analyze prefix semantics in terms of radial categories, i.e., networks of related submeanings organized around a prototype (see Lakoff 1987). The radial-category approach has proven fruit-

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ful in that it has facilitated tests of important hypotheses such as the Vey/Schooneveld Hypothesis (Vey 1952 and Schooneveld 1958) that no Slavic prefix is semantically empty and the Classifier Hypothesis that Slavic aspectual prefixes are verbal classifiers (Janda et al. 2013; Janda and Dickey 2015). At the same time, the internal structure of each node in the radial categories has received less attention in these studies, and the nodes are typically represented as simple labels, such as APART, CRUSH, and SPREAD (from the analysis of the Russian prefix *raz-* in Janda and Nesset 2010).

The aim of the present study is to complement earlier studies in Slavic cognitive linguistics by zooming in on the content of each node in the radial categories. However, rather than providing detailed analyses of individual prefixes, I address the general structure of prefix meanings and the semantic building blocks that combine in different ways to produce the various meanings of the Russian aspectual prefixes.

The contribution of my study can be summarized as follows. First, I show that the general schema for Russian aspectual prefixes involves three elements that I will refer to as trajector, landmark, and relation. Second, I argue that there are nontrivial conditions on the trajector involving differences between verbs and prefixes and the role of an observer and a domain of accessibility. Third, with regard to landmarks, I suggest they are of four types POINT, LINE, PLANE, and CONTAINER. Fourth, the PATH image schema is shown to represent the typical relation, although the prefix *po-* is exceptional in that it does not involve a PATH. It is demonstrated that verbs of motion in Russian offer strong empirical arguments for *po-* as a pathless prefix.

The present study is organized as follows. After a discussion of a general schema for Russian aspectual prefixes in section 2, we turn to conditions on the trajector in sections 3 through 5 and conditions on the landmark in section 6. Sections 7 through 10 explore the relation between trajector and landmark with special focus on the lack of the PATH image schema in *po-*. The contribution of the study is summarized in section 11.

2. A General Schema for Russian Aspectual Prefixes

By aspectual prefix I mean a prefix that changes the aspect of a verb from imperfective to perfective when attached to an unprefixed verb. Thus if we add the prefixes *na-*, *pere-*, or *po-* to the imperfective *pisat'* 'write', the result is the perfective verbs *napisat'* 'write', *perepisat'* 'rewrite', and *popisat'* 'write for a while'. Notice that I do not limit myself to so-called aspectual pairs such as *pisat'—napisat'*, where the imperfective and perfective verbs have the same meaning (apart from the aspectual difference). I also consider what Janda (2007) refers to as "specialized perfectives", such as *perepisat'*, where the prefix changes the lexical meaning of the verb, and "complex acts" such as *popisat'*,

where the prefix places temporal boundaries on the action described by the verb.

Determining the exact number of aspectual prefixes in CSR is a non-trivial question. For instance, while some researchers count *o-*, *ob-*, and *obo-* as different prefixes, other scholars argue that they are allomorphs of one prefix (Krongauz 1998: 133–39; Endresen 2014: 102–50). However, this is tangential to the problem under scrutiny in the present study, and the prefixes listed in Table 1 will form the starting point for my analysis. As illustrated by the examples in the table, all these prefixes are capable of changing the aspect when added to an unprefixed verb. I represent each prefix by its basic allomorph but indicate that *o-* has variants, since—as mentioned—some researchers consider these variants separate morphemes. In cases where the prefix changes the lexical meaning of the verb, the gloss in the table is for the perfective verb, which has the most specific meaning.

Table 1. Inventory of aspectual prefixes in Russian

Prefix	Imperfective	Perfective	Gloss
do-	delat′	dodelat′	'finish'
iz-	pisat′	ispisat′	'use up, by writing'
na-	pisat′	napisat′	'write'
nad-	pisat′	nadpisat′	'superscribe'
o(b(o))-	bednet′	obednet′	'become poor'
ot-	rekomendovat′	otrekomendovat′	'recommend'
pere-	pisat′	perepisat′	'rewrite'
po-	pisat′	popisat′	'write for a while'
pod-	pisat′	podpisat′	'sign'
pri-	gotovit′	prigotovit′	'prepare'
pro-	idti	projti	'walk through'
raz-	kolot′	raskolot′	'chop up'
s-	igrat′	sygrat′	'play'
u-	krast′	ukrast′	'steal'
v-	idti	vojti	'walk into'
vz-	trevožit′	vstrevožit′	'worry'
vy-	pisat′	vypisat′	'write out'
za-	pisat′	zapisat′	'write down'

Is it possible to formulate a general schema, i.e., a template that covers all the prefixes in Table 1? Consider the following simple sentences:[1]

(1) On vošel v komnatu.
'He went into the room.' (Iličevskij 2009)

(2) On […] vyšel iz komnaty.
'He went out of the room.' (Belousova 2000)

Both sentences describe two participants, *on* 'he' and *komnata* 'room'. Following Langacker (2008: 70) I will refer to the most prominent participant, the subject *on*, as the trajector, while the second participant, *komnata*, will be called the landmark. Both sentences portray a relation between trajector and landmark, and this relation is encoded in the prefix. We can see this by comparing (1) and (2); if we replace *v-* by *vy-*, the result is the opposite relation, where the trajector leaves the landmark rather than entering it. The following schema captures the generalization that prefixes describe a relation between two participants, the trajector and the landmark:

(3) General schema for Russian prefixes:
Trajector—Relation—Landmark

Besides representing a template for the meaning of prefixes, this general schema also shows the semantic similarity between prefixes and prepositions.[2] In (1) the preposition *v* 'in(to)' designates the same relation between trajector and landmark as the prefix *v-*, while the preposition *iz* 'out of' in (2) involves the same relation as the prefix *vy-*.[3]

Although the general schema in (3) may not be controversial, it raises a nontrivial question: what are the conditions on trajectors, relations, and landmarks? This question will occupy us in the remainder of this article. We start from the trajector, which we will explore in sections 3 through 5.

[1] Throughout this article, examples are taken from the Russian National Corpus, available at www.ruscorpora.ru. For examples from fiction, I provide the name of the author, while name of newspaper, journal or internet forum is given for examples from nonfiction. The year of publication is provided for all examples.

[2] Notice that while the prefixes in Table 1 involve only two arguments (trajector and landmark), prepositions may involve more than two. For instance, *meždu* 'between' relates three arguments as in *Ne budet li on stojat' meždu mnoj i Aleksandroj?* 'Isn't he going to be standing between me and Alexandra?' (Vodolazkin 2012).

[3] For detailed analyses of the relationship between the prefixes *vy-* and *iz-*, see Endresen 2019 and Nesset, Endresen, and Janda 2011.

3. Conditions on the Trajector 1: Verbs vs. Prefixes

The first condition on trajectors concerns the difference between verbs and prefixes. Consider the following simple example where the prefix *u-* combines with the intransitive motion verb *exat'* 'go (in a vehicle)':

(4) Ja uexal v London.
'I went to London.' (Čukovskij 1953)

The landmark is London, which is the goal of the trip. The trajector of the verb is the grammatical subject, which represents the primary argument that is assigned the nominative case (Langacker 2008: 210). The prefix *u-* encodes a relation whereby the trajector moves away from its present location and ends up somewhere else, in this case London. Since the grammatical subject *ja* 'I' is the mover (the entity that undergoes movement), the grammatical subject is the trajector not only of the verb, but also of the prefix.

Things become more complicated when we consider sentences with three participants:

(5) On uvez menja v London.
'He took me to London.' (Radzinskij 1999)

The trajector of the verb is still the grammatical subject, since this is the primary participant that receives nominative case. But what is the trajector of the prefix? Is it the grammatical subject *on* 'he' or the object *menja* 'me' that represents the mover? The truth value of the sentence depends on whether the object ends up in London, so it stands to reason that the object is the mover and hence the trajector of the prefix. The subject *on* 'he', which we may refer to as the causer, may of course also end up in London, but this does not affect the truth value of the sentence. The sentence is equally true if the subject (causer) goes back to the place he came from—as long as the grammatical object ends up in London.

Comparison of sentences (4) and (5) shows that the prefix trajector is the subject of an intransitive verb and the object of a transitive verb. To the extent that the intransitive subject aligns with the transitive object, we are dealing with a situation that resembles case-marking in ergative languages. This state of affairs is not restricted to the prefix *u-* and the verb *exat'* but generalizes to all situations involving movement or transfer and the roles causer, mover, and goal. In the following sentence with the verb *prislat'* 'send', the prefix *pri-* denotes the arrival of the mover (trajector) at the goal (landmark). Since it is clearly the letter (the grammatical object) that moves to the editorial office, not Solzhenitsyn, the letter is the trajector of the prefix, while Solzhenitsyn (the grammatical subject and causer) is the verb's trajector:

(6) Solzhenitsyn ešče v aprele prislal pis'mo v redakciju.
'Already in April Solzhenitsyn sent a letter to the editorial office.'
(Popovskij 1971)

In the preceding example, a prepositional phrase represents the goal (landmark), but the assignment of the trajector is the same in the dative construction, where an indirect object in the dative represents the goal. Clearly, the letter is the mover and therefore the trajector of the prefix:

(7) On prislal mne pis'mo.
'He sent me a letter.' (D'jakonov 1941–42)

The upshot of this discussion is that verbs and prefixes may have different trajectors. We may formulate the following generalization:

(8) The verb/prefix trajector condition:
In three participant situations with causer, mover, and goal, the grammatical subject is the trajector of the verb, while the prefix trajector is the direct object.

4. Conditions on the Trajector 2: The Observer

The next condition concerns the perspective from which the verbal action is viewed. Does the prefix make us view the action from the perspective of the trajector, or are other perspectives possible? As we will see, the answer depends on the prefix.

Consider the following example with the prefix *vy-*, which describes a situation where the trajector moves out of the landmark, in this case a theater:

(9) Vošel v ložu k samoj zanevesi, tak čto ne videl, byla ona uže v teatre ili net. V pervom antrakte uvidel ee v beloj kosynke na plečax […]. Vo vtorom—ne videl, kak ona vyšla v foje.
'I went into the loge by the curtain, so I did not see if she was already in the theater or not. During the first intermission, I saw her with a white scarf over her shoulders […]. During the second one, I did not see her go out into the lobby.

The narrator is looking at a woman who is seated in another part of the theater before she goes out into the lobby. We may refer to this as an internal perspective, since the observer is located inside the place where the trajector starts his/her movement.

However, *vy-* is also compatible with an external perspective, where the observer is placed outside the location where the movement originates:

(10) On ukrylsja za garažom i videl, kak oxrannik vyšel na kryl'co.
'He hid behind the garage and saw the guard come out onto the porch.' (A. and B. Strugastkie 1966–68)

In this example, the movement starts inside the house but is viewed from outside. While in (9) the trajector moves away from the observer, in (10) the movement is **towards** the observer, who is standing behind the garage, waiting for the trajector to appear on the porch.

The question now arises as to whether all prefixes allow both internal and external perspectives. The answer appears to be no, as shown by the prefix *u-*:

(11) Ty videla, kak Marik ušel utrom?
'Did you see Marik leave in the morning?' (Sabitova 2007)

Here an internal perspective is adopted, since we observe how the trajector (Marik) leaves the room where the movement originates. An external perspective seems incompatible with *u-*. The prefix implies that the trajector moves away, i.e., disappears, and therefore sentences where the trajector moves towards an observer appear unlikely for *u-*. This is implied by the traditional label ablative that is sometimes used about *u-* (see Luraghi, Naccarato, and Pinelli 2020) and the Russian label *proč'* 'away' (Zaliznjak 2001).

I suggest that an adequate description of the prefixes *vy-* and *u-* must accommodate the fact that the former is compatible with both an internal and an external perspective, while the latter requires an internal perspective. The schemas in Figure 1 capture this difference. Both prefixes involve the trajector following a path (the arrow) out of the landmark (the oval). The schema for *u-* in addition includes an observer (the face) inside the landmark. For *vy-*, no observer is included in the schema, since as shown in (9) and (10) there is no requirement that a particular perspective is adopted.

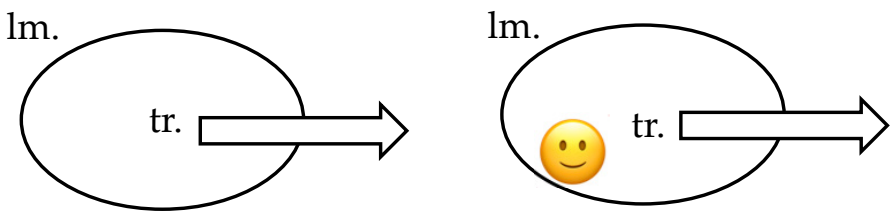

Figure 1. General schemas for prefixes *vy-* (left) and *u-* (right)

To summarize, the comparison of *vy-* and *u-* shows that we need the concept of observer in order to provide a complete description of Russian aspectual prefixes:

(12) The observer condition:
The meaning of a prefix may involve an observer that views the movement of the trajector from a particular perspective.

5. Conditions on the Trajector 3: Domain of Accessibility

Further comparison of *vy-* and *u-* reveals the relevance of another concept, the domain of accessibility. One of the properties of *u-* is that it implies that the trajector is no longer available once the movement has taken place. The following example illustrates this:

(13) – Muž? Prišel i ušel, i net ego,—skazala ona žestko.
'"My husband? He came and left, and he is not here", she said harshly.' (Panova 1958)

Here the implication of the prefix that the trajector (the husband) is no longer available is made explicit, since the verb *ušel* 'he left' is followed by *net ego* 'he is not here'. Here is a parallel example with a metaphorical meaning, where somebody's youth is gone:

(14) Junost' uže ušla, ee net […].
'Youth is gone already, it doesn't exist anymore […].'

Examples like (13) and (14) suggest that *u-* not only means that the trajector leaves the landmark but in addition that the trajector ends up being unavailable.[4] No such condition applies to *vy-*:

(15) On vyšel na ulicu, zakuril.
'He went outside and had a smoke.' (Marinina 1995)

As in this example, *vy-* is typically used when the trajector ends up just outside the landmark and is still available. In order to capture the difference between the two prefixes, we may include a domain of accessibility in the analysis. In the representation of *u-* in Figure 2 on the following page, the endpoint of the

[4] Zaliznjak (2001: 75) remarks that to *ujti* 'walk away' tends to be used about leaving for a long time (*nadolgo*) or forever (*navsegda*), which she relates to the idea of disappearing from the field of vision (*pole zrenija*). This supports the idea that *u-* implies that the trajector ends up being unavailable.

path is outside the domain of accessibility (the dashed oval), thus indicating that the trajector ends up being unavailable. Since *vy-* does not have this feature, the domain of accessibility is not included in the diagram for this prefix. Notice that the domain of accessibility is not the same as the landmark. Both *vy-* and *u-* indicate that the trajector leaves the landmark, but in addition *u-* states that the trajector is no longer available, i.e., ends up outside the domain of accessibility. In order to accommodate the semantic difference between the two prefixes we therefore need the concept domain of accessibility in addition to trajector and landmark.

