Formal Studies in Slavic Linguistics
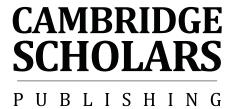
Formal Studies in Slavic Linguistics

Edited by

Anastasia Smirnova, Vedrana Mihaliček and Lauren Ressue

CAMBRIDGE SCHOLARS

PUBLISHING

TABLE OF CONTENTS

PREFACE

CATHERINE RUDIN

It is a very personal pleasure to write a preface for this volume, the latest addition to the growing edifice of formal Slavic linguistics. Thirty years ago, when I began working on a generative analysis of Bulgarian syntax, the field barely existed. Aside from a few pioneers – Catherine Chvany, Leonard Babby, a handful of others – Slavic linguistics and formal linguistics in the 1970s and even 1980's were almost entirely non-overlapping fields. Slavicists tended to be functionalist, literary, or pedagogically oriented, and most formal linguists were unaware of the rich and interesting problems offered by Slavic languages. East European scholars were generally out of touch with developments in linguistic theory in the west, and vice versa. Fortunately, all of this has changed. Formal Slavic linguistics today is a dynamic research area, with several yearly conferences and a host of active scholars, both in Slavic-speaking countries and in the rest of the world. The bibliographies of the eight papers presented here give a small taste of the burgeoning numbers of recent publications taking a formal approach to Slavic languages.

Several factors have contributed to this blossoming of formal Slavic linguistics: the fall of communism, the ease of internet communication – but most of all the maturing of generative theoretical linguistics itself. It is no longer possible to proclaim a universal based only on English and Italian. Formal linguists have come to take seriously the need to investigate a range of typologically different languages, in order to understand the possible forms a human language can take. Formal theoreticians have furthermore come to see the utility of comparing closely related languages and dialects as a way of discovering how small changes in particular parts of the grammar can radiate through other areas of the language; crosslinguistic studies within the Slavic family have illuminated areas such as clitic placement, finiteness, and multiple wh movement, and the insights thus gained have been applied to further work on other language families and Human Language as a whole. Over the past few decades, data and insights from Slavic languages have contributed to the

development of formal theories of aspect, syntactic movement, information structure, and many other areas.

Meanwhile, Slavic linguists have come to recognize the power of formal analyses to make sense of the grammar of individual languages. Formal linguistic theories have greatly enriched the study of Slavic languages, by suggesting new questions to be asked, concepts and claims to be tested against Slavic language facts, more explanatory accounts of traditional problems. As in any field, the very questions asked in Slavic linguistics depend on theoretical scaffolding; formal linguistic theories have made it possible to frame issues that would not have been raised without the vocabulary and tools of tree structures, features, tableaux, and so on.

The papers in this volume ably represent the vitality and variety of the field of formal Slavic linguistics. They deal with very different topics, from phonetics to discourse, but all have two features in common: they present Slavic language data, and they approach these data from the point of view of a rigorous theoretical framework. Several of the papers bring new facts to bear on well-known issues: Slavic language data are shown to support or challenge a previous analysis, for instance of palatalization or of wh movement (in the same language or universally). Others bring a new theoretical perspective to the analysis of previously known data, for instance, the meanings of aspectual prefixes, the marking of the subjunctive, and conditions on ellipsis.

Although the eight papers presented here use a variety of theoretical frameworks, all of them can be considered "formal" in the sense of treating language as a system of structures and rules which can be described in a precise way, rather than as primarily a cultural or literary artifact. Whether the theoretical framework involves syntactic trees, feature matrices, or constraint orderings, the goal is the same: to represent the knowledge which speakers of a language possess. This knowledge, the linguistic structures and rules, is at least partially innate, subject to universal constraints, and generally below the level of conscious understanding. Speakers "know" the system in that they are able to use it fluently, manipulate it for their own needs, and can judge which utterances do and do not fall within the system of the language (i.e. which are grammatical). Formal linguistics aims to specify the architecture of this system; to state exactly what the structures and rules of a given language are, and ultimately what the possible structures and rules are for any human language. Formal Slavic linguistics focuses on languages within the Slavic family, but is situated firmly within the larger aim of understanding

Human Language; many of the papers in this volume build on and refer to work on languages outside Slavic.

It is exciting to see the range of innovative and careful work presented here, and it is especially exciting to see such high quality work from a group of young scholars (all participants in a graduate colloquium) with native fluency in the languages they investigate. These papers make it clear that formal Slavic linguistics has a bright future – and general linguistics is the richer for it.

INTRODUCTION

Formal Studies in Slavic Linguistics is a collection of essays that provide formal accounts of challenging phenomena in various Slavic languages. The present volume contains selected papers presented at the 4th, and 5th Graduate Colloquia on Slavic Linguistics, held at the Ohio State University in October 2006 and 2007.

