"Grammatical profiles and the interaction of the lexicon with aspect, tense, and mood in Russian"

Abstract

We propose the "grammatical profile" as a means of probing the aspectual behavior of verbs. A grammatical profile is the relative frequency distribution of the inflected forms of a word in a corpus. The grammatical profiles of Russian verbs provide data on two crucial issues: a) the overall relationship between perfective and imperfective verbs and b) the identification of verbs that characterize various intersections of aspect, tense and mood (TAM) with lexical classes. There is a long-standing debate over whether Russian aspectual "pairs" are formed only via suffixation (the Isačenko hypothesis) or whether they are formed via both suffixation and prefixation (the traditional view). We test the Isačenko hypothesis using data on the corpus frequency of inflected forms of verbs. We find that the behavior of perfective and imperfective verbs is the same regardless of whether the aspectual relationship is marked by prefixes or suffixes; our finding thus supports the traditional view. Introspective descriptions of Russian aspect have often connected the use of particular inflectional forms with certain uses of aspect; for example, the use of imperative forms with the imperfective aspect to produce expressions that are very polite. Grammatical profiles make it possible to identify verbs that behave as outliers, presenting unusually large proportions of usage in parts of the paradigm. This analysis both gives substance to and extends previous introspective descriptions by identifying the verbs most involved in certain TAM-category interactions. On a methodological level, this study contributes to current discussions on the use of inflected forms vs. lemmas in corpus studies. Whereas Gries (forthcoming) argues that inflectional forms do not necessarily provide a better basis for analysis than lemmas, Newman (2008) finds valuable information at the level of the inflectional form. We suggest that the appropriate level of granularity is determined by both the language and the linguistic phenomenon under analysis.[1]

1.0 Introduction: Calibration of granularity

We present a corpus study of the inflectional forms of Russian verbs, showing that these distributions, termed "grammatical profiles", have important implications for the description of Russian aspect. From a wider perspective this study also addresses the issue of granularity in corpus analysis.

Gries (forthcoming) questions the use of data on inflectional forms in a usage-based analysis of corpus data. He is well-justified in pointing out that the presence of linguistic distinctions does not necessarily entail the presence of meaningful patterns. Just because we have data at a given fine-grained level of analysis does not mean that the given level is the optimal level. Gries' (forthcoming) study of verbs in the English ditransitive construction demonstrates that analysis at a more comprehensive level can give more insightful results than one at a fine-grained level. Newman and Rice (Newman 2008, Newman & Rice 2006, Rice & Newman 2005) present a series of studies of inflected forms of English verbs, both in their own right and in constructions such as *going to*, *used to* and *VERB and VERB*. They on the contrary find that the distribution of English inflected verb forms provide valuable insights that would be invisible at the lemma level. For example, while the meanings of English *think*, *know*, and *mean* appear very similar, their behavior at the inflectional level is very different (Newman 2008: 9-11). This disparity suggests that, even within a given language, the appropriate level of granularity for analysis is likely a function of the task at hand: whereas inflectional data may not be revealing for the ditransitive construction, it appears to be valuable for other English constructions.

An additional factor that likely plays a role is linguistic typology. A language that is heavily invested in inflection will offer more opportunities for a meaningful analysis at the level of the inflected form. English has only a handful of inflected forms for verbs. By contrast, the paradigm of a Russian imperfective verb contains up to 121 forms, while that of a perfective verb contains sixty-eight forms (cf. Table 1). Since we analyze verb "pairs" (where a perfective verb and an imperfective verb share lexical meaning), this brings us to a total of 189 forms.

subparadigm	categories within subparadigm	imperfective inflected forms	perfective inflected forms
non-past	person, number	6	6
past	gender, number	4	4
infinitive		1	1

imperative	person, number	4	4
gerund	tense	2	1
participles	case, gender, number, tense, voice	96	48
short form participles	gender, number, tense	8	4
Totals		121	68
Illustrative example with the verb pair *s/delat'* 'do'			
subparadigm	forms of *s/delat'* 'do' (*s/* indicates that the form exists both as an unprefixed imperfective and as a prefixed perfective)		
non-past	*s/delaju* (1sg), *s/delaeš'* (2sg), *s/delaet* (3sg), *s/delaem* (1pl), *s/delaete* (2pl), *s/delajut* (3pl)		
past	*s/delal* (Msg), *s/delala* (Fsg), *s/delalo* (Nsg), *s/delali* (pl)		
infinitive	*s/delat'*		
imperative	*s/delaj* (sg), *s/delajte* (pl/pol), *s/delaem* (pl/incl), *s/delaemte* (pl/incl/pol)		
gerund	*delaja* (non-p), *s/delav* (past)		
participles	*delajuščij* (presact), *s/delavšij* (pastact), *delaemyj* (prespass), *s/delannyj* (pastpass)		
short form participles	*delaem* (prespass), *s/delan* (pastpass)		
abbreviations	1, 2, 3: first, second, third person; sg, pl: singular, plural; M, F, N: masculine, feminine, neuter; pol, incl: polite, inclusive; non-p: non-past; presact, pastact, prespass,pastpass: present active, past active, present passive, past passive		
note re participles	each of the participles has the complete inflectional paradigm of an adjective (24 forms for case, gender, and number for long participles, and 4 forms for gender and number for short form participles)		