Domains of the type explored in this section are well known in cognitive linguistics. For instance, in Langacker's (1993) analysis of possessive constructions in terms of reference points, a dominion plays an important role. Langacker's concept is very close to domain of accessibility explored above. In Russian the domain of accessibility is relevant beyond the analysis of aspectual prefixes. A case in point is negative existential sentences. As shown in Babby's (1980) seminal analysis, *Ego net doma* describes the non-accessibility of something or someone within a domain, here *doma* 'home'. Stated differently, in negative existential sentences a trajector is outside the domain of accessibility in the same way as the prefix *u-* indicates movement out of this domain, as shown above.

Summarizing the analysis, we have seen that in addition to an observer discussed in the previous section, we also need a domain of accessibility in order to provide an adequate characterization of the trajector:

(16) The domain of accessibility condition:

The meaning of a prefix may relate the trajector to a domain of accessibility.

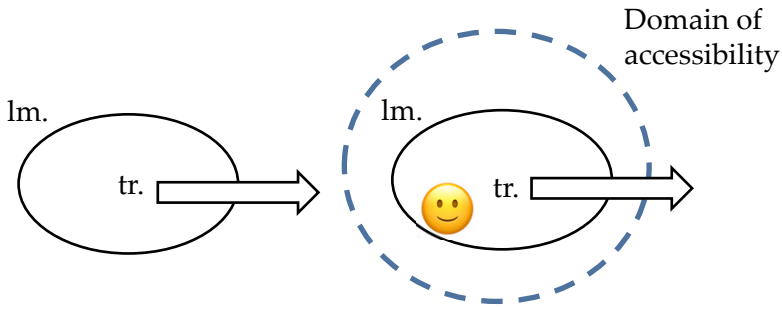

Figure 2. Adjusted general schemas for prefixes *vy-* (left) and *u-* (right)

6. Conditions on the Landmark

Conditions hold also for landmarks. I suggest landmarks come in four geometric types and a given prefix may be compatible with more than one type. The four types are POINT, LINE, PLANE, and CONTAINER, which I will represent in capital letters, since they may be analyzed as image schemas, i.e., abstract prelinguistic structures based on embodied experience (Johnson 1987).

In the following example, the landmark is a POINT, which the trajector moves up to:

(17) "Kunašir" podošel k točke randevu.
'"Kunašir" approached the meeting point.'
(A. and B. Strugackie 1961–67)

The prefix *pod-* can also be used about landmarks that are not points in a literal sense:

(18) Ja vzjal zerkalo i podošel k oknu.
'I took the mirror and walked over to the window.' (I. Tolstoj 2012)

However, while a window can be considered to be a two-dimensional plane (as in *the bird hit the window*) or a three-dimensional area (as in *I was sitting in the window*), for the purposes of *pod-* the window in (18) is just a point in space that the trajector approaches.

The prefix *pere-* provides good illustrations of the image schema LINE:

(19) Načalas' vojna. Vrag perešel granicu.
'The war had started. The enemy crossed the border.'
(*Soldat udači* 2004)

Here is an example where the landmark is a PLANE:

(20) Ona ispuganno vyterla slezy i ogljanulas', no slezy nabežali snova.
'Scared, she wiped away her tears and looked around, but tears again covered (lit. ran over) her eyes.' (Ketlinskaja 1942)

The prefix *na-* here indicates that the tears covered the surface of her eyes—a (curved) plane in geometrical terms.[5] Another prefix that is compatible with a

[5] *Nabežat'* is a polysemous verb, and as pointed out by a reviewer, the PLANE image schema may not be equally relevant in all the uses of the verb. The reviewer cites the following example:

PLANE as the landmark is *za-*, as in the following example, where the surface of a street is covered with asphalt:

(21) K priezdu važnoj činovnicy zaasfal'tirovali dorogu.
'In preparation for the arrival of an important bureaucrat the road was covered with asphalt.' (*Russkij reporter* 2013)

The fourth type of landmark, CONTAINER, is illustrated in examples of the following type:

(22) Spustivšis' vniz, on vošel v komnatu.
'Having come downstairs, he entered the room.' (Cerniš 2010)

Here, the landmark (the room) is a three-dimensional space, that we for convenience may term CONTAINER.

The four types of landmarks are visualized in Figure 3 on the following page. Based on the examples discussed in this section, I suggest the following condition:

(23) The landmark image schema condition:

The landmark of a Russian aspectual prefix is a POINT, LINE, PLANE, or CONTAINER.

At this point the reader may ask whether the statement above narrows down the range of possible landmarks; after all, it permits landmarks from zero to three dimensions. However, there is no limit to the number of distinctions that could potentially be encoded. Potentially, landmarks can be of all sorts and shapes—round, rectangular, curved, small, long, etc. However, the Russian aspectual prefixes do not encode such meanings but are instead restricted to the four image schemas listed in (23). The prefixes observe Talmy's (2000b: 25) typological restriction: closed-class items have topological mean-

(i) Ja sglotnul nabežavšuju v rot sljunu.
'I swallowed the saliva that suddenly appeared in my mouth.' (Pelevin 2013)

According to the reviewer, the meaning shared by this example and example (20) is "sudden, uncontrolled appearance of something with a point of contact". I agree that a sudden, uncontrolled appearance is an important part of the meaning of *nabežat'*, and I suggest that this part of the meaning is motivated by the base verb *bežat'* 'run', which denotes rapid movement. With regard to the "point of contact", I suggest that this is a surface (PLANE), since even in the example with the saliva, the saliva covers the relevant surfaces inside the mouth. However, while one may disagree on the details of the analysis of *nabežat'*, the reviewer brings up an important question: to what extent is the basic spatial meaning of a prefix present in all uses of a prefixed verb? We return to this question in section 9.

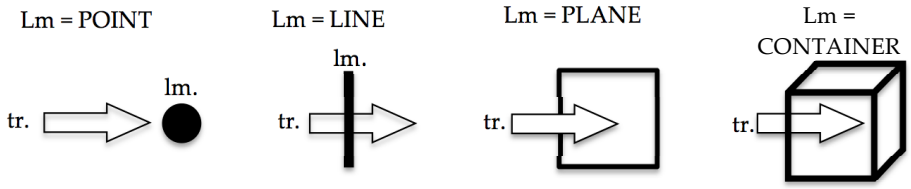

Figure 3. Four types of landmarks: POINT, LINE, PLANE, and CONTAINER

ings, i.e., meanings that specify basic shapes, rather than other aspects of reality.

Before we leave conditions on landmarks, it is important to point out that a prefix may be compatible with more than one of the four types mentioned in (23). The prefix *o(b)-* illustrates this:

(24) Korolev spustilsja v pereulok, obošel dom, priblizilsja k musornym kontejneram.
'Korolev went down into the narrow street, went around the house, and approached the trash cans.' (Iličevskij 2007)

While in (24), the landmark (the house) can be construed as a POINT, which the trajector moves around, in (25) the house is arguably construed as a PLANE, that is covered completely by the action, insofar as the subject looks all over the house:

(25) Posle obeda Vasilij Mixajlovič obošel dom, osmotrel. […] Dom xorošij.
'After lunch Vasilij Mixajlovič went all over the house and inspected it. […] The house is fine.' (Kara-Murza 1998)

7. Do All Prefixes Involve a PATH?

In all the examples we have considered so far, the relation connecting the trajector and the landmark has been a PATH. This is no coincidence; Russian is a satellite-framed language (Talmy 2000b: 222), where the PATH image schema is expressed in satellites such as prepositions and prefixes. In view of this, the strongest hypothesis we can advance is this:

(26) The PATH hypothesis:
All Russian aspectual prefixes express the PATH image schema.

In the next section, we will see that this hypothesis is too strong. Although the hypothesis captures the typical state of affairs for Russian prefixes, the prefix *po-* is an exception in that it does not encode a PATH. However, before we turn to *po-*, we will consider some examples with different manifestations of the PATH image schema, which testify to the versatility of this image schema.

Straightforward examples involving the PATH image schema come from verbs of motion, such as prefixations of *idti* 'walk' and *bežat'* 'run' explored in the previous section. In such verbs, the trajector moves along a PATH. Can we analyze other verbs by means of the same image schema? By way of example, let us first consider the verb *šit'* 'sew', which denotes a physical activity, but unlike *idti*, *bežat'* and other motion verbs does not focus on movement from one location to another. If we add the prefix *pri-* to *šit'*, the result is a verb that means 'attach':

(27) Tam že ja prišila k plat'ju belyj vorotničok.
'Right there I attached a white collar to the dress.' (Petruševskaja 1987)

Here the collar that is attached to the dress follows a PATH onto the dress in accordance with the PATH hypothesis.

Adding *raz-* yields a more substantial change in the lexical meaning of the verb, since *rasšit'* means 'embroider':

(28) Ona […] rubaxu ne rasšila.
'She […] didn't embroider the shirt.' (Šiškov 1928–33)

Raz- typically denotes movement in different directions from a center (see e.g., Janda and Nesset 2010), and the meaning of *rasšit'* 'embroider' is compatible with this meaning, since embroidering involves moving one's hands in different directions and placing stitches all over a surface. Arguably, therefore, a PATH is part of the meaning of the prefixed verb, as predicted by the PATH hypothesis.

Here is a metaphorical example where *šit'* combines with the prefix *pro-*:

(29) Čerez tri mesjaca ja vižu v telenovostjax znakomuju mne černuju «Audi», podrobno prošituju puljami.
'Three months later I see on the TV news a black Audi that I recognized, which was riddled (lit. "sewn through") with bullet holes.' (Saxnovskij 2003)

This prefix has the prototypical meaning 'through', thus denoting a PATH from one side to the other of a landmark. Example (29) is compatible with this, since the bullets follow a PATH through the car. (I analyze this as a metaphor-

ical example; although the bullets follow a physical PATH, the PATH does not result from sewing in the literal sense.)

The examples above involve dynamic verbs. Is the PATH image schema also compatible with stative predicates? Again, *pro-* is a good example. If we add *pro-* to the stative predicate *stojat'* 'stand', the result is a metaphorical PATH through time:

(30) Mne povezlo: ja prostojal tol'ko čas.
'I was lucky, I stood there only for (lit. "through") an hour.'
(*Russkij reporter* 2008)

The stative event of standing is metaphorically construed as a process that follows a PATH through a period of time, in this case an hour.

The prefix *ot-* also illustrates how the PATH gets reinterpreted when it combines with a stative predicate. For the sake of comparison, consider first the following example where *ot-* combines with the dynamic predicate *exat'* 'drive':

(31) Ot"exal ot goroda, ostanovilsja u lesa.
'I drove away from the city and stopped by the forest.'
(Zotov and Šaxmagonov 1977)

The prefix denotes a PATH away from the landmark, in this case a city, and the trajector (the implicit subject of the sentence) moves along this PATH. In the following example, *ot-* combines with the stative predicate *stojat'* 'stand':[6]

(32) Akademgorodok otstoit ot goroda xot' i ne na čas i vosem' minut.
'The academic town is located not even an hour and eight minutes from the city.' (Popov 1970–2000)

Since there is no physical movement involved, the PATH is instead interpreted as indicating direction. The sentence prompts us to scan through the PATH from the city to the academic town, as it were measuring the distance from the academic town and the city. In the example, the measurement is in terms of driving time, but the construction is compatible with spatial measurement, say, in kilometers. Examples of this type resemble sentences with endpoint metonymy in English, as in *He lives over the hill* where the focus is on the end-

[6] Notice that in the construction in (32) *otstojat'* behaves like an imperfective verb (Zaliznjak 1980), and thus represents an exception to the general rule that adding a prefix to a simplex verb yields a perfective verb. I will not discuss this issue here, since it is tangential to the present study.

point of the path (Lakoff 1987: 419). Notice that *otstojat'* is also used about metaphorical distances:

(33) Odnako sud'ba ego nedaleko otstojala ot sud'by "Van'ka".
'However, his fate was not very different from (lit. "not far away from") that of "Vanek".' (Limonov 1987)

The examples we have reviewed in this section indicate that PATH is a versatile image schema that manifests itself in both literal and metaphorical examples, and combines with both dynamic and stative predicates. While this lends support to the PATH hypothesis, the prefix *po-* represents an exception—as we will see in the next section.

8. *Po-*: A Prefix Without a PATH?

Dickey (2007: 326, see also Dickey 2011) has argued that the prefix *po-* has changed its meaning from PATH/SURFACE-CONTACT to INGRESSIVE-PARTIAL TRAJECTORY. For present purposes, it is not necessary to explore the details of Dickey's thorough analysis, but his main point is important: although the meaning of *po-* used to involve a PATH, *po-* in modern Russian is a pathless prefix. In what follows, I will provide an argument in favor of Dickey's analysis that is not discussed by Dickey. The PATH hypothesis discussed in the previous section will be shown to be too strong, since there is at least one prefix that does not involve the PATH image schema.

The Russian distinction between unidirectional motion verbs such as *idti* 'walk (in one direction towards a goal)' and non-directional verbs such as *xodit'* 'walk' can be analyzed in terms of the PATH image schema.[7] Since the unidirectional verbs are used for goal-directed motion, it makes sense to say that their meaning contains a PATH, while non-directional verbs lack the PATH image schema in their meaning, since they are used about movement that is not goal-directed (Nesset 2008):

(34) Čtoby uvidet' kenguru, ne nado bylo daže idti v les.
'In order to see a kangaroo, we didn't even have to walk into the forest.' (*Nauka i žizn'* 2008)

(35) Ja xodil po lesu i čuvstvoval sebja putešestvennikom.
'I walked around in the forest and felt like an explorer.' (Granin 1966)

[7] Alternative terms for motion verbs are determinate/indeterminate (e.g., Timberlake 2004) and unidirectional/multidirectional (e.g., Wade 1992).

While in (34) the subject follows a PATH into the forest, which is the goal of the walk, in (35) the walk takes place inside the forest, not following a particular PATH.