This book is a continuation of an earlier volume: *Issues in Slavic Syntax and Semantics* (2008). While preserving the same quality standards, the current volume has a broader scope, as it includes papers in phonology, phonetics, morphosyntax, syntax, semantics and pragmatics. The analyses are formulated in a variety of theoretical frameworks, such as Optimality Theory, minimalist syntax, and lexical semantics. From the typological perspective, all subgroups of Slavic languages are represented in the volume; individual papers focus on Polish, Russian, Serbo-Croatian and Slovenian. When considered together, these papers advance our understanding about the properties of natural language and show how important it is for the development of theoretical linguistics to continuing doing formal work on the Slavic languages.

Vikotr Kharlamov's paper, *'The Role of Perceptual Factors in Consonant Deletion: Evidence from Russian'*, offers a perception-based account of consonantal deletion in Russian. The author examines word-internal clusters of 3 or more consonants and argues, following Côté (2000, 2004), that perceptual factors play a crucial role in determining which segments undergo deletion. More specifically, he argues that consonants in perceptually weak environments, segments lacking strong internal cues and other elements lacking perceptual distinctness are deleted, whereas perceptually strong segments (e.g., dissimilar consonants, segments in perceptually beneficial environments, and consonants with strong internal cues) are retained. The formal analysis of consonantal deletion is presented in the optimality-theoretic framework.

Svitlana Antonyuk-Yudina's paper, **'*Russian Loanword Phonology: A Phonetic Account*'**, discusses a peculiar pattern in Russian loanword phonology, whereby stops followed by a mid front vowel [e] are sometimes palatalized and sometimes remain unpalatalized, as opposed to

cases of stops followed by the high front vowel [i], which are always palatalized in loanwords. The paper reports on a phonetic experiment, the results of which suggest that a certain L2 to L1 mapping may be responsible for the pattern. Specifically, the author suggests that the voice onset time (VOT) in the source language prompts native Russian speakers to map consonants, either palatalized or plain, onto the target language, depending on whether the source VOT is closer to that of plain or palatalized stops.

Rok Žaucer's contribution, *'The Reflexive-Introducing NA- and the Distinction between Internal and External Slavic Prefixes'*, discusses prefixed structures such as the Slovenian *na-gledati se filmov* (lit. on-watch self movies$_{GEN}$) 'get one's fill of watching movies'. In this use, *na-* behaves as an 'internal'/'lexical'/'resultative' prefix in some respects and as an 'external'/'superlexical' prefix in other respects. The author argues, nonetheless, that it is resultative. He also argues that despite appearances, such constructions sometimes contain two VPs. The main evidence includes data with two unselected objects, perfectivity triggering, and secondary imperfectives and various kinds of adverbials with two scopes. A comparison is made with cases such as Slovenian *z-laufati se* (lit. out-run self) 'wear oneself out running' and English *run oneself exhausted*, which have simple resultative structures with a single VP. The findings of the paper cast serious doubt on the validity of the diagnostics that are widely used for distinguishing between the two types of prefixes.

Vedrana Mihaliček's paper, *'The Order of Wh Words in Multiple Wh Extraction in Serbo-Croatian'*, argues against the analysis of multiple wh constructions proposed by Bošković (1997, 2002) for Serbo-Croatian. In particular, Bošković claims that in multiple wh constructions, wh fronting is constrained by the Superiority Condition so that the subject wh phrase has to linearly precede any fronted object or VP adjunct wh phrases. In those constructions, he claims, wh movement is involved. Since there are no such constraints in main clause multiple wh questions, Bošković (1997, 2002) argues that a distinct wh fronting mechanism is involved in their formation ('focus fronting'; see also Stjepanović 2003). This paper challenges Bošković's empirical generalization about the possible orders of fronted wh phrases in Serbo-Croatian and argues that there are no syntactic constraints on the order of fronted wh words, in any wh construction. It follows that there is no need for two distinct wh fronting mechanisms: whatever mechanism is responsible for wh fronting in Serbo-Croatian is not constrained by the Superiority Condition.

Barbara Tomaszewicz's paper, *'Subjunctive Mood in Polish and the Clause Typing Hypothesis'*, addresses the puzzling case of the so-called subjunctive complementizers in Polish and shows that it is not the complementizers themselves that are subjunctive, but the whole structure of the clause. The incorporation of counterfactual morphology into the complementizer is a result of a clause-typing requirement.

Boštjan Dvořák's paper, *'Stress and Strength by Clitics in Slovenian'*, addresses the question of the function of pronominal clitics in Slovenian. With their ability to be used as short answers, Slovenian pronominal object clitics demonstrate crosslinguistically rare behaviours with respect to their position, stress and use. Thus, defining them as 'clitics' poses a problem, since this term ascribes them properties that they do not exhibit in Slovenian. This paper presents a detailed account of the distribution of clitics and proposes an analysis based on functional differences between 'weak' and 'strong' pronouns.

Oxana Skorniakova's paper, *'Syntactic and Semantic Properties of Russian Dative "Subjects" in the Impersonal Construction'* presents evidence against dative subjects in Russian impersonal constructions. The author divides all impersonal clauses into two groups and demonstrates that they exhibit similar tendencies with respect to the case assignment on their agentive argument. If an impersonal predicate is reflexive or copular 'be', an agentive argument takes the dative case. However, unlike what is usually assumed in the literature, the author presents a convincing argument against treating accusative and dative arguments as subjects. She also presents a lexical semantics analysis of the arguments' proto-roles (Dowty 1991) and shows that it accounts for the semantic difference between dative impersonal agentive arguments and nominative agentive subjects. The former obligatorily lacks the proto-agent entailment of volition, which is reflected in the different case marker.