Table 1: The inflected forms of Russian verbs[2]

Following Gries' lead, however, we should be aware that the most detailed

level of granularity available in our data is not necessarily the most optimal one.

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[2] The non-past forms express present tense for imperfective verbs but future tense for perfective verbs. Imperative forms distinguish first and second person, and singular and plural. The imperfective can have two gerunds, both the present gerund and the past gerund, whereas perfective verbs form only the past gerund. Imperfective verbs can have up to four participles (the present active, past active, present passive and past passive participles), whereas perfective verbs have two (the past active and past passive participles). Each participle in turn has a full complement of twenty-four adjectival paradigm forms, though there is some syncretism within this subparadigm. In addition, each passive participle has four short forms. Note that passives formed with the reflexive *-sja* are not included in this inventory. Of course different grammars might tally up the number of forms in different ways. Here we present the maximal number of forms that can be distinguished. There are some verbs with "defective" paradigms (cf. *pobedit'* 'conquer', which lacks a first person singular non-past form), but these are exceptions. Note that our data takes into account only single-word forms, not paraphrastic forms such as, for example, the imperfective future with the auxiliary *budu* 'I will', *budeš'* 'you will', etc.

Figure 1 presents a relatively high-resolution overall grammatical profile for Russian.[3] Given the variety of forms, grammatical profiles can be represented at varying levels of resolution. Full resolution, representing all 189 forms for a given lexical verb, yields cumbersome matrices where most of the cells have values equal or close to zero. Figure 1 collapses all of the adjectival subparadigms of participles as well as number, person and gender distinctions in finite forms.

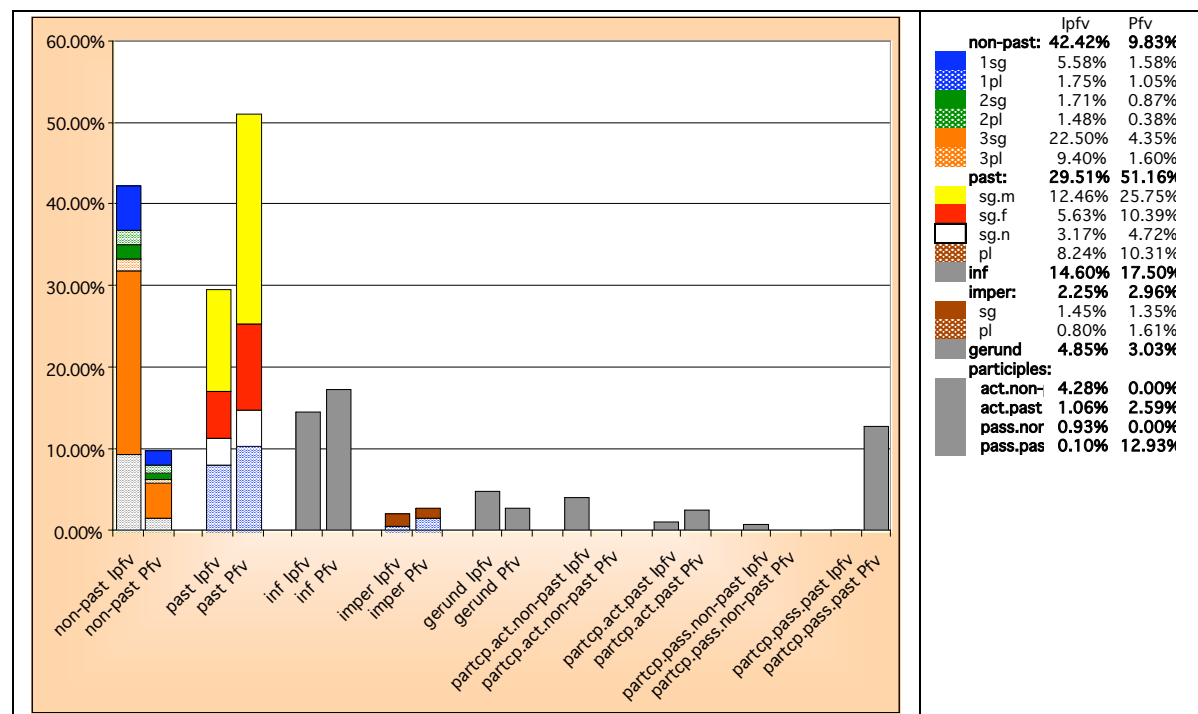|	Ipfv	Pfv
non-past:	**42.42%**	**9.83%**
1sg	5.58%	1.58%
1pl	1.75%	1.05%
2sg	1.71%	0.87%
2pl	1.48%	0.38%
3sg	22.50%	4.35%
3pl	9.40%	1.60%
past:	**29.51%**	**51.16%**
sg.m	12.46%	25.75%
sg.f	5.63%	10.39%
sg.n	3.17%	4.72%
pl	8.24%	10.31%
inf	**14.60%**	**17.50%**
imper:	**2.25%**	**2.96%**
sg	1.45%	1.35%
pl	0.80%	1.61%
gerund	**4.85%**	**3.03%**
participles:		
act.non-	4.28%	0.00%
act.past	1.06%	2.59%
pass.nor	0.93%	0.00%
pass.pas	0.10%	12.93%