What happens when we combine unidirectional and non-directional verbs with prefixes? In the normal case, the result is a pair of synonymous verbs that differ only in aspect, e.g., *vojti* 'walk into' (perfective) and *vxodit'* 'walk into' (imperfective). We can account for this if we assume that the prefix involves the PATH image schema. The unification of the relevant facets of prefix and verb meanings can be represented as follows:[8]

(36) Prefixation of unidirectional verb:

v- + *idti* = *vojti* 'walk into' (perfective)
PATH + PATH = PATH

(37) Prefixation of non-directional verb:

v- + *xodit'* = *vxodit'* 'walk into' (imperfective)
PATH + Ø = PATH

In (36), both the prefix and the simplex verb contributes the PATH image schema, and hence the prefixed verb also contains a PATH. In (36), the simplex verb does not have a PATH (as shown by the Ø symbol), but the prefixed verb nevertheless includes a PATH, which it inherits from the prefix. We thus correctly predict that the result is two prefixed verbs that are synonymous since both include a PATH. The only difference between *vojti* and *vxodit'* is that the former is perfective, while the latter is imperfective.

An important exception to the pattern illustrated in (36) and (37) is motion verbs with *po-*. Unlike *vojti* and *vxodit'*, which have the same meaning, the corresponding verbs with *po-* have somewhat different meanings, insofar as *pojti* means 'begin to walk', while the meaning of *poxodit'* can be glossed as 'walk for a while'. Can we predict this outcome by means of the PATH image schema? I argue that the answer is yes, if we adopt Dickey's (2007) analysis of *po-* as a prefix without a PATH:

(38) *Po-* and unidirectional verb:

po- + *idti* = *pojti* 'begin to walk' (perfective)
Ø + PATH = PATH

[8] Notice that I use unification in the sense of Sag et al. (1985: 246) about "an operation that does nothing more than to amalgamate compatible partial information and to fail to amalgamate incompatible partial information."

(39) *Po-* and non-directional verb:

po- + *xodit'* = *poxodit'* 'walk for a while' (perfective)
Ø + Ø = Ø

In (38), the unification of the prefix and verb meanings yields a prefixed verb with a PATH, since the unidirectional verb *idti* involves a PATH. In (39), however, the result of the unification process is a prefixed verb without a PATH; since neither prefix, nor simplex verb contains a PATH, there is no PATH for the prefixed verb to inherit.

The upshot of this discussion is simple. We are able to provide a principled account for the unusual properties of motion verbs with *po-* if we follow Dickey and assume that *po-* does not contain a PATH. This suggests that Dickey's assumption is correct, and we thus have a strong argument in favor of the analysis of *po-* as a pathless prefix. Thus, the PATH hypothesis discussed in the previous section is too strong, insofar as there is at least one exception to the idea that all prefixes involve the PATH image schema.

9. Dichotomy or Continuum?

The analysis of *po-* as a pathless prefix raises an important question: to what extent is the basic spatial meaning of a prefix present in all uses of a prefixed verb? Are we dealing with a dichotomy, whereby spatial image schemas such as PATH are either present or absent? Or should we rather construe the situation as a continuum which spans from cases where the spatial image schemas are clearly present, through examples where the spatial meaning is attenuated, to the limiting case of *po-* where the PATH image schema is completely absent, as argued above? In keeping with basic tenets of cognitive linguistics (Langacker 2006), I propose that a continuum represents the more realistic model.

The clearest cases for PATH and the other spatial image schemas explored in this article (POINT, LINE, PLANE, CONTAINER) come from verbs of motion used in their literal senses. Thus, in *On vyšel iz komnaty* 'he went out of the room' the trajector (*on* 'he') follows a physical PATH out of a physical CONTAINER (the landmark *komnata* 'room'). For this reason, examples with verbs of motion are numerous in the present study.

The spatial meaning of a prefix can be attenuated in numerous ways, some of which are touched upon above. One factor is metaphor, mentioned in section 7. Arguably, a metaphorical PATH is less salient than a literal PATH. Thus, the PATH may be attenuated in the metaphorical example *vyjti iz upotreblenija* 'go out of use' compared to the literal *vyjti iz komnaty* 'go out of a room'. The PATH may be even less salient in verbs such as *vyzdorovet'* 'recover (from illness)', where a person follows a metaphorical PATH out of an illness. While

vyjti 'go out' has both literal and metaphorical uses, the PATH in *vyzdorovet'* 'recover' is always metaphorical, which may make the PATH image schema a less salient part of the meaning of *vyzdorovet'* than of *vyjti*.

A second factor that may attenuate the PATH meaning of a prefix is so-called fictive motion (Talmy 2000a: 99) as in *doroga vyxodit iz kotloviny* 'the road goes out of the valley'. Here, a motion verb is used although the situation described is static. The fact that the road does not go anywhere in a literal sense, may make the PATH meaning less salient compared to examples with literal movement.

The attenuation of the PATH meaning may result from its interaction with other semantic elements in the meaning of a verb. The combination of directional prefixes with stative verbs, discussed in section 7, is a case in point. For instance, the combination of *vy-* with the stative verb *stojat'* 'stand' may lead to the construal of an arguably attenuated metaphorical path through time, as in *vystojat' dva časa* 'stand for two hours'.

Another potential source of attenuation of the PATH meaning is the interaction between the verb and other constituents of the sentence. Consider the verb *vypit'* 'drink', where the liquid one drinks follows a PATH out of a CONTAINER, as in *vypit' kofe iz čašečki* 'drink coffee from (literally "out of") a small cup'. Here, the prepositional phrase, which describes movement out of a source, arguably makes the PATH meaning more salient, while the PATH is attenuated in sentences without the prepositional phrase, e.g., *vypit' kofe* 'drink coffee'.

This discussion of mechanisms that may attenuate the meaning of spatial image schemas such as PATH is not meant to be exhaustive. However, it suffices to show that a dichotomous model whereby a spatial image schema is either present or absent in the meaning of a prefixed verb is overly simplistic. A more realistic model involves a continuum where a spatial image schema may be attenuated to various degrees. More research is needed in order to work out the details of this continuum model, but that topic is beyond the scope of the present study.

10. Where is Aspect?

Throughout this article I have used the traditional term "aspectual prefix", although the analysis has not had much to say about aspect as such. What is the relationship between the prefix meanings we have considered and the category of aspect? I propose that the aspectual meaning is the result of metaphorical extension from the basic spatial meanings of the prefixes.

Since the addition of a prefix to a simplex verb is the prototypical way of forming a perfective verb in Russian, we will be concerned with the perfective aspect, which has often been characterized as involving a change of state. Classic examples include Bondarko's (1996) idea that perfective verbs

express the "emergence of a new situation" (vozniknovenie novoj situacii) and Padučeva's (1996/2010: 85–88) similar characterization of perfective as involving the "onset of a new state" (nastuplenie novogo sostojanija, see Zaliznjak and Šmelev 2000: 34–35 for discussion).

In cognitive linguistics, change of state has been analyzed as a metaphorical extension from movement in space, e.g., the event-structure metaphor of Lakoff (1993: 220). I suggest that the Russian prefixes invoke a version of this metaphor:

(40) The metaphor of perfectivizing prefixes:
A CHANGE OF STATE IS MOVEMENT ACROSS A BOUNDARY.

With the exception of *po-*, we have seen that the meaning of prefixes involves a PATH in combination with one of the four image schemas POINT, LINE, PLANE, and CONTAINER that represent the landmark. Typically, the landmark defines a boundary that the PATH crosses. For instance, in sentences like *on vošel v komnatu* 'he walked into the room' (see example 21 above), the prefix describes a PATH into a CONTAINER, i.e., a PATH that starts outside the CONTAINER, and ends up inside it. I submit that movement following a PATH that crosses a boundary defined by a landmark represents the prototypical metaphorical motivation for the perfective aspect in Russian.

I hasten to add that the epithet "prototypical" is important here. I do not claim that the metaphor in (40) motivates all uses of perfective verbs in Russian. Importantly, while CONTAINER, PLANE, and LINE involve boundaries that can be crossed, POINT is arguably not compatible with the idea of crossing a boundary. Furthermore, Russian has atelic perfectives such as *poxodit'* 'walk for a while' and many other verbs with the pathless *po-* prefix. Such verbs arguably do not involve a change of state. Nevertheless, it stands to reason that change of state represents a prototypical meaning of the Russian perfective that is straightforwardly motivated through the metaphor in (40).

Does Russian have "aspectual prefixes"? If we follow the logic of the analysis developed in the present study, the prefixes in question primarily express spatial meanings. Aspect is subsidiary in that aspectual meanings emerge from the metaphorical interpretation of spatial movement as change of state. The prefixes are aspectual, but only as a side effect of their basic spatial meanings.

11. Concluding Remarks

In this article, I have discussed the meanings of the Russian aspectual prefixes. My contribution can be summarized as follows. First, I have shown that a general schema for prefixes involve three components, viz. a trajector,

a landmark, and a relation connecting trajector and landmark. Second, I have suggested that verbs and prefixes may have different trajectors, and I have advanced conditions on trajectors, involving an observer and a domain of accessibility. Third, it has been argued that landmarks come in four types: POINT, LINE, PLANE, and CONTAINER. Fourth, I have proposed that PATH represents the prototypical relation between trajector and landmark, but that *po-* is an exception, which does not involve a PATH in Russian. Fifth, I have shown that verbs of motion provide strong empirical support for *po-* as a pathless prefix. Finally, I have suggested that the aspectual meaning of the prefixes is the result of metaphorical extension from the basic spatial meanings.

Although the present article does not offer detailed descriptions of individual prefixes, it gives a small set of building blocks that can be combined in various ways to derive all the individual meanings of the Russian aspectual prefixes. In (41), the relevant concepts are located according to which part of the general schema for prefixes they relate to (trajector, relation, or landmark):

(41) Inventory of semantic building blocks for Russian aspectual prefixes

Trajector:	Relation:	Landmark:
Observer	PATH	POINT
Domain of accessibility		LINE
		PLANE
		CONTAINER

The strongest hypothesis one can adopt is that the inventory in (41) is sufficient to analyze all meanings of all Russian aspectual prefixes. However, further investigation of this hypothesis must be left for future research.

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Possessive Modifiers in Serbian: Coreference with Clitics and Strong Pronouns

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Abstract: On the basis of experimental evidence this paper shows that in Serbian prenominal possessive modifiers modifying a noun phrase in subject position can be interpreted as coreferential with a clitic or a strong pronoun in object position. This finding speaks against a condition B violation in these contexts as has been assumed in previous analyses of Serbian (cf. Despić 2013). It implies that possessive noun phrases in article-languages like English and articleless languages like Serbian may receive a parallel analysis (Universal DP hypothesis, Bašić 2004; Progovac 1998): in both languages, the modifier occupies a position in the noun phrase structure from where it does not c-command out of the noun phrase, leading to free covaluation in these contexts (cf. Reinhart 2006). Interestingly, clitics are more likely than strong pronouns to be interpreted as coreferential with the possessive modifier in our test. This may be attributed to the fact that clitic forms in general are more easily bound in non-c-command configurations. In addition, the discourse conditions in the test, where the possessor represented given information, could have contributed to the fact that it was more likely associated with a clitic than with a strong pronoun.

1. Introduction

There are two competing proposals concerning the structure of the noun phrase in article-less languages like Serbian. According to proponents of the Universal DP Hypothesis (Bašić 2004; Progovac 1998), Serbian noun phrases do not differ structurally from the noun phrase in article languages like English. They assume that both Serbian and English project a DP structure and that the difference between the languages concerns the realization of the D-head by an article: in contrast to English, D cannot be overtly realized by an article in Serbian. An alternative view has been proposed by Bošković (2005, 2008), who assumes that Serbian does not project a DP (the Parametrized DP Hypothesis). According to this author, DP-languages like English differ in systematic ways from NP-languages like Serbian with respect to left-branch extraction, adjunct extraction, scrambling, negative raising, multiple *wh*-fronting, and clitic doubling. This proposal assumes that prenominal modifiers are adjuncts to NP as shown in (1).

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(1) $[_{NP}$ Demonstr $[_{NP}$ Poss $[_{NP}$ AP $[_{NP}$ N]]]]
(Despić 2013: 240 following Bošković 2005)

According to Despić (2013), the lack of a DP shell in Serbian accounts also for cross-linguistic differences between English and Serbian with regard to binding properties.

In English, object pronouns can be coreferential with a possessive modifier modifying a noun phrase in subject position in the same sentence, see example (2).

(2) Paul_i's brother called him_i.

Despić (2013) argues that binding as in (2) is not grammatical in Serbian and that the object clitic pronoun *ga* 'him' in sentences like (3a) cannot be coreferential with the possessive modifier *Kusturicin* 'Kusturica's'. According to Despić, the same holds true if the clitic is replaced by a strong pronoun as in (3b).

(3) a. *Kusturicin_i najnoviji film ga_i je (Despić 2013: 245, ex. 12)
Kusturica's latest film him_{CL} is
zaista razočarao.
really disappointed

b. *Kusturicin_i najnoviji film je (Despić 2013: 246, fn.6, ex. ii)
Kusturica's latest film is
zaista razočarao njega_i.
really disappointed him_{STR}
[Intended] 'Kusturica_i's latest film really disappointed him_i.'

Despić (2011, 2013) attributes the ungrammaticality of these structures to the absence of a DP shell in Serbian. He assumes that Serbian prenominal modifiers are adjuncts (cf. also Zlatić 1997) that c-command out of the subject noun phrase, leading to a violation of binding principle B.

However, there seems to be some gradience with respect to the judgments. Some speakers of Serbian find (3b) with a strong pronoun less acceptable than (3a) with a clitic, which corresponds to a general preference for clitic pronouns in neutral contexts in Serbian. From the perspective of the NP account that attributes (3a–b) to a syntactic violation, it is also unexpected that, given the right discourse context, the ungrammaticality of the examples disappears and binding of a pronoun becomes possible in Serbian (Jovović 2020; see section 2).

In this paper, we will take a closer look at constructions like (3a–b) and argue for a unified account of possessive binding in articleless languages like Serbian and article languages like English, in terms of non-c-command and covaluation instead of binding. Based on experimental evidence,

we will show that possessive binding is indeed possible in Serbian. Our investigation concurs with accounts of binding and covaluation, which attribute cross-linguistic and language-internal variation to the properties of the pronominal objects available in a given language.

2. Theoretical Background

As mentioned in the introduction, the aim of this paper is to empirically investigate the binding properties of clitics and strong pronouns in Serbian and to discuss their theoretical implications. More concretely, we will pursue the following research questions: a) Is coreference between a possessive modifier modifying a noun in subject position and a (clitic or strong) pronoun in object position possible for native speakers of Serbian? and b) do we find a difference between clitic and strong pronouns with respect to the possibility of coreference with possessive modifiers?