Oksana Laleko's paper, *'Negative-Contrastive Ellipsis in Russian: Syntax Meets Information Structure'*, accounts for the distribution of the elliptical constructions involving the negative polarity marker NET 'no' in Russian. Assuming that ellipsis is an empty complement of a functional category S, where SP is understood to be a unified projection for negative and affirmative sentences, Condition (i) requires that S in the Russian NET-construction bears a contrastive focus. Condition (ii) requires contrastive topicalization of the remnant constituent. These licensing conditions on negative-contrastive ellipsis in Russian are argued to both

distinguish this construction from English VPE, despite some superficial parallels in distribution, as well as account for the restrictions on the occurrence of certain additive particles and conjunctions in the ellipsis clause. By analyzing the polarity head NET in Russian as a valid ellipsis licenser only when specified for a Contrastive Focus feature [+CF], this work advances the idea that the licensing of ellipsis can be mediated by information structural features, such as [+contrastive].

LIST OF ABBREVIATIONS

ACC	Accusative case
ATEL	Atelic
AUX	Auxiliary
C	Complementizer
CL	Clitic
DAT	Dative case
DEM	Demonstrative
DL	Dual
FEM	Feminine
FUT	Future
GEN	Genitive case
IMP	Impersonal
IMPF	Imperfective aspect
INF	Infinitive
MASC	Masculine
NEG	Negation
NEUT	Neuter
NOM	Nominative case
OPT	Optative
PART	Particle
PASS	Passive
PAST	Past tense
PERF	Perfective
PL	Plural
POSS	Possessive
PPLE	Past participle
PRES	Present tense
PREP	Prepositional case
PROG	Progressive
PRON	Pronoun
PTCP	Participle
Q	Question word
REFL	Reflexive
SG	Singular
TEL	Telic

The Role of Perceptual Factors in Consonant Deletion: Evidence from Russian

Viktor Kharlamov

Abstract. This paper offers a perception-based account of consonantal deletion in Russian. I examine word-internal clusters of 3 or more consonants. Following Côté (2000, 2004a,b), I argue that perceptual factors play a crucial role in determining which segments undergo deletion. Namely, consonants in perceptually weak environments, segments lacking strong internal cues and other elements lacking perceptual distinctness get deleted, whereas perceptually strong segments (e.g., dissimilar consonants, segments in perceptually beneficial environments, and consonants with strong internal cues) are retained. The formal analysis of consonantal deletion is presented in the optimality-theoretic framework.

1. Introduction

Russian is well known to allow word-internal clusters of 3 or more consonants. Such sequences often surface in a reduced form, as demonstrated for /stn/ in (1) below.

(1) /me<u>st</u>nij/ 'local' → [mesnij] / *[mestnij]

However, not all consonants can be deleted even if they occur in the exactly same environment. For example, whereas the /t/ in /stn/ undergoes deletion, the /k/ in /skn/ must be retained and the cluster can never surface as [sn] in the variety of Russian spoken by the author. This is shown in (2) below.

(2) /vipu<u>skn</u>oj/ 'senior' → [vipusknoj] / *[vipusnoj]

In the past several years, Silverman (1997), Kirchner (2000), Hume and Johnson (2001) and many others have argued that perception plays a crucial role in phonology and that perceptually salient phonological

contrasts are maintained, whereas contrasts of low perceptibility can be sacrificed. Steriade (2001) and Côté (2000, 2004a,b) suggest that the likelihood of a segment undergoing assimilation or deletion depends on the strength of perceptual cues associated with the segment itself or the environment in which it occurs. For example, in a cluster consisting only of coronal stops, the level of perceptual distinctness of adjoining consonants can be relatively low and one of the segments can assimilate or delete.

In the present paper, the perceptually-motivated approach outlined above is applied to the phenomenon of consonantal deletion which affects groups of 3 or more adjacent consonants in the majority of Russian dialects. The clusters in question occur either suffix-internally (the nominal suffix /stv/) or at the root-suffix and suffix-suffix boundaries (e.g., /stn/, /ntsk/, /ntstv/). Following Côté (2000, 2004a,b), I argue that there is an interaction between deletion and perceptibility: consonants in perceptually salient environments, dissimilar segments, and/or consonants with strong internal cues resist deletion, whereas segments in weak, non-vocalic environments, similar consonants, and/or segments without robust internal cues are simplified.[1] The formal analysis of deletion is done within the optimality-theoretic (OT) framework. I propose a system of perceptually-motivated constraints that can successfully account for the observed patterns, including the cases of optional and prohibited deletion.

The novelty of the current project is that whereas previous cluster simplification studies have concentrated on word-final deletion (e.g., Côté 2004b), resolution occurring with specific suffixes (e.g., the Icelandic preterite suffix; Côté 2004a), and 2-consonant clusters (e.g., Wilson 2001), this paper looks at a complex case of word-internal deletion patterns that involve clusters of 3 or more segments and multiple suffixes.