Figure 1: Distribution of forms in corpus data (patterns on bars refer to specific forms within subparadigms, as described in Table1)

As we see in Figure 1, the most relevant forms in the grammatical profiles for Russian verbs are the non-past, past, infinitive, and imperative, which yield approximately 90% of the total data for verbs.[4] Given the fact that these subparadigms

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[3] Figure 1 presents frequency data available in a frequency dictionary of modern Russian (Lyashevskaya & Sharoff forthcoming) that is based on a 92-million-word portion of the Russian National Corpus representing samples from 1950-2007.
[4] Gerunds and participles present a problem for comparing the behavior of aspectual pairs based on prefixation vs. suffixation, due to transitivity and morphological restrictions that would skew the data. Only transitive verbs can form passive participles. The morphological shape of an imperfective verb determines whether it can form certain gerunds and participles. Only simplex imperfectives can form past gerunds and past passive participles such as *(ne) znavši* '(not) having known [imperfective]' and *brityj* 'shaven [imperfective]'. Verbs with imperfectivizing suffixes are categorically prevented from forming past gerunds and past passive participles. Additionally one could justify excluding gerunds and participles on the

represent the most information-rich portion of the verbal paradigm, the grammatical profiles in this article offer a "medium" level of resolution, presenting only these four subparadigms and collapsing all information within each subparadigm. The medium level of resolution we have selected does not distinguish among categories not generally acknowledged to interact with aspect (person, number and gender), but focuses instead on those distinctions most likely to be relevant, namely finiteness, mood, and tense. We have thus calibrated our level of analysis to both the topic of our investigation (aspect) and the language of our study (Russian).

Since the topic of our analysis is Russian aspect, we offer a brief overview of relevant facts (2.0), focusing primarily on the Isačenko hypothesis (2.1) and special relationships between verbal subparadigms and aspect (2.2). We describe our two databases (3.0), one representing aspectual relationships marked by prefixation (3.1), and one representing aspectual relationships marked by suffixation (3.2). Our analysis (4.0) tests the Isačenko hypothesis (4.1) and examines outliers showing particularly strong relationships between aspect and verbal subparadigms (4.2). We conclude that grammatical profiles provide strong evidence that the perfective vs. imperfective distinction is the same regardless of how it is marked (via suffixation or prefixation), and that there are certain grammatical "idioms" in the interaction of aspect with inflection (5.0).

2.0 Aspect in Russian

Aspect in Russian is the topic of a vast literature that cannot be fully represented in this article. We focus instead on the most prominent works that serve as landmarks in the debate about whether aspectual pairs are formed via both prefixation and suffixation, or by suffixation alone. Before turning to this debate in 2.1, we offer some brief remarks on the morphological markers that signal aspect in Russian.

In Russian aspect is realized in all forms of all verbs. Given the ubiquity of aspect, verbs are usually recognized as being either perfective [p] or imperfective [i].[5] Russian uses a variety of morphological means to distinguish perfective and

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grounds that they are peripheral members of the verbal paradigm, functioning instead as adverbs and adjectives.

[5] While bi-aspectual verbs do exist, most scholars agree that they are unambiguous in context and they also tend to develop aspectual morphology, as for example the biaspectual verb *rekomendovat'*[p/i] 'recommend' which has a prefixed perfective *otrekomendovat'* despite the fact that the unprefixed form can serve as a perfective. For a discussion and references, see Janda 2004: 523 and 2007: 637-638.

imperfective verbs, yielding three major patterns, plus some minor variations. The major patterns are:

1) Simplex verbs -- These are verbs consisting of a stem without any overt aspectual morphology, such as *delat'*[i] 'do, make'. The vast majority of these verbs are imperfective, though there is a handful simplex perfectives, such as *dat'*[p] 'give'; cf. Švedova et al. (1980: 590) who list only eleven simplex perfectives in Russian.