The first research question is based on Despić's proposal, which will be discussed briefly in section 2.1. The second research question follows from observations by Franks (2019), suggesting that different types of pronouns may behave differently with respect to binding. We will discuss these observations in section 2.2.

2.1. Binding and (the Lack of) C-Command

The grammaticality of possessive binding in languages like English (as exemplified in 2) has been attributed to the fact that the possessor is not in a configuration to bind the pronoun and therefore no violation of binding principle B arises (cf. Reinhart 2006: 186). According to Kayne (1994), following Szabolcsi's (1981, 1983) analysis of Hungarian possessives, the possessor in English occupies a structural position below DP from where it cannot c-command out of the DP phrase (cf. also Bernstein and Tortora 2005). The lack of c-command also accounts for the fact that possessive binding induces a violation of binding principle A and no violation of binding principle C in English. As shown by Reuland (2005), anaphora are not licensed in the same position as the pronoun in (2) because they have to be bound, and binding by a non-c-commanding antecedent is impossible (Reuland 2005: 5, ex. 15).

(4) *John$_i$'s mother loves himself$_i$.

In the same vein, no violation of condition C arises, although example (5) is of course pragmatically overexplicit.

(5) John$_i$'s mother loves John$_i$.

As already mentioned in section 1, based on the supposed ungrammaticality of examples like (3a–b), Despić argues that Serbian prenominal modifiers are adjuncts to NP which c-command out of the subject noun phrase, causing a Binding Principle B violation. However, under Despić's account, it is unexpected that Serbian does not show a condition C violation, as seen in (6a), and that anaphora are not licensed, as shown by (6b). If the possessor were able to c-command out of the noun phrase, one would expect that (6a) is ungrammatical because of a violation of principle C and (6b) is grammatical, because the anaphor is properly c-commanded.

(6) a. Jovanov$_i$ papagaj je juče ugrizao Jovana$_i$.
Jovan's parrot is yesterday bitten Jovan
'Jovan$_i$'s parrot bit Jovan$_i$ yesterday.' (Despić's 2013: 256, ex. 45)

b. *Jovanov$_i$ papagaj je juče ugrizao sebe$_i$.
Jovan's parrot is yesterday bitten self
'Jovan$_i$'s parrot bit himself$_i$ yesterday.' (Despić's 2013: 256, ex. 46)

In order to account for these unexpected patterns, Despić (2013: 252) adopts Lasnik's (1989) restricted version of principle C, according to which "An R-expression is pronoun—free." He also refers to an additional syntactic filter (Form to Interpretation Principle (FTIP), proposed by Safir (2004) that compares different derivations containing referential forms (7).

(7) Form to Interpretation Principle (FTIP, Safir 2004):
If x c-commands y, and z is not the most dependent form available in position y with respect to x, then y cannot be directly dependent on x.
(Despić 2013: 255)

Following this principle, Despić assumes that (6a) is grammatical because a) (6b) is not available for independent reasons (since the reflexive *sebe* is strictly subject-oriented and can only be anteceded by a local subject) and b) a strong or clitic object pronoun is also not possible (cf. ex. 3a–b). We will come back to examples like (6a–b) in section 4.

2.2. Coreferential Interpretation: Clitics vs. Strong Pronouns

LaTerza (2016) questions the assumption that cross-linguistic differences between English and Serbian are due to the absence of the DP in Serbian. She compares the Serbian binding data with those of Slavic article languages like Macedonian and Bulgarian. According to LaTerza, these languages unexpectedly do not pattern with English but rather with Serbian in not allowing for coreference of a possessive modifier and an object pronoun (8a–b).

(8) a. *Ivanovijat$_i$ papagal nego$_i$ uhapa včera. (Bulgarian)
Ivan$_{POSS.DEF}$ parrot him bit yesterday
[Intended] 'Ivan$_i$'s parrot bit him$_i$ yesterday.'
(LaTerza 2016: 748, ex. 13b)

b. *Jovanoviot$_i$ papagal go$_i$ grizna (Macedonian)
Jovan$_{POSS.DEF}$ parrot him$_{CL}$ bit
nego$_i$ včera.
him yesterday
[Intended] 'Jovan$_i$'s parrot bit him$_i$ yesterday.'
(LaTerza 2016: 748, ex. 14b)

According to LaTerza, the similarity between Serbian, Bulgarian, and Macedonian can be explained by assuming that prenominal possessors uniformly raise at LF to the edge of their largest containing nominal from where they c-command the rest of the clause.

However, as shown by Franks (2019), LaTerza's examples are problematic because they involve strong pronouns which are ruled out in these contexts for independent reasons.

Franks (2019) argues that the ungrammaticality of (8a) in Bulgarian is not a reflex of c-command of the possessive out of the noun phrase as argued by LaTerza, but results from the infelicity of strong pronouns in these contexts, independent of binding (9a). According to Franks (2019: 70), a strong pronoun is only possible if it receives contrastive focus. However, focusing of *nego* in (8a) would block any cataphoric interpretation, "rendering *nego* …disjoint from *Ivan* independently of binding theory". If a clitic pronoun is used in contexts like (8a), binding becomes possible (see (9b)).[1]

(9) a. ?*Papagalât nego uxapa včera.
parrot$_{DEF}$ him bit yesterday
[Intended] 'The parrot bit him yesterday.' (Franks 2019: 70, ex. 17)

[1] According to Franks (2019), the same holds true for embedded possessives as *prijatelj Markove majke* 'a friend of Marko's mother', which are acceptable with the clitic but not with the strong pronoun (i) vs (ii).

(i) *[$_{NP}$ [$_N$ Prijatelj] [$_{NP}$ **Markove**$_i$ majke]] je zagrlio **njega**$_i$.
friend Marko's mother AUX$_{3SG}$ hugged him$_{STR}$
[Intended] 'A friend of Marko$_i$'s mother hugged him$_i$.' (Franks 2019: 76)

(ii) [$_{NP}$ [$_N$ Prijateljica] [$_{NP}$ **Markove**$_i$ majke]] **ga**$_i$ je zagrlila.
female-friend Marko's mother him$_{CL}$ AUX$_{3SG}$ hugged
'A (female) friend of Marko$_i$'s mother hugged him$_i$.' (Franks 2019: 76)

(9) b. Ivanovijat$_i$ papagal go$_i$ uxapa včera.
Ivan's$_{DEF}$ parrot him bit yesterday
'Ivan$_i$'s parrot bit him$_i$ yesterday.' (Franks 2019: 70, ex. 18)

The situation is slightly different for Macedonian, where clitic pronouns have developed into agreement markers (Franks 2009). As a result, strong pronouns are possible if doubled by a clitic, and the Macedonian native speakers consulted by Franks do not distinguish in their judgments between the clitic and the strong form. In contrast to the judgments provided by LaTerza, Franks (2019) considers coreference possible in these contexts. He explains the discrepancy between the judgments as a potential reflex of preferences because a non-coreferential reading is also available.

(10) Jovanoviot$_i$ papagal go$_{i/j}$ grizna (nego$_{i/j}$) včera.
Jovan's$_{DEF}$ parrot him bit (him) yesterday
'Jovan$_i$'s parrot bit him$_{i/j}$ yesterday.' (Franks 2019: 72, ex. 14b)

Based on these facts, Franks rejects LaTerza's analysis of the LF movement of the possessive and argues that Bošković's (2012) and Despić's (2013) parametrized DP/NP account for Serbian is correct.

Although we will ultimately not follow this argumentation for Serbian, Franks's observations are crucial for our study, because they show that different types of pronouns may behave differently with respect to binding and that the binding possibilities in a given language depend to some extent on the pronominal forms available in that language.

Actually, as shown above, Macedonian and Bulgarian provide evidence for the different behaviour of clitics and strong pronouns with respect to binding relations with possessives modifying a noun in subject position. Serbian seems to show similar restrictions on the occurrence of strong pronouns as exemplified by Franks for Bulgarian (ex. 8a). According to Zec (2002: 243), a strong pronoun is not admissible when an antecedent is mentioned in previous discourse. Only the clitic can be used as the bearer of given information.

(11) *What does she think of Peter?*

a. Poštuje ga.
respects him$_{CL}$
'She respects him.'

b. *Poštuje njega.
respects him$_{STR}$ (Zec 2002: 243, ex.81)

That clitics and strong pronouns in Serbian may behave differently with respect to binding is argued also by Jovović (2020), who shows, that given an appropriate information structural context (old information on the subject for clitics (12) and new information on the subject for strong pronouns (13)), binding of both clitic and strong pronouns becomes grammatical in Serbian.

(12) A: *Directors always admire their own films. Šijan likes all his movies. Dragojević isn't really happy with his recent movies. I don't know about Kusturica—is he more like Šijan or Dragojević?*

B: Zapravo, Kusturičin$_1$ najnoviji film ga$_1$ je razočarao.
Actually, Kusturica's latest movie him$_{CL}$ is disappointed.

Na ostale je ponosan.
On rest is proud

'Actually, Kusturica$_1$'s latest movie disappointed him$_1$. He is proud of the others.' (Jovović 2020: 4, ex. 13)

(13) A: *Who was disappointed by what?*

B: Kusturičin$_1$ najnoviji film je razočarao njega$_1$.
Kusturica's latest movie is disappointed him$_{STR}$

'Kusturica$_1$'s latest movie disappointed him$_1$.'
(Jovović 2020: 4, ex. 14)

In contrast to binding of pronouns by possessive modifiers, which becomes possible given the relevant discourse context as shown in (12) and (13), "uncontroversial principle B violations" as in (14a–b) cannot be rescued in the same way.

(14) *Who disappointed who?/ Who did Kusturica disappoint?*

a. *Kusturica$_1$ je razočarao njega$_1$.
Kusturica is disappointed him$_{STR}$

[Intended] 'Kusturica$_1$ disappointed himself$_1$.'

b. *Kusturica$_1$ je razočarao NJEGA$_1$.
Kusturica is disappointed him$_{STR}$.

[Intended] 'Kusturica$_1$ disappointed himself$_1$.'
(Jovović's 2020: 6, ex. 19, 20a–b)

Based on these findings, Jovović concludes that the ungrammaticality of (3a–b) is not a condition B violation, but relates to the appropriateness of a clitic or strong form in the given context. Hence, according to Jovović's (2020)

argumentation, clitics are illicit when the antecedent is focused and strong pronouns are illicit when the antecedent is a topic.

In view of these observations, together with the evidence provided by Franks (2019) for the differential behaviour of clitics and strong pronouns in Bulgarian, the following question arises: Do Serbian clitic and strong pronouns indeed behave the same with respect to binding by possessive modifiers as argued by Despić (2013)? That there may be differences is acknowledged by the author himself who mentions that when judging the examples with strong pronouns (3b) as compared to the sentences with clitics (3a), "the speakers I consulted … found examples like (ii) (including a strong pronoun — our addition) equally ungrammatical (*or even more*) …" (Despić 2013: 146, fn. 6 — our emphasis).

3. The Present Study

3.1. Research Questions and Predictions

In order to test empirically if a coreferential reading is indeed possible in Serbian and whether clitics and strong pronouns behave in the same way or differently, we conducted a picture-selection task with 36 native speakers of Serbian. In line with the discussion in section 2, we formulated the following research questions:

> Research question 1:
>
> Is coreference between a possessive modifier modifying a noun in subject position and a (clitic or strong) pronoun in object position possible for native speakers of Serbian?

If possessive modifiers are NP-adjuncts and c-command out of the noun phrase in Serbian, we expect that native speakers will not be able to establish coreference between the possessive modifier and the object pronoun. If, on the other hand, the participants allow for a coreferential interpretation, this would speak against the assumption that possessive modifiers c-command out of the noun phrase in Serbian, and in favour of a parallel analysis of possessive constructions as in DP-languages like English. Note that in the latter case it is of course not expected that the speakers will opt for coreference in each and every context.

> Research question 2:
>
> Do we find a difference between clitic and strong pronouns with respect to the possibility of coreference with possessive modifiers in Serbian?

Section 2 has revealed that Serbian clitics are in general more easily associated with given discourse antecedents than strong pronouns. Taken together with Franks' (2019) observations concerning Bulgarian and given the methodology of our experiment, in which the potential referents (including the one referring to the possessor) are mentioned in the preceding context, we expect that a clitic may receive a coreferential interpretation more easily than a strong pronoun, if coreferentiality is in principle available.

3.2. Participants and Methodology

Thirty-six native speakers of Serbian (n = 36), with normal or corrected-to-normal vision participated in this study. All of them gave their consent and agreed to participate in the study voluntarily. The group included both male and female participants (27 female and 9 male), between 19 and 33 years of age (mean age 26.2). The participants were non-linguists and all of them lived in Novi Sad, a city located in the northern part of Serbia. The majority of participants were highly educated: 31 had graduated from a university and five of them had finished high school.

The method used in this experiment was a picture-selection task constructed in the online software IBEX farm, using PennController (Zehr and Schwarz 2018). The dependent variable was the picture choice, with coreferential or non-coreferential interpretation as options. The independent variable was the type of the pronoun: clitic *ga* 'him$_{CL}$' vs. strong pronoun *njega* 'him$_{STR}$'. The stimuli (N = 24) consisted of test sentences with either a clitic or a strong pronoun, together with 10 control sentences. A set of items is shown in Table 1.

The participants first heard a short context and saw an introductory picture on the first screen. Subsequently, on the second screen, they heard a test sentence (see Table 1) and saw two pictures, one expressing a coreferential

Table 1. A sample of test items

Condition 1: clitic *ga* 'him$_{CL}$'	*Jovanov papagaj ga je ugrizao.* Jovan's parrot him$_{CL}$ is bitten. 'Jovan's parrot bit him.'
Condition 2: strong pronoun *njega* 'him$_{STR}$'	*Jovanov papagaj je ugrizao njega.* Jovan's parrot is bit him$_{STR}$ 'Jovan's parrot bit him.'
Control condition: R-expression *Jovana* 'Jovan$_{ACC}$'	*Petrov konj je napao Jovana.* Petar's horse is attacked Jovan 'Petar's horse attacked Jovan.'

reading, the other a non-coreferential reading (the position of pictures was randomized).[2] Their task was to choose which of the two pictures matched the corresponding sentence. The procedure is illustrated in Figures 1 and 2.