The paper is organized as follows. The data is introduced in Section 2. Section 3 draws generalizations from the data, provides appropriate background information and introduces a system of ranked OT constraints. The proposed analysis is applied to the Russian data in Section 4.

---

[1] For the absolute majority of clusters, the deleting segment can occur pre-vocalically in morphologically-related words. E.g., the /t/ is not pronounced in /mesʹnij/ 'local', but it is audible in /mesʹto/ 'locality'. The two words share the same root morpheme /mest-/ and the /t/ is spelled out in both cases. Therefore, Russian speakers are undoubtedly aware of the underlying sequence being /stn/ rather than /sn/, and I assume that all deletion cases presented in the current paper (possibly, with the exception of lexically-specified items) are due to cluster simplification and that the lexical entries of all words in question contain the deleting segment underlyingly.

Conclusions are presented in Section 5. The Appendix provides examples of words containing the clusters undergoing simplification.

2. Data

Several hundred words containing 3 or more consequent word-internal consonants were extracted from a list of over 35,000 Russian words. The author's judgments on consonant cluster pronunciation, syllabification and segmentation into morphemes were strengthened by intuitions obtained from 5 other native speakers (all coming from the Perm district of the Russian Federation and representing the author's variety or Russian) as well as descriptions given in the generative literature (Townsend 1975, Derwing and Priestly 1980, Bogdanova 2001a,b, Schukina 2004). Clusters undergoing simplification are listed in (3) below. The deleting segment is always underlined. Since palatalization of consonants does not appear to influence the likelihood of deletion, it is omitted in all clusters (except to show the /š-šʲ/ contrast). Clusters consistently resisting deletion are in (4).

(3) a.   Compulsory reduction[2]: /st̲n/, /zd̲n/, /nt̲š/, /nt̲šʲ/, /nd̲c/, /st̲c/, /zd̲c/, /st̲č/, /zd̲č/, /mt̲sk/, /nd̲sk/, /nt̲sk/, /st̲sk/, /št̲sk/, /nt̲stv/;

  b.   Optional/lexically-specified reduction: /st̲b/, /nd̲k/, /nt̲k/, /st̲k/, /zd̲k/, /st̲l/, /žd̲l/, /ngsk/, /rd̲sk/, /rgsk/, /rk̲sk/, /sk̲sk/, /d̲stv/, /gstv/, /t̲stv/, /f̲stv/, /v̲stv/, /lv̲stv/.

(4) Not subject to reduction: /bsk/, /bšʲn/, /dsk/, /fsk/, /jsk/, /ksk/, /ktn/, /ltk/, /lsk/, /lzk/, /lvk/, /lčk/, /lkl/, /lzl/, /lbn/, /lkn/, /lsn/, /lzn/, /lž̲n/, /lčn/, /lzt/, /msk/, /mkn/, /nsk/, /ntl/, /ndn/, /rpk/, /rsk/, /rtk/, /rzk/, /rž̲k/, /rbl/, /rkl/, /rml/, /rzl/, /rbn/, /rdn/, /rgn/, /rkn/, /rpn/, /rsn/, /rtn/, /rvn/, /rzn/, /rxn/, /rž̲n/, /rmč/, /stj/, /skl/, /spl/, /skn/, /stv/, /tsk/, /txl/, /tkn/, /vsk/, /xsk/, /xtn/, /zgš/, /šsk/, /ž̲sk/, /ž̲gl/, /bstv/, /jstv/, /lstv/, /lž̲sk/, /mstv/, /nstv/, /prsk/, /pstv/, /rbsk/, /rmsk/, /rnsk/, /rstv/, /vrsk/, /drstv/.

3.   Generalizations and constraints

The data reported above shows that clusters of 3 or more consonants often simplify in Russian. In traditional OT, cluster simplification is thought to be syllable-driven (Kager 1999) and is accounted for with *ComplexCoda

---

[2] For some speakers, retention is possible for infrequent words.

or other similar constraints referring to the position of the deleting segment in a syllable. Côté (2004a,b) challenges the syllabic nature of consonantal deletion and argues that the preference for smaller consonant clusters should be analyzed using a sequential approach. Namely, consonantal segments in pre and post-vocalic environments are claimed to have a higher degree of perceptibility. Since such consonants are less likely to be misperceived or not perceived at all than segments which do not benefit from vocalic transitions, Côté (2004a,b) suggests that the sequence VC_1C_2V should be preferred over $VC_1C_2C_3V$, which has a consonantal segment in a non-vocalic environment (i.e., the C_2). According to this approach, /stn/ simplifies to [sn] because the /t/ would otherwise surface in a perceptually weak, non-vocalic environment where it might be mistaken for zero.

Accepting the assumption that deletion in Russian is sequential rather than syllabic allows us to offer a simpler and more direct analysis of consonantal deletion, especially since Russian speakers vary considerably in their syllabification judgments for many of the clusters in question. For example, the /f/ can be optionally deleted in the bi-syllabic noun /šefstvo/ 'supervision'. Some speakers syllabify the word as /šefst.vo/, and deletion could be analyzed using *ComplexCoda. Other speakers syllabify the noun with the /f/ in a complex onset (i.e., /še.fstvo/). In this case, simplification would have to be attributed to *ComplexOnset. However, there are also speakers (including the author) who choose yet another syllabification pattern: /šef.stvo/. In the latter example, the first syllable has a simple coda and neither *ComplexCoda nor *ComplexOnset would account for the deletion of the fricative. In contrast, if the sequential approach is used, a single constraint banning a 4-consonant cluster could trigger deletion regardless of how the speakers syllabify the word.

To account for the Russian data, I adopt the markedness constraints in (5) and (6) below that enforce adjacency to a vocoid segment. These constraints are based on Côté's $C \leftrightarrow V$ ('A consonant is adjacent to a vowel'; 2004b); however, I use the feature [vocoid] instead of referring to 'V' since not only adjacency to vowels but also to vocoid consonants can increase perceptibility of consonantal segments.

(5) **$C \leftrightarrow$[vocoid]** – a consonant must be adjacent to a vocoid

(6) **$C \leftrightarrow$[vocoid]^{x2}** – a sequence of two consonants not adjacent to vocoid segments is not allowed

As demonstrated in (7), C↔[vocoid] penalizes clusters of 3 or more consonants. The self-conjoined C↔[vocoid]^{x2} disallows clusters of 4 or more segments. Introduction of the self-conjoined constraint allows us to account for deletion patterns occurring in 4 and 5-consonant clusters exclusively. Since constraint conjunctions are traditionally assumed to outrank the individual constraints they consist of, C↔[vocoid]^{x2} must be ranked above C↔[vocoid].

(7)

cluster	C↔[voc]^{x2}	C↔[voc]
VCCV		
VCCCV		*!
VCCCCV	*!	**

Markedness constraints in (5) and (6) compete with a number of faithfulness constraints that penalize deletion of perceptually salient consonants. In Russian, pre and post-vocalic consonants do not delete in any 3-consonant clusters (e.g., neither the /t/ nor the /k/ can delete in /tsk/). Côté (2004b) and Anttila et al. (2004) argue that adjacency to a vowel can increase perceptibility of a consonant and, therefore, can block deletion. Côté (2004b: 22) introduces the constraint in (8).

(8) **Max(C)/V -** do not delete a consonant adjacent to a vowel

In Russian, post-vocalic segments may delete optionally in 4-consonant clusters (e.g., /VtstvV/ can surface as either [tstv] or [stv]). Therefore, the constraint in (8) above needs to make a distinction between pre and post-vocalic positions. Moreover, cluster-medial consonants followed by the /j/ are not subject to simplification (e.g., the /t/ never deletes in /stj/). Adjacency to glides and other vocoid segments also increases a segment's perceptibility, and the reformulated constraint will need to refer to the feature [vocoid] instead of 'V' or [syllabic].

In addition, consonants followed by either the /r/ or the /v/ (but only when the latter is immediately followed by a [vocoid] segment) consistently resist deletion (e.g., the /t/ in /VvstvV/ and the /d/ and the /t/ in /VdrstvV/ cannot simplify). I propose that the /r/ in any environment and the pre-vocoid /v/ are specified as [vocoid] in Russian. As a trill, Russian /r/ involves vowel-like portions that are characteristic of vocoid segments. Treating the rhotic as [vocoid] underlyingly is also consistent with Côté (2004b), who points out the existence of both phonotactic and

phonetic reasons for analyzing /r/ as [vocoid] in Quebec French, English and Catalan. The phonemic status of the /v/ in Russian is also quite special. Kiparsky (1985) considers it to be /w/ underlyingly (i.e. [vocoid]). Padgett (2002) argues that Russian /v/ is a non-vocoid narrow approximant. A preliminary acoustic study conducted for the purposes of the present paper showed significant differences between instances of /v/ in different environments. In pre-vocoid environments, [v] has very limited frication noise and is similar to the English glide /w/. In pre-consonantal environments, [v] involves substantially more frication and resembles other fricatives. A detailed acoustic study is needed to draw any final conclusions, yet it seems reasonable to hypothesize that Russian has both vocoid and non-vocoid [v]'s.

The constraint in (8) can now be reformulated to include directionality (expressed with arrows pointing left/right) and the feature [vocoid], as shown in (9) and (10) below.

(9) **Max(C)←[vocoid]** – do not delete a consonant preceded by a [vocoid] segment

(10) **Max(C)→[vocoid]** – do not delete a consonant followed by a [vocoid] segment

In Russian, consonants followed by vocoids never delete, suggesting that Max(C)→[vocoid] is undominated. This is consistent with the assumption that a pre-vocoid position provides better perceptual cues for a consonant than a post-vocoid one (Côté 2000, etc.) Since deletion of post-vocoid segments is possible in clusters of 4 or more consonants (e.g., /tstv/ can surface as either [tstv] or [stv]), Max(C)←[vocoid] must be ranked lower than Max(C)→[vocoid]. Keeping the former constraint crucially unranked with respect to C↔[vocoid]^{x2} allows us to account for optional deletion occurring in 4-consonant clusters. This is demonstrated in (11) below, where the optimal candidate is marked with an arrow.[3]

---

[3] Additional constraints are required to eliminate other possible candidates not considered in the tableau (e.g., $VC_1C_3C_4V$). These constraints will be introduced in the remainder of the current section.