Participants were instructed to choose the picture they think fit better if both options were possible. Participants were first given two practice items, which were excluded from the analysis. In order for each participant to see only either the clitic or the strong pronoun version of an item, the stimuli were divided into two groups. They were presented to the participants in random-

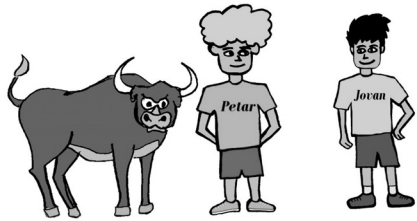

Figure 1. Screen 1: introductory context and picture.
Context: Here are Petar, Petar's bull, and Jovan. Look what happened!

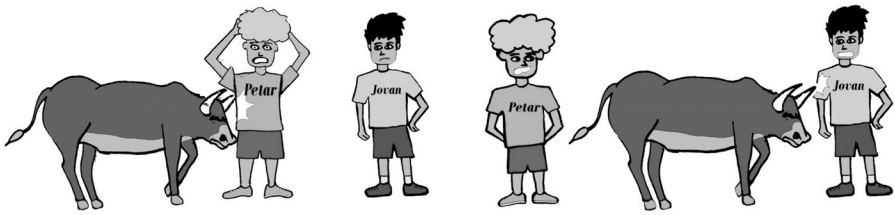

Figure 2. Screen 2: test items and pictures choice.

Test sentence: Petrov bik (ga) je povredio (njega).
Petar's bull him_{CL} is hurt him_{STR}
'Petar's bull hurt him.'

Choose the corresponding picture.

[2] The sentences were read by a native speaker in order to control for the stress on the strong pronoun, i.e., that it had no emphatic stress, which would favour the coreferential interpretation, since it would have a contrastive role, e.g., 'Peter's dog bit HIM, not John.'. The experiment was recorded, and it was checked that all the stimuli were read with a neutral stress.

ized order. We included 10 sentences with an R-expression, where only one reading was possible as control items, in order to check if participants paid attention to the stimuli and if they clicked on pictures randomly. The experiment lasted around 15 minutes.

3.3. Results

The thirty-six participants produced a total of of 864 test items and 360 control items. For the control items, which only allowed for non-coreferential interpretation, the participants chose the non-coreferential picture with 100% accuracy. This shows that they understood the test and paid attention to the pictures. Our results for the test items indicate that participants chose the picture expressing a coreferential reading in 55% of the examples in which the clitic pronoun was used (240 out of 432 items). Coreference with the strong pronoun was slightly less often chosen, in 41% of the examples (177 out of 432 items). The percentages of (non-)coreference for the clitic and the strong pronoun are illustrated in Figure 3.

For the statistical analysis, the results were introduced in a Generalized Linear Mixed-Effects Regression (GLMER) with choice (coreference/non-coreference) as the dependent variable and condition (strong vs. clitic pronoun) as the independent variable. The trial order was included in the statistical model as a numerical co-variable, and all were treated as fixed effects. Participants and stimuli were included as random factors, in the final GLMER model (For-

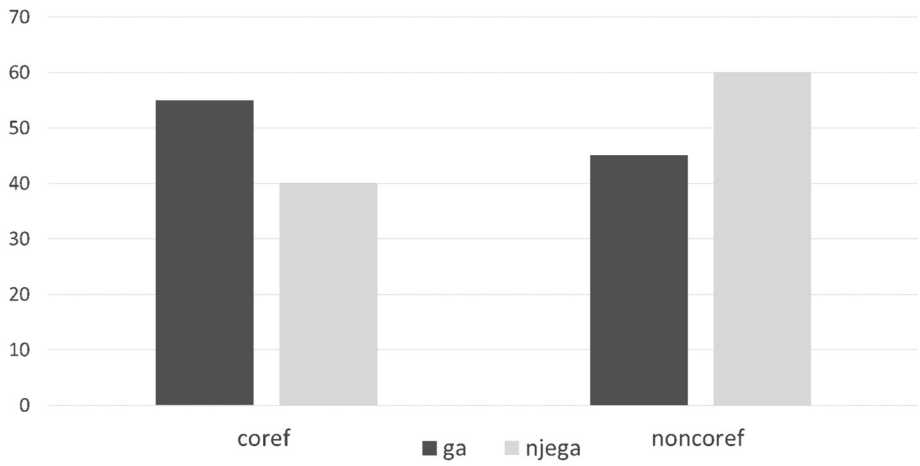

Figure 3. Choice of coreferential/non-coreferential interpretation with clitic/strong pronoun in percentages

mula: Answer ~ poly(TrialOrder, 2) + IV + (1 | Participants) + (0 + poly(TrialOrder, 2) | Participants) + (1 | Stimuli)). The results indicated that there was only a significant effect of the condition ($p < .001$). There was no statistically significant effect of trial order. The results of the final GLMER are summarized in Table 2.

Table 2. Generalized Linear Mixed-Effects Regression (fixed effects results)

Fixed effects:	**Estimate**	**Std. Error**	**Z value**	**Pr(>|z|)**
(Intercept)	–0.563	0.283	–1.99	0.046*
TrialOrder	3.432	3.341	1.03	0.304
Condition (*ga*)	**0.917**	**0.172**	**5.32**	**0.000*** **

The results in Table 2 show that only condition turned out to have a significant effect on the results, showing that the participants indeed differentiated between strong and clitic pronouns. Even though there are no statistically significant effects of participants as a random factor, there still exist some individual variation among participants. There were two speakers who always opted for one option in both conditions (either always coreference (one speaker), or non-coreference (one speaker)). Some speakers preferred the coreferential (eight speakers) and some the non-coreferential (six speakers) reading in both conditions. However, the overall picture indicates that the choice between coreferential and non-coreferential reading is indeed a question of preference. For most speakers, coreference and non-coreference were an option with the clitic and with the strong pronoun. Most participants favoured the coreferential reading or almost equally allowed for both readings with the clitic but preferred the non-coreferential interpretation with the strong pronoun.

4. Discussion

In section 3.1, we formulated two research questions. First, we wanted to find out whether Serbian native speakers accept coreference between a possessive modifier modifying a noun in subject position and a clitic or strong pronoun in object position. Second, we wanted to investigate whether they differentiate in this respect between clitics and strong pronouns. With respect to the first research question, our results clearly show that coreference is indeed an option in Serbian. Except for one participant, all speakers in our study showed that they are able to interpret a possessive modifier and a clitic or a strong pronoun as coreferential. This result suggests that previous accounts claiming that coreference between a possessive modifier modifying a noun phrase

in subject position and a pronoun in object position represents a violation of binding principle B resulting in ungrammaticality are incorrect. This result speaks against an analysis of the possessive as an adjunct to NP which c-commands out of the noun phrase as proposed by Despić.

The question arises whether the possibility of coreference in Serbian possessive constructions can be accommodated within an NP analysis of Serbian (Bošković 2005, 2008; Despić's 2013) or whether the NP-analysis of Serbian must be rejected in favour of the Universal DP hypothesis (Bašić 2004; Progovac 1998). With respect to the first option, one could assume that the realization of a possessive modifier exceptionally leads to the projection of some functional category above NP in Serbian, to which the possessor covertly moves at LF and which prevents c-command out of the noun phrase in these constructions (15a). This would mean that noun phrases modified by a possessor have a similar structure as the one proposed by Despić (2011: 71) for noun phrases including a quantifier like *mnogo* 'many' (15b), which project a QP above NP and allow for a coreferential interpretation with a pronoun because c-command is blocked and condition B effects disappear.

(15) a. [$_{FP}$ [$_{F}$ [$_{NP}$ Kusturicin$_i$ [$_{NP}$ najnoviji [$_{NP}$ film]]]]] ga$_i$ je
Kusturica's latest film him$_{CL}$ is
zaista razočarao.
really disappointed

b. [$_{QP}$ [$_{Q}$ Mnogo [$_{NP}$ Kusturicinih$_i$ [$_{NP}$ prijatelja]]]] je
many Kusturica's$_{GEN}$ friends$_{GEN}$ is
kritikovalo njega$_i$.
criticized him$_{STR}$
'Many of Kusturica$_i$'s friends criticized him$_i$.'
(Despić's 2011: 71, ex. 82)

However, assuming a structure like (15a) for possessive constructions is just an ad hoc solution and difficult to justify on independent grounds. Also, it remains unclear how this functional category actually differs from a DP with an empty D-head as assumed for an article-language like English for the same constructions (cf. Kayne 1994). In our view, the results of our study, together with the grammaticality of (6a, here repeated as 16a) and the ungrammaticality of (6b, here repeated as 16b) rather speak for a parallel structure of possessive noun phrases in Serbian and English and ultimately in favour of the Universal DP hypothesis.

(16) a. Jovanov$_i$ papagaj je juče ugrizao Jovana$_i$.
Jovan's parrot is yesterday bitten Jovan
'Jovan$_i$'s parrot bit Jovan$_i$ yesterday.' (Despić's 2013: 256, ex. 45)

b. *Jovanov$_i$ papagaj je juče ugrizao sebe$_i$.
Jovan's parrot is yesterday bitten self
'Jovan$_i$'s parrot bit himself$_i$ yesterday.' (Despić's 2013: 256, ex. 46)

Recall from section 2 that Despić (2013: 252) accounts for the grammaticality of such structures by adopting Safir's (2004) Form to Interpretation Principle (FTIP), assuming that (16a) is grammatical because neither a reflexive nor a clitic or strong pronoun are possible in this context. Although such economy principles are of course plausible if it comes to explain pronoun choice in different pragmatic contexts (Cardinaletti and Starke's 1999 Minimize α; Koster's 1997 Principle of Maximal Specialization), however, it is problematic in the present context because it is unclear how such a principle can circumvent a core structural configuration such as c-command and second, because the reflexive is undoubtedly possible in this position if it refers to the subject parrot (17).

(17) Jovanov papagaj$_i$ je juče ugrizao sebe$_i$.
Jovan's parrot is yesterday bitten self
'Jovan's parrot$_i$ bit himself$_i$ yesterday.'

The grammaticality of (16a) and the ungrammaticality of (16b) follow without any additional stipulation if one assumed that the possessive does in fact not c-command out of the noun phrase, indicating that Serbian patterns with DP languages with respect to binding.

Concerning our second research question, we indeed find a difference between clitics and strong pronouns with respect to coreferentiality: with clitics, a coreferential interpretation is preferred, whereas strong pronouns are preferentially interpreted as non-coreferential. In contrast to Bulgarian where a coreferential reading is exclusively possible with the clitic but disallowed with strong pronouns (cf. Franks 2019), our participants also accepted a coreferential reading with the strong pronoun. Although clitics in Serbian have not (yet) developed into agreement markers as argued by Franks (2019) for Macedonian, this points towards a parallel to the Macedonian judgments, where both coreferential and non-coreferential readings are possible with both pronominal forms, hinting that the (non-)coreference in these structures entails preference and cannot be related to grammaticality constraints.

Taking our results and the observations in (16a–b) and (17) together, we conclude that the apparent violations of principle B cannot be attributed to c-command by possessive modifiers out of the noun phrase (and a lack of DP)

but call for an alternative explanation. The fact that speakers do not always associate the pronoun with the possessive antecedent in these structures leads us to conclude that the variability of coreference with possessive modifiers does not follow from a grammatical constraint but reflects a preference of the speakers (as argued for the Macedonian data by Franks 2019). Hence, we propose that we are not dealing here with binding but with covaluation in the sense of Reinhart (2000, 2006: 165).

Covaluation is a mechanism of anaphora resolution different from binding by which a pronoun is assigned the value of a discourse antecedent. Reinhart (2006: 165f.) explains the difference between binding and covaluation as follows: in binding configurations, the variable gets bound by the λ-operator, as in (19b), where "the predicate denotes the set of individuals who think that they have got the flu, and the sentence asserts that Lili is in this set." (Reinhart 2006: 165). In the case of covaluation (see 19c), "the free variable is assigned a value from the discourse storage" (Reinhart 2006: 165). Assuming that we build an inventory of discourse entities which can serve further as antecedents of anaphoric expressions while processing sentences in context (McCawley 1979; Prince 1981; Heim 1982), Reinhart (2006) proposes that in (19c) "we have stored an entry for *Lucie*, and when the pronoun *she* is encountered, it can be assigned this value" (Reinhart 2006: 165).

(18) a. Lucie didn't show up today.
b. Lili thinks she's gotten the flu.

(19) a. Lili (λx (x thinks z has gotten the flu))
b. Binding: Lili (λx (x thinks x has gotten the flu))
c. Covaluation: Lili (λx (x thinks z has gotten the flu) & z = Lucie)
(Reinhart's 2006: 165, ex. 25a–b and 26a–b)

According to Reinhart (2006), the underlying ambiguity becomes visible in elliptical constructions such as (20), where the strict reading ("Max thinks that Lili has gotten the flu") corresponds to (19c) and the sloppy reading ("Max thinks that he himself has gotten the flu") corresponds to (19b).

(20) Lili thinks she has gotten the flu, and Max does, too.

Coming back to our proposal, we assume that coreference in possessive constructions is not determined by binding but by covaluation. The following examples from Despić (2013: 264) point in the same direction. Despić (2013) shows that a pronoun can be coreferential with a possessive modifier in Serbian, given the right context:

(21) Jovan$_i$ je razočaran. Njegov$_i$ omiljeni papagaj ga$_i$ je juče ugrizao.
Jovan is disappointed his favourite parrot him$_{CL}$ is yesterday bitten
'Jovan is disappointed. His favourite parrot bit him yesterday.'
(Despić 2013: 264, ex. 73)

In (21), *Jovan*, *njegov*, and *ga* can refer to the same person, namely Jovan. It is revealing, as pointed out by Despić (2013), that if the sentence is embedded in an ellipsis context (see ex. 22), it only allows for the strict reading but not for the sloppy one,[3] showing that a bound interpretation is not available.

(22) Jovan$_i$ je razočaran. Njegov$_i$ papagaj ga$_i$ je juče ugrizao, dok Markov papagaj nije.
Jovan is disappointed his parrot him$_{CL}$ is yesterday bitten while Marko's papagaj is$_{NEG}$
'Jovan is disappointed. His parrot bit him yesterday, while Marko's parrot did not.' (Despić 2013: 264, cf. ex. 73/75)

If there is no bound interpretation but only covaluation in examples like (22), it follows that there is no c-command in these configurations (cf. Reinhart (2006: 186), who argues that covaluation is free in such contexts in English because of the lack of c-command).