(11)

/$VC_1C_2C_3C_4V$/	Max(C) →[vocoid]	Max(C) ←[vocoid]	C↔[voc]^{x2}
→ $VC_1C_2C_3C_4V$			*
→ $VC_2C_3C_4V$		*	
$VC_1C_2C_3V$	*!		

For 3-consonant clusters, ranking Max(C)←[vocoid] above C↔[vocoid] blocks deletion of post-vocoid segments. With deletion of pre-vocoid consonants being penalized by the highly-ranked Max(C)→[vocoid], only medial consonants can be simplified in such clusters. This is shown in (12) below.

(12)

/$VC_1C_2C_3V$/	Max(C) →[vocoid]	Max(C) ←[vocoid]	C↔[voc]^{x2}	C↔[voc]
$VC_1C_2C_3V$				*!
VC_2C_3V		*!		
VC_1C_2V	*!			
→ VC_1C_3V				

The tableau in (12) above predicts that all clusters of 3 or more consonants should simplify and lose the medial segment(s). This is clearly not the case. For example, bilabial plosives never delete regardless of the environment or cluster size. In the Russian data, the /b/ and the /p/ are invariably retained in /bstv/ and /pstv/, respectively. In contrast, labiodentals, coronals and velars are optionally deleted in the exact same environment: /fstv/ surfaces as [fstv] or [stv], /tstv/ becomes [tstv] or [stv], /gstv/ is pronounced as [kstv] or [stv], etc. Crucially, bilabial stops appear to be consistently released in all Russian clusters and, therefore, they always benefit from the noise burst cue that drastically increases their perceptibility.

Similarly, strident fricatives and affricates /s, z, š, šʲ, <u>ž</u>, c, č/ are not subject to deletion regardless of their position or cluster length (e.g., the /s/ cannot be deleted in /bsk/, /mstv/, /drstv/). The strong frication noise associated with the production of strident segments is a robust internal cue that makes them perceptually salient in any environment.

Finally, sonorant consonants resist simplification in all Russian clusters. For example, unlike the /f/ that can be optionally deleted in /fstv/, the /n/ is always retained in /nstv/. Sonorants have formant structure and, consequently, they can remain perceptually salient even in non-vocalic environments.

To account for the absence of simplification, I introduce the constraint in (13) which penalizes the deletion of perceptually-strong consonants (i.e., bilabials, sibilants, and sonorants). In Russian, the constraint in (13) is never violated and must remain undominated.

(13) **Max(C, strong)** – do not delete perceptually-strong consonants

As demonstrated in (14), /dsk/ can never simplify by deleting either the sibilant /s/ or the two consonants in perceptually-salient pre and post-vocalic environments. Only the faithful candidate may win.

(14)

/VdskV/	Max(C, strong)	Max(C) →[voc]	Max(C) ←[voc]	C↔ [voc]
→ a. dsk				*
b. dk	*!			
c. ds		*!		
d. sk			*!	

In addition to the nature of segments themselves, distinctness of adjacent consonants may also play a role in cluster simplification. Côté (2004b) demonstrates that the likelihood of deletion may depend on how distinct adjacent segments are from each other: in Quebec French, stop deletion is more likely in a sequence of coronal consonants than in a sequence of segments contrasting in [place].

In the case of Russian, contrasts in [continuant] and/or [sonorant] do not appear to interfere with cluster simplification, whereas contrasts in [place] or [approximant] can block deletion. For example, in the cluster /stn/, the /s/ and the /t/ contrast in [continuant] and the /t/ and the /n/ contrast in [sonorant]; however, all 3 segments are coronal and the cluster is systematically simplified to [sn]. The sequences /stk/ and /stl/, on the other hand, can surface faithfully. In /stk/, there is a contrast in [place] between the coronal /t/ and the velar /k/, and the closure of the /k/ is less likely to mask the release of the /t/. Similarly, the /t/ and the /l/ contrast in

[approximant] in /stl/, and the /t/ can have a lateral release. As a result, the /t/ can remain perceptually salient and resist deletion in both clusters.

Unlike a single contrast in [place] with only one of the adjacent consonants, a dual contrast in [place] with both adjacent segments blocks deletion in 3-consonant clusters. For example, the velar /k/ in /skn/ has a [place] contrast with both the /s/ and the /n/, and the cluster cannot simplify. The same velar stop can delete optionally in the 4-consonant cluster /sksk/, which also involves a dual contrast in [place]. At the same time, some combinations of contrasts block deletion in clusters of any size. For example, the /t/ cannot be deleted in /ltk/, which involves two simultaneous contrasts: a contrast in [approximant] with the /l/ and in [place] with the /k/. Resolution is also not possible when there is a contrast in [sonorant] with the following segment and a contrast in [place] with the other segment (e.g., /ktn/→[ktn], *[kn]), or when there are contrasts in sonority with *both* adjacent segments (e.g., /ntl/→[ntl], *[nl]). The table in (15) summarizes the likelihood of deletion based on the presence of featural contrasts.