The question arises of how to account for the differences between strong and weak pronouns. If we compare structures with possessive antecedents to binding configurations with a (non-possessive) R-expression as antecedent and a pronoun in a non c-command position (subordinate clause), we can see that clitics and pronouns behave differently. Namely, clitics allow both strict and sloppy identity readings, while strong pronouns ban sloppy readings (cf. Runić 2014 for Serbian and Stegovec 2019 for Slovenian). In example (23) both the sloppy and the strict readings are allowed with the clitic, i.e., Marija either thinks that the police saw Jovan (strict) or her (sloppy):

(23) Jovan misli da ga je policija videla i Marija misli također.
Jovan thinks that him$_{CL}$ is police saw and Marija thinks same
'Jovan thinks that the police saw him and Marija thinks the same.'

[3] According to Despić (2013: 264) "the only reading available here is that Marko's parrot did not bite John. (strict — our addition) The sentence cannot mean that Marko's parrot did not bite Marko. (sloppy — our addition)"

In contrast, as shown in (24), a strong pronoun in the same contexts only allows for the strict reading ("Marija thinks that the police saw Jovan") but not for the sloppy reading ("Marija thinks that the police saw her"), indicating that there is **only** covaluation but no binding for this type of pronoun available.

(24) Jovan misli da je policija videla njega i Marija
Jovan thinks that is police saw him$_{STR}$ and Marija
misli takođe.
thinks same
'Jovan thinks that the police saw him and Marija thinks the same.'

If we suppose that the difference between Serbian *ga* and *njega* in (23 vs. 24) is related to their internal structure, we may conclude that the structural difference between the strong form *njega* and the reduced form *ga* may lead to this difference with respect to their interpretation. In fact, differences in binding between structurally different types of pronouns are not unexpected from the perspective of more recent minimalist accounts of binding, which attribute the complementary distribution of anaphors and pronouns to derivational economy instead of independent binding principles whose status has been challenged by minimalist theory (Hicks 2009; Reuland 2001, 2006; Pesetsky and Torrego 2004, among others).

Based on the observation that the binding of a clitic by an R-expression is possible in Serbian if no c-command applies, whereas strong pronouns in this configuration can only be covaluated, we hypothesise that clitics allow for a coreferential interpretation more easily, while strong pronouns are preferred with disjoint reference. This preference may also relate to the specific discourse conditions in the test situation: Because the protagonists were supplied in the context, the speakers could assume that the possessor was the discourse topic, in which case the use of a clitic would lead to a coreferential interpretation because clitics refer to given information (Zec 2002; Jovović 2020). If the participants do not assume such an interpretation of the possessor, a non-coreferential interpretation with the clitic is preferred. As for the strong pronoun, a coreferential reading is also possible if the speakers assume a contrast between the protagonists given in the introduction, which is also possible in our test. As pointed out by Jovović (2020), the strong pronoun needs to be contrastively focused to be coreferential with the possessor if the antecedent is already mentioned in the discourse, as was the case in our items. Despite the fact that the participants heard the test sentences, which were read without an emphatic stress on the strong pronoun, it might be the case that they still implicitly stressed the pronoun for themselves and allowed for coreference with the strong pronoun in more cases than expected. Some of

the participants actually did when they were asked to explain their choices after the experiment was finished. Thus future studies should control more carefully for the context and for stress in order to find out which factors actually determine the interpretation of the strong and clitic pronouns in these configurations.

5. Conclusions

To sum up, our study shows that there are no differences between English and Serbian with respect to the grammaticality of constructions involving a possessive modifying a noun phrase in subject position and a coreferential pronoun in object position. In contrast to previous accounts by Despić (2011, 2013), our study provides experimental evidence that coreference is indeed possible in these constructions in Serbian just like in English. This speaks against the assumption that Serbian possessive modifiers are NP-adjuncts that c-command out of the noun phrase, leading to violations of binding condition B. To the contrary, there has to be a functional category above the possessive preventing it from c-commanding out of the noun phrase. This speaks in favour of the Universal DP hypothesis. We have seen that clitics are preferentially interpreted as being coreferential with the possessor while strong pronouns tend to be interpreted as non-coreferential. In our view, this finding relates to the fact that the two forms take different kinds of discourse antecedents: discourse topics in the case of the clitic, new information antecedents or contrast in the case of strong pronouns (as shown by Jovović 2020). Hence, when the speaker interprets the possessor in terms of given information (more likely in our test), he/she admits coreferentiality with the clitic. But when the speaker interprets the possessor in terms of new information or contrast (less likely in our test), this induces non-coreferentiality with the clitic but a coreferential interpretation with the strong form. The fact that both interpretations are equally available with both pronominal forms and that the choice relates to the discourse conditions shows that we are not dealing with binding (and c-command) but rather with covaluation in the sense of Reinhart (2006).

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Reviews

Tanja Anstatt, Anja Gattnar, and Christina Clasmeier, eds. *Slavic languages in psycholinguistics: Chances and challenges for empirical and experimental research*. Tübingen: Narr Francke Attempto, 2016. 315 pp. [*Tübinger Beiträge zur Linguistik*, 554.] ISBN 978-3-8233-6969-1.

Reviewed by Olga Parshina

This book is a result of the workshop on empirical psycholinguistic methods, "Slavic languages in the black box", which aimed to create a space for discussion of methodological problems in the field of Slavic psycholinguistics. The current volume goes beyond simple discussion. In 12 different contributions, it 1) offers an overview of the existing experimental designs, online and offline methods of investigation as well as various tasks that are employed in modern Slavic psycholinguistics research, 2) presents the key issues associated with these designs and methods, and, crucially, 3) suggests possible solutions to overcome the challenges. Below I briefly outline the content, summarize the takeaway message and provide a short review for each contribution of the volume. I conclude with a general evaluation of the book.

In the first paper of the volume, Barbara Mertins discusses several online and offline methods used inside and outside psycholinguistic research. The chapter starts with a brief classification of experimental methods as online (e.g., eye-tracking, elicitation), offline (e.g., surveys), and true online methods (e.g., EEG, fMRI), along with an outline of the potential benefits and drawbacks of using one technique over another. Next, Mertins concentrates on the evaluation of several methods that she and her colleagues employed in her language-production research: 1) elicitation, 2) memory tasks, 3) eye-tracking, 4) speech onset times, and 5) preference/grammatical judgment tasks. Finally, Mertins presents three experimental studies (authored by Mertins and other colleagues) that implemented either one technique or a combination of these methods in language-production studies, enabling the reader to observe the application of the techniques in experimental contexts. In the overview of each study, Mertins provides detailed information as well as a critical evaluation of the design, materials, randomization procedures, and general protocol (e.g., sample size, language background of the participants, stimulus length,

amounts of fillers, coding procedure, etc.). Crucially, for each study, the contributor also points out benefits and issues that should be considered before planning to use one of the described methods in combination with a specific aspect of study design (e.g., elicitation method and intercultural suitability of the materials). The chapter also places an interesting focus (in study 2) on the importance of using a combination of linguistic and non-linguistic (e.g., memory) tasks to investigate the effects of language on cognition (i.e., language leads to differences in thinking). However, the link between these two types of tasks (especially the memory task) is not clear. It would be useful to provide researchers with more arguments for the necessity of adding non-linguistic tasks to the experiments. In general, the article, although likely not intended for this purpose, might serve as an excellent introduction for graduate students and early-career researchers to various psycholinguistic methods and advantages and caveats of the designs with the emphasis on language-production research.

Chapter 2 (by Roumyana Slabakova) shifts the focus of discussion from details of the experimental design to issues of the inconsistency of results caused by the variability in linguistic judgments of native Russian speakers. First, Slabakova introduces the results of her study (2004) that examines how native Russian speakers interpret telicity based on the perfectivity of the verb. Specifically, the goal of study 1 is to confirm that perfectivity of verbs in Russian (as an example of a Slavic language) dictates the (non-) quantization of the objects they refer to, an association known as Event-Object Homomorphism. Counter to expectations, the findings of the study indicated that Russian native speakers marked sentences with perfective verbs as having two possible interpretations (as opposed to one, as was expected) almost half of the time (49%). Slabakova argues that other factors than perfectivity of the verb come into play, e.g., free word order in Russian and Information Structure associated with the word order. In the second part of the contribution, Slabakova takes word order and Information Structure as points of discussion and demonstrates again based on a previous study (Cho and Slabakova 2014) that native speakers of Russian unexpectedly accepted the focused object (i.e., object carrying new information) in the preverbal position, although the Focus is typically located post-verbally. In the final section of the chapter, Slabakova suggests that such variability in judgments may be due to the fact that some grammatical meanings in Russian are underspecified (vary as a function of semantics, word order, context, intonation, Information Structure, etc.). As a result, Russian speakers show sensitivity to this variation, as is evidenced by flexibility in their linguistic judgments. In concluding remarks, Slabakova suggests that in addition to 'typical' considerations of the experimental design, such diversity of internal linguistic factors that affects speaker's interpretation should be taken into account before choosing a method for a study (e.g., online methods will not be sensitive to speaker's interpretations).

Taken together, this chapter a) provides a plausible theory of why there is high variability in interpretations produced by native speakers of Russian and thus creates a platform for future research to test the predictions of this theory and b) serves as a caution for researchers in the second language acquisition field who compare interpretations of L2 speakers to the assumed homogeneous monolingual baseline.

Chapter 3 focuses on the advantages and disadvantages of using a corpus-based approach in linguistic research as well as statistical methods appropriate for the analysis of corpus-based data. The authors, Dagmar Divjak, Antti Arppe, and Harald Baayen, discuss how Tense, Aspect, and Mood (TAM) markers affect the processing of synonymous verbs expressing the meaning 'try' in Russian. First, the authors review findings from a previous study in which Divjak and Arppe (2013) trained a polytomous logistic regression model to predict which of six synonymous verbs will fit into a sentence based on several variables that describe the properties of these verbs. The results indicated that for more frequent synonyms TAM marking is a strong predictor for the choice of 'try' verbs. Second, in a self-paced reading task the authors investigate whether reading times of these synonymous verbs are affected by the probability of TAM marking on the verb. The series of mixed-effect generalized linear-regression models indicated the lack of significant effect on the verb reading time, which the authors suggested was due to several factors, including the assumption violation of the linear relationship between the effects. As a solution, Divjak, Arppe, and Baayen used a generalized additive mixed model that can correctly estimate effects that are nonlinear in nature. This model confirmed that TAM marking plays a significant role in online processing by native speakers but in an unexpected way: participants slowed down when reading verbs with a highly likely TAM marking. The explanation they suggest is the sudden change of surprisal. Without a previous context, participants were going through words quickly until they encountered the verb that tied everything together, allowing information integration. The chapter is valuable from both theoretical and methodological perspectives. First, the results of the study warn against exclusively using lemmas as predictors; one should take word forms into account, especially when dealing with morphologically rich languages. Second, the authors go into great detail in explaining each step of the analyses, including data preparation, variable coding, and reasons for adding each variable to the structure of the mixed-effect models, thus making this chapter extremely informative for researchers who plan to use these statistical methods in corpus-based research.

In Chapter 4 Anja Gattnar discusses challenges that occur when designing materials for cross-linguistic research, including inner-Slavic studies. Taking verbal aspect as an example, Gattnar provides a detailed description of how similarity among languages does not make the task of design transfer easier

but on the contrary, leads to difficulties not predicted by researchers. First, taking a previously conducted eye-tracking study as a basis, Gattnar discusses the differences between German and Russian that made the identical design transfer impossible. Among these differences, Gattnar mentions the mismatch in a number of control sentences in Russian (as the language has two verbal aspects) vs. German, the different number of syllables in Russian verbs compared to German, differences in word order, and the way the two languages express (in)definiteness with bare nouns. In the other two studies, which both used self-paced reading technique to investigate aspectual processing, Gattnar and colleagues faced the challenge of translating materials from the original study in Russian to another Slavic language—Czech. Researchers found that the problem was not trivial. The languages differ in word frequencies (e.g., names), connotations, verbal constructions, and aspect usage itself. In a final section Gattnar maintains that although it could seem counter-intuitive, the design transfer might be easier for languages with core differences in grammar. For example, crucial experimental elements are located in different sentential positions in the non-aspect German language and the aspect-bearing Russian language, removing the pressure to make the translation of other sentence elements ideal. In Slavic languages, on the other hand, these differences are peripheral, as all words in the sentence prior to or following the target construction have to match in frequency, length, connotation, etc., which is unfortunately not feasible. Gattnar provides two possible ways to deal with the challenge: 1) translating materials as close to the original as possible and 2) adapting the materials. The first suggestion, while it allows researchers to maintain design, leads to the possible necessity of reformulating the hypotheses, since the translation most likely will lead to differences in results (e.g., different reading times due to increased word length). The latter solution, while enabling researchers to keep their hypotheses, makes it almost impossible to compare results statistically due to the number of variables that should be considered in translation (e.g., frequency, length, predictability, connotations, etc.). In general, the chapter provides a detailed account of the challenges that researchers are likely to face when designing a cross-linguistic comparative study of the Slavic languages. The task might be difficult, but these studies are definitely needed to address an important limitation on existing cross-linguistic research, i.e., its bias toward Romance-based languages.

Chapter 5 by Anastasia Makarova describes two experiments that, as in previous chapters, examine the usage of aspectual morphology by native Russian speakers. In this paper, however, experiments are concerned with the distribution of and motivation for the use of affixes associated with attenuative and semelfactive Aktionsarten in Russian. Relevant to the broad topic of the book, the chapter focuses on the methodological challenges related to the selection of stimuli for the two cloze-task corpus-based experiments. In

experiment 1, which investigated the distribution of prefixes on attenuative verbs, stimuli were chosen from the Russian National Corpus, and the task was to add the most fitting prefix to the verb in the sentence. In experiment 2, which examined the prefix/suffix distribution of the morphological marking for semelfactives, the stimuli consisted of constructed contexts and nonce-verbs to elicit the whole verb form (to reduce the bias for prefix or suffix and to avoid memory retrieval of existing verbs). In sum, based on the example of studies that focus on two very similar phenomena (two types of Aktionsarten) in Russian, the chapter describes the necessity for modifications in the methodology as well as statistical analysis for each research question. The takeaway message from this contribution is that in morphologically rich Slavic languages such as Russian, even closely related linguistic phenomena should be approached with methodological scrutiny. The assumption that if the first experimental design works well for examining the first phenomenon, then it would transfer to the similar second phenomenon is not valid.