(15)

Contrast	Deletion	Examples
a. [continuant] [sonorant] [continuant]&[sonorant]	unrestricted	/stn/ → [sn] /zdn/ → [zn]
b. [place] [approximant]	restricted	/stk/ → [sk]/[stk] /stl/ → [sl]/[stl]
c. [place]&[place] [approximant]&[place] →[sonorant]&[sonorant] →[sonorant]&[place]	prohibited in CCC; restricted or unattested in CC(C)CC	/skn/ → [skn] /sksk/→[sksk]/[ssk] /ltk/ → [ltk] /ntl/ → [ntl] /ktn/ → [ktn]

Côté (2004b) proposes a number of contrast-based faithfulness constraints that penalize the deletion of segments contrasting in a specified feature. To account for the Russian data, the constraints in (16) through (23) below can be introduced:

(16) **Max(C)/Contr:[cont]** – do not delete a consonant contrasting with an adjacent consonant in [continuant]

(17) **Max(C)/Contr:[son]** – do not delete a consonant contrasting with an adjacent consonant in [sonorant]

(18) **Max(C)/Contr:[pl]** – do not delete a consonant contrasting with an adjacent consonant in [place]

(19) **Max(C)/Contr:[appr]** – do not delete a consonant contrasting with an adjacent consonant in [approximant]

(20) **Max(C)/Contr:[pl]&[pl] -** do not delete a consonant contrasting in [place] with both adjacent consonants

(21) **Max(C)/Contr:[appr]&[pl] -** do not delete a consonant contrasting in [approximant] and [place] with adjacent consonants

(22) **Max(C)/Contr:[son]&[son]**– do not delete a consonant contrasting in [sonorant] with both adjacent consonants

(23) **Max(C)/Contr:→[son]&[pl] -** do not delete a consonant contrasting with its following consonant in [sonorant] and the other adjacent consonant in [place]

The individual contrast-based faithfulness constraints in (16) through (26) can be grouped together under a number of cover constraints. As it has been shown in (15), 3 different types of contrasts can be identified in Russian: (i) contrasts that do not interfere with deletion, (ii) contrasts that make deletion optional/lexically-specified, and (iii) contrasts that block deletion in 3-consonant clusters, but make it optional or lexically-specified in larger clusters (or unattested in 4 and 5-consonant clusters). Thus, Max(C)/Contr:[cont] and Max(C)/Contr:[son], for example, can be combined together under the cover constraint in (24), since both constraints behave in the same way with respect to cluster simplification.

(24) **Max(C)/Contr:'minimally distinct'** – do not delete a consonant that is minimally distinct from adjacent consonants

Since contrasts in [continuant] and/or [sonorant] never block deletion in Russian, the constraint in (24) must be ranked below C↔[vocoid], as demonstrated for /stn/ in (25) below.

(25)

/VstnV/	C↔[voc]	Max(C)/Contr: 'min. dist.'
stn	*!	
→ sn		*

The constraint in (26) combines Max(C)/Contr:[pl] and Max(C)/Contr:[appr].

(26) **Max(C)/Contr:'distinct' –** do not delete a consonant that is distinct from adjacent consonants

Contrasts in [place] or [approximant] make deletion optional or lexically-specified in 3-consonant clusters. To predict this optionality, the constraint in (26) must not have a fixed ranking with respect to C↔[vocoid]. This is shown in (27) below for the cluster /stk/, which can surface as either [stk] or [sk].

(27)

/VstkV/	Max(C)/Contr: 'distinct'	C↔[voc]
→ stk	*	
→ sk		*

The constraint in (28) replaces Max(C)/Contr:[pl]&[pl] and Max(C)/Contr:[appr]&[pl], both of which block deletion in 3-consonant clusters but not in clusters of larger size, as well as Max(C)/Contr:[son]&[son] and Max(C)/Contr:→[son]&[pl], since the Russian data does not contain any examples requiring either constraint to outrank C↔[vocoid]^{x2}.

(28) **Max(C)/Contr:'substantially distinct' –** do not delete a consonant that is substantially distinct from adjacent consonants

As noted above, Max(C)/Contr:'substantially distinct' blocks deletion in 3-consonant clusters, but deletion is possible in 4 and 5-consonant clusters. As demonstrated for /sksk/ in (29), the constraint in (28) must outrank

C↔[vocoid], but it must not have a fixed ranking with respect to C↔[vocoid]^{x2}. The complete list of ranked constraints is in (30).[4]

(29)

/VskskV/	Max(C)/Contr: 'subst. dist.'	C↔[voc]^{x2}	C↔[voc]
→ sksk		*	**
→ ssk	*		*

(30) Max(C)→[vocoid], Max(C, strong)
    >>
  C↔[vocoid]^{x2}, Max(C)←[vocoid],
    Max(C)/Contr:'substantially distinct'
    >>
  C↔[vocoid], Max(C)/Contr:'distinct'
    >>
  Max(C)/Contrast:'minimally distinct'

4. Application to Russian

The system of constraints proposed above can successfully account for all cases of compulsory, optional and prohibited deletion in the Russian variety under consideration. This is demonstrated in the subsections 4.1, 4.2, and 4.3 for 3, 4, and 5-consonant clusters, respectively.

4.1   3-consonant clusters

The clusters /stn/, /zdn/, /ntš/, /ntš^j/, /stč/, /zdč/, /stc/, /zdc/ and /ndc/ are subject to compulsory deletion of the interconsonantal stop. C↔[vocoid] requires every consonantal segment to occur in a vocoid environment and, therefore, triggers deletion. Pre and post-vocoid segments (e.g., the /s/ and the /n/ in /stn/) cannot be deleted without fatally violating Max(C)→[vocoid] and Max(C)←[vocoid], both of which outrank C↔[vocoid].[5] Medial segments (e.g., the /t/ in /stn/) contrast in [sonorant]

---

[4] Russian does not use epenthesis, metathesis or coalescence to resolve consonant clusters. Constraints penalizing these strategies (e.g., *Dep-IO*, *Linearity*, and *Uniformity*) are presumed undominated.

[5] Deletion of either the sibilant /s/ or the sonorant /n/ in /stn/ would also be blocked by the undominated Max(C, strong).

and/or [continuant] with the adjacent segments. However, Max(C)/ Contr:'minimally distinct' is ranked below C↔[vocoid] and cannot block deletion. As a result, these clusters undergo deletion of the medial consonant, as demonstrated for /stn/ in (31) below.

(31)

/VstnV/	Max(C) →[voc]	Max(C) ←[voc]	C↔ [voc]	Max(C)/ Contr: 'min.dist.'
a. stn			*!	
→ b. sn				**
c. st	*!			*
d. tn		*!		*

The clusters /ndk/, /ntk/, /stb/, /stb/, /stk/, /zdk/, /stl/ and /ždl/ are subject to optional or lexically-specified deletion of the medial segment. In all these clusters, neither the first nor the third consonant can delete without fatally violating Max(C)→[vocoid] or Max(C)←[vocoid]. The medial segment always contrasts in [place] or [approximant] with one of the adjacent consonants and its deletion results in a violation of Max(C)/Contr:'distinct'. However, since the latter constraint does not have a fixed ranking with respect to C↔[vocoid], two candidates (i.e. with and without the medial segment) are correctly predicted to surface.[6] This is shown in (32) below for the cluster /zdk/.

(32)

/VzdkV/	Max(C) →[voc]	Max(C) ←[voc]	Max(C)/ Contr: 'dist.'	C↔ [voc]
→ a. stk				*
→ b. sk			*	
c. st	*!		*	
d. tk		*!		

---

[6] Optionality is also predicted for lexically-specified cases, unless we assume that certain words have specific rankings associated with them. It remains to be explored why such fixed rankings may exist and whether optionality was present diachronically for all the clusters under consideration. These questions are beyond the scope of the present paper and will need to be addressed in future works.

A number of 3-consonant clusters consistently resist deletion. For example, unlike the /t/ in either /stn/ or /stk/, the same coronal stop can never delete in /stv/ or /stj/, where the /t/ is immediately followed by a vocoid segment (i.e., the pre-vocalic /v/ and the glide /j/). As shown in (33) for /stv/, ranking Max(C)→[vocoid] above C↔[vocoid] ensures that all consonants are invariably retained in these clusters.

(33)

/VstvV/	Max(C) →[voc]	Max(C) ←[voc]	C↔[voc]
→ a. stv			
b. sv	*!		
c. st	*!		
d. tv		*!	

Many clusters contain a medial sibilant, a bilabial stop or a sonorant that never deletes: /bsk/, /bš^jn/, /dsk/, /fsk/, /jsk/, /ksk/, /lsk/, /lzk/, /lsn/, /lzl/, /lzn/, /lŽn/, /lzt/, /lbn/, /rbl/, /rbn/, /rgn/, /rpn/, /spl/, /rml/, etc. The proposed undominated ranking of Max(C, strong) blocks deletion of the interconsonantal segment in all these clusters. This is shown in (34) for the cluster /dsk/.

(34)

/VdskV/	Max(C, strong)	Max(C) →[voc]	Max(C) ←[voc]	C↔ [voc]
→ a. dsk				*
b. sk			*!	
c. ds		*!		
d. dk	*!			

Finally, in /ktn/, /lkn/, /lkl/, /ltk/, /mkn/, /ntl/, /rkn/, /rvn/, /rxn/, /skl/, /skn/, /tkn/, /Žgl/, /txl/, /xtn/, etc., deletion of the medial segment is blocked because reduced outputs violate Max(C)/Contr:'substantially distinct', which is ranked above C↔[vocoid]. This is demonstrated in (35) for the cluster /lkn/.