In chapter 6 Denisa Bordag reviews studies with several experimental paradigms that use reaction time as a dependent variable to investigate various morphological phenomena in Czech. The first two studies are concerned with the processing of inflected verbs and use lexical-decision and repetition-priming paradigms. Besides discussing the stimuli requirements in the experiments (e.g., word frequency match) and experimental findings, Bordag notes that these studies might be the only available psycholinguistic research in Czech comprehension. In the next sections, Bordag reviews two studies (Bordag and Pechmann 2008, 2009) that employed picture-word interference-paradigm to investigate the representation and processing of such grammatical features as gender, declensional class of nouns, and the conjugational class of verbs. The studies are valuable as they add more data from rarely investigated languages to (dis)confirm psycholinguistic theories that are assumed to apply across languages. For example, Bordag discusses the Split Morphology Hypothesis in respect to the processing of inflected verbs and the Hierarchical feature selection mechanism in relation to grammatical feature processing. Crucially, these studies inform theories by exploring phenomena (e.g., declensional classes of nouns) that are typically absent in frequently explored languages such as English. In general, the chapter can serve as an inspiration for researchers on languages that have a short history of psycholinguistics research. It shows that one can conduct highly impactful and novel studies employing relatively simple and inexpensive designs.

Chapter 7, by Elena Dieser, overlaps with chapter 2 as it describes a series of studies that aim to explore cases of doubt in grammaticality judgments, cases when two or more grammatical variations are accepted as correct by native Russian speakers. In this chapter, however, the primary focus is not on the internal reasons for variability in grammatical judgments (in case and animacy categories), but on the results as a function of the experimental task.

Specifically, Dieser describes several experiments that used grammaticality-judgment tasks with (scale 1–5) and without (thermometer judgments) endpoints as well as questionnaires that required respondents to put the words under consideration into the grammatically required form based on the syntactic frames of the sentences. Furthermore, these experiments have additional tasks: to improve the forms that are considered ungrammatical. The goal of the additional tasks was to investigate whether they affect the numerical judgements of the sentences. While none of the tasks yielded statistically different results, the findings still provide valuable insights into the effectiveness of the grammaticality-judgment method. First, Dieser concludes that there is no difference in using scales with or without endpoints. Second, it was only additional tasks that revealed some curious findings: some native speakers considered assumed deviations as codified forms. Finally, the comparisons of results from the grammaticality-judgment tasks and questionnaires showed that some judgments were made accidentally, presumably due to lack of attention. To summarize, the chapter further solidifies conclusions from several contributions in this volume: 1) the optimal solution is to use multiple methods and tasks in experimental design (see also chapter 1 and 10) and 2) linguistic judgments of native speakers are not always unified and in many cases are graded: one form that is nearly unacceptable for one native speaker may be perfectly fine for another.

Chapter 8 (Julija Nigmatulina, Olga Raeva, Elena Riechakajnen, Natalija Slepokurova, and Anatolij Vencov) further builds upon the necessity of using a combination of experimental methods and careful selection of experimental materials in psycholinguistic research, here from the perspective of spoken-word recognition in spontaneous speech. Nigmatulina and colleagues start the chapter with a detailed description of the steps they undertook and challenges they faced in creating the materials for their experiments, which constitute a newly developed corpus of spontaneous Russian. The corpus includes both orthographic and phonetic transcriptions of various radio news and TV shows. Next, the authors discuss the findings of the experiment that used a dictation task to investigate the processing of reduced wordforms in spontaneous speech. They note that the dictation task, although it revealed several important aspects of using asemantic vs. semantic stimuli in the task as well as confirming expected frequency and type-frequency effects (i.e., frequency of the form is the strongest predictor of the homophone preference in asemantic condition, see also chapter 3 of the volume), it also allows for factors that cannot be controlled by the researcher (e.g., orthographic mistakes or lapses by participants, or particular strategies that a participant follows when she is writing down the words). Finally, the authors discuss the results of two other studies, which employed cloze-test and estimation of naturalness of speech methods with the purpose of confirming the influential role of context in natural speech processing that was established in the dictation task ex-

periments. The chapter concludes with a list of methodological principles that the authors recommend following when planning spoken-word recognition research. This list, however, can be generalized to any area of psycholinguistic research and can serve as a checklist in an attempt to increase the external validity of any laboratory experiment.

Chapter 9, by Christina Clasmeier, Tanja Anstatt, Jessica Ernst, and Eva Belke, looks further into the challenges researchers face when conducting spoken-word comprehension research. The authors discuss particular difficulties of choosing stimuli for a visual-world paradigm experiment that investigates differences in bilingual mental lexicon between languages from different family branches—German and Russian (see also chapter 4). First, the authors discuss problems in measuring and matching the word frequencies. Not only is it extremely difficult to select items that match in their frequencies cross-linguistically (besides having a phonological overlap in the onset), but it is also hard to establish the frequency within one language, as different dictionaries provide different results. In addition, there is no guarantee that the dictionary or corpus-based frequency list adequately represents the frequencies of the word in the participants' mental lexicon. As a solution, the authors suggest a method of collecting subjective frequencies from the participants of the study. Next, the authors describe in great detail the procedure of picture selection, which resulted in multiple sets of pre-tests and stimuli exclusion. Finally, they provide a thorough description of how they measured the phonetic distances among stimuli words in languages with drastically different phonetic systems in order to be able to choose target stimuli with the highest phonetic overlap. The chapter presents an example of a thorough approach to stimuli selection, where researchers made every attempt to consider variables that can affect the results of the study. The discussion of the possible ways to deal with word-frequency challenges is especially useful for anyone conducting research with bilingual populations, and heritage speakers in particular. As of now, there is no objective test for establishing word frequencies in such populations.

Chapter 10, by Barnhard Brehmer, Tatjana Kurbangulova, and Martin Winski, continues the topic of Slavic heritage languages and discusses the most reliable method of assessing lexical proficiency in this population. In a study with heritage speakers of Russian and Polish (dominant German), they tested four different methods—picture naming, semantic mapping, translation, and verbal fluency—of evaluating lexical abilities in both dominant and heritage languages. Based on the results of cluster analysis and correlational analysis, the authors found that in the dominant language, German, the results of the tasks did not yield significant correlations, which likely means that these tasks tap into different dimensions of lexical knowledge (e.g., active vs. passive vocabulary size). For heritage languages, however, a positive correlation was established and among the four tasks, the translation tasks

yielded the most consistent results in relation to the average scores from other assessments. The authors conclude that, although the translation task might be the best option for designs with limited time resources, the combination of several methods is the most reliable way to assess the lexical proficiency of heritage speakers comprehensively. This contribution along with chapter 9 presents an invaluable source of information for researchers who conduct studies on heritage languages, as it is extremely challenging to establish proficiency levels in heritage language speakers due to the wide range of individual variability in language abilities among these speakers. The heritage-language research community, therefore, is in desperate need of establishing some reliable assessment tools that can be used in experimental settings; these chapters present the first steps in this direction.

Jan Patrick Zeller, Gerd Hentschel, and Esther Ruigendijk in chapter 11 discuss what online methods such as event-related potentials (ERPs) can contribute to the knowledge of code-switching (CS) between two closely related languages, i.e., Russian and Belarusian. The chapter starts with a brief overview of the code-switching phenomenon and the specific type of Belarusian-Russian bilingualism. Next, the authors lay out the main goals for the study, which is to investigate 1) whether CS between two structurally close languages is different or similar to CS between languages that are semantically, syntactically, and phonetically distant, and 2) whether the direction of the switch matters. The section is followed by a CS literature overview, method, and results of the study conducted with young Belarusian-Russian bilinguals. Zeller, Hentschel, and Ruigendijk found that similar to results of studies exploring less related languages, there is an early negativity effect that suggests two separate subsystems of the mental lexicon. Curiously, the authors also report two effects that have not been observed before in CS studies: 1) the late right frontal negativity present when code-switching from Russian to Belarusian, and 2) absence of late positivity—a platform for future hypothesis testing in studies with closely related languages. In general, the chapter serves as an example of an online investigation of psycholinguistic phenomena in closely related Slavic languages and the challenges that come up as a result of this relatedness, e.g., creating stimuli and recruiting participants. In this respect, the chapter cross-references chapter 4 of this volume (by Anja Gattnar). The closer the languages structurally, the harder it is to create an ideal experimental design.

The volume concludes with chapter 12, by Jakub Jehlička, which investigates whether the previous findings of reduced mental-rotation effect in users of sign language will hold for deaf users of Czech Sign Language as compared to native hearing Czech speakers (control group). The study adopts the design from research conducted with hearing participants speaking American English and American Sign Language participants (Emmorey, Klima, and Hickok 1998). In this volume, however, Jehlička presents only preliminary re-

sults for Czech hearing participants and compares them to the findings from the original study. Jehlička reports that in the condition with no rotation both groups (American English and Czech hearing participants) perform on par. The effect of mental rotation in the rotation condition, however, is much less pronounced in Czech participants than in American counterparts. Jehlička suggests that such differences may be a result of experimental design modifications, in particular changes in the presentation order of the stimuli, an interstimulus interval that was based on the production duration of the respective stimulus by a native Czech Sign Language speaker as well as subject pool composition—there were more women than men in the experiment, which is a relevant factor for a mental rotation effect study. The chapter concludes with Jehlička's remarks on the need for specific task designs when working with special populations, the need for more replication studies and especially for those that produce cross-linguistic comparisons of the same psycholinguistic phenomenon.

Conclusion

The main goal of the book is to thoroughly overview methodological challenges and specifics of psycholinguistic studies in Slavic languages. In my opinion, the volume not only successfully accomplishes this goal but also surpasses it, as each chapter offers valuable advice and possible solutions to overcome the challenges. As such, the book will especially appeal to researchers conducting psycholinguistic experiments with Slavic languages. Although each chapter covers very distinct topics and various aspects of methodological issues, the volume gives a coherent outline of general issues that researchers deal with when designing and running an experiment: 1) choosing an appropriate method, 2) selecting or creating stimuli, 3) applying appropriate statistical tests, 4) managing cross-linguistic differences and similarities, 5) handling the cultural and individual differences of the participants, and 6) testing linguistic effects in special populations of speakers.

Another strength of the book is that it can serve not only as a resource for experimental designs but also as an inspiration for new ideas and theories—many chapters present readers with curious and yet unexplored questions in the field of Slavic psycholinguistics. Overall, this is a valuable contribution to the literature and should be read by all researchers in Slavic psycholinguistics.

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Predrag Piper, Milivoj Alanović, Slobodan Pavlović, Ivana Antonić, Marina Nikolić, Dojčil Vojvodić, Ljudmila Popović, Sreto Tanasić, and Biljana Marić. *Sintaksa složene rečenice u savremenom srpskom jeziku*. Edited by Predrag Piper. Novi Sad: Matica Srpska; Beograd: Institut za srpski jezik, SANU, 2018. 766 pp. ISBN 978-86-7946-231-2.

Reviewed by Ljiljana Progovac

This 766-page syntax of the complex sentence in Serbian is a feat of thoroughness and attention to detail. It shows deep insight into the structure of sentences and their combinations. It provides a wealth of lucidly presented and described data that amply illustrate each type of imaginable combination, not only with the authors' own examples, but primarily with carefully selected passages from literature, mostly fiction, by prominent writers, as well as from newspapers. The examples from these sources were so carefully selected for each phenomenon discussed that it must have taken the authors days upon days just to find and integrate them. But each author of each chapter took the time to do that, and the chapters are quite uniform in their data coverage and the level of detail that the book reads as almost written by a single author. I have to admit that I was initially terrified when this book that I agreed to review arrived at my door, with its 766 packed pages. But I quickly realized that what I held in my hand was a treasure, with every page rewarding me with rich, often unexpected data and insight.

The authors consider the description and the analysis of each phenomenon from multiple angles. They offer evidence for their view, while leaving the door open for the reader to explore alternative views. They acknowledge the complexity of the choice in each case, and this is especially welcome in the case of ambivalent forms that straddle the boundaries of traditional classifications, such as conjunctions vs. subordinators, parataxis vs. hypotaxis, and adjuncts/adverbials vs. arguments/complements. The sheer volume and detail of the data provided is disarming, listing quite possibly every single conjunction and subordinator, and a myriad of ways in which they can be used, and then citing relevant examples form the literature to illustrate various subtle differences in usage and in nuances of meaning. The authors often appeal to diachronic considerations, which is why the book can also be of relevance to historical linguists, specifically those interested in the changes in meaning and usage of particular words and expressions in Serbian.

This is a descriptive grammar that does not make much use of modern theoretical frameworks, but it offers the modern theoretician of syntax a wealth of data that often surprises and poses good, potentially productive challenges for various theoretical postulates. One of the common threads is a characterization of syntactic combinations of clauses/sentences as paratactic or hypotactic, offering sharp insight into this overarching topic, with each particular phenomenon receiving careful attention, including various correlative constructions. The theoretical syntactician is provided with endless possibilities for new ideas and projects, and made aware of how much rich data is out there to tap into. The content of this book, while not theoretical, is neither dull nor naïve; the analyses are deep, and the insights inspiring.

It is also commendable that the authors resisted a prescriptive approach. They show the Serbian language as it is naturally used, with all the rich possibilities and nuances, rather than as a desideratum of some prescriptively minded scholars. To take just one illustrative example, there is a discussion of the naturalness and special effect of starting a sentences with a conjunction, quoting many carefully selected examples from the best literature. Although in some chapters there are subtle recommendations as to which form is more natural in Serbian, this is based on naturalness of usage, i.e., on what ordinary speakers of Serbian perceive as more natural or common, rather than on some prescriptive ideal having to do with logic, or proscribed by some "higher" authority. Faced with some of the data presented in the book, I realized that many phenomena that sound marginal to me in English, such as certain dangling modifiers and run-on sentences, both of which relate to parataxis, in fact can sound completely natural in Serbian, offering nuances of meaning that are not possible to express with "better"-structured alternatives. Here are some examples (p. 598):[1]

(1) Svetlana je ušla u kuhinju, pristavila kafu.
Svetlana AUX entered in kitchen put.on coffee
'Svetlana went into the kitchen, she put the coffee on.'

(2) Sunce se pomolilo iznad brda, biće lep dan.
sun REFL appeared above hill be$_{FUT}$ beautiful day
'The sun came up over the hill, it will be a beautiful day.'

[1] The English translations of Serbian examples are sometimes imperfect as they mimick the Serbian examples, thus showing the difference between the two languages when it comes to acceptability of this type of sentences.

(3) Deca se opiru, neće da zaćute.
children REFL resist will.not that$_{COMP}$ be.quiet
'The children are resisting, they won't be quiet.'

(4) Pesma je bila vesela, pa i drska, malo je
song AUX was cheerful and even sassy little AUX
prizoru odgovarala.
scene suited
'The song was cheerful and even sassy, it suited the scene very little.'

(5) Ne borim se ja za tvoju i vašu slobodu, ja se za
not fight REFL I for your$_{SG}$ and your$_{PL}$ freedom I REFL for
svoj narod borim.
own people fight
'I am not fighting for your freedom and that of all of you, I fight for my people.'

This begs the question of whether this is a consequence of the different syntaxes of the two languages, with one allowing more freedom with paratactic attachment than the other. Perhaps this is related to the null subject parameter or the flexibility of word order. In any event, this is just one place that shows that carefully selected and (pretheoretically) considered data, and an abundance of it, can surprise you and raise some deep questions.

The book also introduces some perhaps unexpected, novel classifications of sentence combinations. To take one example, there is a section on "gradacijske rečenice" (gradational sentences) (76–86), where the term pertains to complex sentences whose components seem to be combined in order to express some difference (or lack thereof) in the degree of some property, resembling in this respect traditional comparative and equative constructions. Some examples from that section are given below:

(6) Niko ih čestito i ne pogleda, a kamoli da
nobody them honestly even not looks.at and much.less that
ih upita za cijenu.
them asks for price
'Nobody even looks at them properly, let alone asking them about the price.'

(7) Vreme ne samo što ga je uvek zbunjivalo
weather not only that$_{COMP}$ him AUX always confused
nego ga je i zamajavalo.
but.rather him AUX even irked
'The weather didn't just always confuse him but it even irked him.'

(8) Nemačke pojave i stvari ne samo da nisu
German phenomena and things not only that$_{COMP}$ are.not
bezbojne, već su, naprotiv, puno, gusto šarenilo,
colorless but are on.the.contrary full dense colorfulness
često oporo, i, baš zato, nezaboravnije.
often pungent and precisely because.of.that more.unforgettable
'German phenomena and things not only are not colorless, on the contrary, they are a full, dense rainbow of color, often pungent, and all the more unforgettable exactly because of that.'

(9) Ne voli goste, ne voli nikoga.
not loves guests not loves nobody
'(S)he doesn't like guests, (s)he doesn't like anybody.'

(10) Našla je što je tražila, to jest poklon za sestru.
found$_{FEM}$ AUX what AUX sought$_{FEM}$ that is gift for sister
'She found what she was looking for, that is, a present for her sister.'

(11) Oni su tada odlučili da presaviju tabak iliti
they AUX then decided that$_{COMP}$ fold stack that.is
da se obrate sudu.
that$_{COMP}$ REFL go.to court
'They then decided to "turn the page", that is, to go to court.'

They surely have some common ground with a variety of comparative constructions, some correlative, raising again many questions regarding their precise classification/differentiation, as well as syntactic analysis (398–99):

(12) Što više, to bolje.
what more that better
'The more, the better.'

(13) On je srećniji nego (što je) pametniji.
he is luckier than (what is) smarter
'He is more lucky than (he is) smart.'

(14) Ona je šira nego (što je) duža.
she is wider than (what is) longer
'She is wider than she is long [i.e., tall].'

(15) Uzela sam (onoliko) hrane koliko mi treba za put.
took AUX$_{1SG}$ (so.much) food as.much me$_{DAT}$ needs for journey
'I took as much food as I needed for the journey.'

(16) Čovek hoće bar onoliko koliko si bubama dao …
man wants at.least so.much as.much AUX$_{2SG}$ insects$_{DAT}$ gave
'A man wants at least as much as you have given to insects …'

One thing that puzzled me was the lack of any scholarly references for the claims and analyses offered. One can find a good number of references at the end of each chapter, as well as at the end of the book itself, where there is a long and informative list. But these references are not given in the text, so it is not clear which particular claims in the chapters relate to which references listed at the end of the chapters. The book really reads as some kind of collective accumulation of important syntactic knowledge, with no perceived need to distinguish what has already been claimed and by whom, and what are the new claims by these authors. This may be a matter of cultural preference. Nonetheless, I note that the same is not true of the quotes taken from the literary works or newspapers. There, every quote is diligently ascribed to the writer, perhaps because the sentences were taken from these sources verbatim, or perhaps because they often take words from the pens of some true giants of Serbian literature. I must say that this lack of acknowledgement of who said what in previous scholarly work was initially worrisome to me. But as I continued reading, it stopped bothering me, as I relaxed and told myself that it is perhaps less important who said what and more important to achieve such a great depth in describing and documenting the remarkable richness of detail and nuance when it comes to sentences and their combinations in Serbian. It is thus fitting, perhaps, for my review not to give specific credit to individual authors of this book and their claims, but instead to consider this book as a true collective, cumulative masterpiece of a descriptive grammar.

It is also inconvenient that this book does not have a single index of terms for the whole book, but instead offers several brief indexes, one for each chapter. Thus, if you want to search, for example, for correlatives, you have to either know in which chapter they are discussed, or just go through the index of

each chapter. It struck me that it would be quite easy to collapse these indexes into one. But then it also struck me that this would be just a bit more effort on the part of the reader, and the effort is well worth it. What I am trying to say is that this book leaves a lot to the reader to find on his/her own, but, at the same time, it offers so much more than a reader can even imagine. I hope that *The syntax of the complex sentence in contemporary Serbian* gets consulted also by linguists working on other languages, especially Slavic languages, as it is there that one would be likely to find many fruitful comparisons and new inspirations.

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Rajna Dragićević, ed. *Krugovi Irene Grickat: Gramatičko-semantička istraživanja savremenog srpskog jezika* [Circles of Irena Grickat: Grammatical and semantic explorations of the modern Serbian language]. Beograd: Savez slavističkih društava Srbije, 2020. 587 pp. ISBN 978-86-81622-02-5.

Reviewed by Danko Šipka

The present volume includes various papers by Irena Grickat (1922–2009), an important yet less known Serbian linguist from the generation of Milka Ivić, Pavle Ivić, and Ivan Popović. The volume is edited by Rajna Dragićević of Belgrade University, who continues Grickat's intellectual tradition and has been a moving spirit behind various recent important projects in the field of lexicology, lexicography, and lexical morphology.

There are nine circles of Irena Grickat's scholarly interests featured in this book: 1) verb semantics, 2) adverbial semantics, 3) the semantics of indeclinable words, 4) lexical morphological and semantic features of diminutives, 5) the semantic and grammatical role of prefixation, 6) the semantic role of suffixation in the past and today, 7) the paradigmatic lexical relations of antonymy, 8) syntagmatic lexical relations, and 9) lexicography. Indeed, exploring these intricate linguistic problems is akin to visiting the nine circles of hell, and lexicography is appropriately in the ninth circle.

The volume encompasses 587 pages. It opens with a comprehensive biography of Grickat written by Rajna Dragićević (9–44), who has also provided a note explaining the architecture of the volume (44–47). The nine aforesaid circles contain a total of 29 papers written by Grickat between 1955 and 2003. An index is conspicuously absent from the volume.

The circle devoted to verb semantics (51–76) contains two papers: "The development of the meanings of the verb *imati*" and "What are all the meanings of *značiti*". The former paper analyses the key semantic and syntactic components of the Serbo-Croatian verb *imati*, meaning roughly 'to have' by revealing undercurrents of historical processes in which two Proto-Slavic verbs, *jęti* 'to take' and *iměti* 'to have', merged. The paper about the meaning of the verb *značiti* 'to mean' strives to show that the meaning of this verb actually happens, that it is performative rather than fixed, as we find it in dictionary definitions.

The section about adverbial semantics (77–190) includes six papers arranged chronologically, from the first paper published in 1951 to the last one

in the year 2000. "Adverbs and their relationship toward adjectives and adjectival meanings" focuses on less common meanings and functions of adverbs, in particular those that are in some kind of relationship with adjectives. "About one peculiarity of adverbs and adverbial phrases in Serbo-Croatian" addresses the use of the same adverbs in referring to location and destination, which is rather uncommon in most other Slavic languages. "About adverbs in Serbo-Croatian linguistic scholarship" provides a broad review of the treatment of adverbs in various grammars, papers, and dictionaries, with an eye toward detecting general epistemological regularities in the history of that treatment. "Adverbial words seen through the phenomenon of antonymy" focuses on the asymmetry of adverbial antonyms and their peculiarities compared to adjectival antonyms. "About certain pronominal (and adverbial) words in *k-*" explores additional meanings of the words like *ko* 'who' and *kako* 'how'. "The phenomena of being metaphorical in adverbs" looks into the mechanisms of metaphorical extensions of the adverbs that determine verbs.

The third circle is about the "Semantics of indeclinable words" (191–203). It includes two papers: "Semantic potential in some indeclinable words", about the ways in which the meaning of some conjunctions and adverbs morphs into new functions, and "About the preposition *za* in Serbian", which provides a review of the network of meanings of this preposition, and how they are related to one another and to a broader cultural background of the language.

The fourth circle tackles "Word-formation and semantic features of diminutives" (205–99). "Diminutive verbs in Serbo-Croatian" explores a peculiar feature of Serbo-Croatian compared to other Slavic languages: it has developed an extensive and intricate network of verbal diminutives, e.g., *skakutati*, a diminutive from *skakati* 'to jump'. "In the meanings of affixal verbal diminution", Grickat provides important new insights continuing the research tradition of Radoslav Bošković in this field. "About some peculiarities of diminution" provides an elaborate review of typical sounds, affixes, and semantic patterns in diminutives.

"The semantic and grammatical role of prefixation" (301–26), the fifth section, includes three papers. "What is the importance of pure (grammatical) prefixal perfectivization for research on verbal semantics" is about the elusive nature of perfectivization, which defies a straightforward formal analysis. "The features of verbal aspect pairing as semantic indicators" analyses thirty relations between prefixed perfective and secondarily imperfectivized verbs in Serbo-Croatian. Finally, "The prefix *s(a)-* with verbs in Serbian" addresses the possibilities for deploying this prefix in its various meanings.

"The semantic role of suffixation in the past and today" (327–54), the sixth circle, includes three papers. "Attempts at creating Serbian scholarly terminology in the mid-19th century" presents an analysis of the word-formation (mostly suffixal) patterns in the scholarly terms proposed before the reforms of Vuk Stefanović Karadžić. "About words derived in *-ar* and *-ač* in Serbo-

Croatian" analyses the criteria of differentiation of these two suffixes, which are both rough equivalents of the English suffix *-er*. "About the suffix *-ak* and in connection with it" is about the functions of this suffix in forming diminutives and hypocoristics.

"Paradigmatic lexical relations: Antonymy" (355–84) is in the seventh circle and includes two papers. "About antonymy" is an attempt at unearthing a deeper linguistic sense of antonymy and delimiting it from other similar lexical relations. "About some problems of negation in Serbo-Croatian" analyses Serbo-Croatian lexical means of negation against the background of other Slavic languages.

"Syntagmatic lexical relations" (385–438) are explored in the eighth section. It contains the following two papers: "Figures of speech in light of linguistic analyses", which points to the importance of differentiating linguistic analysis of figures of speech from their treatment in literary scholarship, and "Expressive phrases with genitives in Serbo-Croatian", devoted to phrases of the form *the/a pillar of*.

The volume is crowned by the section on "Lexicography" (429–587), which contains six papers. First, there are two different papers about "Academic dictionaries and their tasks". They are published in two different venues on the occasion of the publication of the first volume of the *Dictionary of Serbo-Croatian Literary and Vernacular Language*, under the aegis of the Serbian Academy of Sciences and Arts. Academic in this context means: sponsored by national academies of sciences (which are central cultural institutions in Slavic and many other European countries). "Lexicographic treatment in the dictionaries of the Serbian Academy of Sciences and Arts and the Yugoslav Academy of Sciences and Arts" is next. This paper discusses two multivolume unabridged dictionary projects, the former unfolding in Belgrade since 1958, the latter running from 1880 to 1976 in Zagreb. The fourth paper in this circle is titled "The problems of descriptive lexicography". It is the author's acceptance speech for the membership in the Serbian Academy of Sciences and Arts. The paper discusses a range of issues encountered in monolingual descriptive lexicography. "Dictionary of the Serbian Academy of Sciences and Arts" is next. This paper presents various interesting qualitative and quantitative data about this dictionary, from its prehistory and the motivation for its initiation to the number of words in the first 14 volumes. The final paper in the volume is titled "Language scholarship and the activities of the Serbian Academy of Sciences and Arts". In it we will find a historical review of linguistic research sponsored by the Academy.

What all these diverse papers have in common is the following. First, all of them are based on solid data. Second, the author always clearly identifies the issues that need to be analyzed and then chooses appropriate methodology to tackle problems at hand. Third, the author never remains in the narrow realm of the Serbo-Croatian phenomena she analyzes. She always introduces evi-

dence from other Slavic and, not infrequently, non-Slavic languages. Fourth, the papers appropriately include synchronic and diachronic perspectives. Fifth, they are written in a beautiful language with the line of argumentation not always following the strict architecture of scholarly papers. These features of Grickat's writing style are quite common in Slavic philological traditions. Finally, all papers are all clearly rooted in a structuralist lexicological and metalexicographical approach, as practiced in Slavic countries.

This last fact is something that will make the volume interesting to the readership of the *Journal of Slavic Linguistics*. Slavic linguistics in North America is dominated by syntax and phonology, which leaves lexicology and metalexicography on the sidelines. Additionally, data from Slavic languages are used primarily to advance the claims of an approach to which the researcher in question adheres. Given all that, it will certainly be useful to get acquainted with an alternative research agenda, one that is very common in all research traditions in Slavic countries. In the approach followed by Irena Grickat, Slavic-specific phenomena and their elucidation are front and center. Even the titles of the chapters in this volume sound rather different from what one is accustomed to in the North American research tradition. Needless to say, in addition to having the walls of one's own research agenda breached and getting a chance to look at various linguistic problems through a very different lens, the reader will get a wealth of information about Serbo-Croatian words. While the words are in the center of analysis in the present volume, the relevance of the conclusions reached in each paper spreads across various linguistic fields. The volume will be of interest not only to lexicographers and lexicologists, but also to syntacticians, semanticists, those working in the field of lexical morphology, students of writing styles, historical linguists, and, some of them, even to phonologists and historians.

The papers in this volume have been published across decades, some more than a half-century ago. Obviously, new findings have been unearthed in the intervening period. However, this fact does not change our general perception of the papers. They still stand as coherent accounts of the phenomena they analyze and they are still a rich source of important insights. Readers are in for a feast of hands-down research on a range of interesting issues. Rajna Dragićević, the editor of this volume, should certainly be applauded for gathering in one volume diverse texts that could have remained less known, being dispersed in various publication venues across a long span of time.

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