2) Prefixed verbs -- These are verbs consisting of a prefix added to a stem, such as *sdelat'*[p] 'do, make' and *peredelat'*[p] 'redo', where the prefixes *s-* and *pere-* have been added to *delat'*[i] 'do, make'. With very few exceptions, these verbs are perfective.[6] There are nineteen such prefixes (cf. Krongauz 1998), and they are commonly termed "perfectivizing prefixes" due to their function in the aspect system. For the purposes of this study, we need to distinguish among two subtypes: Natural Perfectives (with the same meaning as the simplex imperfective, like *sdelat'*[p] 'do, make'), and Specialized Perfectives (with a different meaning from the simplex imperfective, like *peredelat'*[p] 'redo').[7]

3) Prefixed and suffixed verbs -- These are verbs consisting of a prefix, a stem, and a suffix, such as *peredelyvat'*[i] 'redo', which has the prefix *pere-*, the root *-dela-*, and the suffix *-yva(j)*. These verbs involve the same nineteen prefixes (plus a twentieth, *do-*), plus three "imperfectivizing" suffixes: *-a(j)*, *-va(j)*, or *-i/yva(j)*. It is primarily only Specialized Perfectives that admit such secondary imperfectivization.

There are additionally some minor patterns, which we list here but do not discuss further:

i) Suffixed verbs -- There are two subtypes here. The first subtype adds one of the imperfectivizing suffixes to a simplex perfective, yielding an imperfective such as *davat'*[i] 'give'. There are three such verbs (*devat'*[i] 'put' and *padat'*[i] 'fall' in addition to *davat'*[i]); the remaining simplex perfectives are aspectually paired via suppletion. Another subtype involves the addition of the *-i/yva(j)* suffix to produce habitual verbs such as *govarivat'*[i] 'talk, say habitually' (from *govorit'*[i] 'talk, say').

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[6] Most of the exceptions involve the indeterminate stems of motion verbs such as *xodit'*[i] 'walk', which can form both perfective (cf. *zaxodit'*[p] 'begin to walk') and imperfective (cf. *proxodit'*[i] 'walk through/past') verbs when prefixed. For more discussion of this group of exceptions, see Janda forthcoming.

[7] The distinction between Natural Perfectives and Specialized Perfectives is presented in detail in Janda 2007, where two further types of perfectives are also distinguished. Note also that "the same meaning" here refers to lexical meaning, that is, meaning apart from aspectual differences.

The number of such habitual verbs in Russian is very small and the type is unproductive (cf. Danaher 2003: 31). Both types of verbs are too marginal to be included in the current study.

ii) Semelfactive suffixed verbs -- These verbs contain a verbal stem plus the semelfactive perfectivizing suffix *-nu*, as in *čixnut'*[p] 'sneeze once' (formed from *čixat'*[i] 'sneeze'). There are approximately three hundred such perfective verbs in Russian; for more discussion, see Dickey & Janda 2009. These verbs have a semelfactive meaning and thus do not normally serve as perfective "partners" for the imperfectives they are derived from. Since this study specifically examines the "purely aspectual" relationships of pairs, the semelfactive suffixed verbs are beyond the scope of our analysis.

iii) Semelfactive prefixed and suffixed verbs -- These verbs add a prefix to the semelfactive suffixed type, yielding verbs such as *vyprygnut'*[p] 'jump out once'. There appear to be under two hundred such verbs in Russian (for a detailed study, see Makarova & Janda 2009). Like the semelfactive suffixed verbs, these verbs do not form aspectual pairs and are thus not included in the present study.

While "prefix stacking" is possible in Russian, yielding verbs with multiple prefixes, this type is rather marginal and generally forms perfectives such as *poperepisyvat'*[p] 'spend a while rewriting'.[8] There are furthermore a few dozen verbs that form suppletive pairs, such as *govorit'*[i] - *skazat'*[p] 'talk, say'. These are not systematic types and are therefore likewise excluded from the current study.

2.1 Isačenko hypothesis

The three major morphological patterns of Russian verbs offer two options for forming aspectual pairs, namely:

a) Via prefixation of a simplex imperfective, yielding pairs such as *delat'*[i] - *sdelat'*[p] 'do, make' (henceforth "p-partners" since they involve prefixation); and

b) Via suffixation of a prefixed perfective, yielding pairs such as *peredelat'*[p] - *peredelyvat'*[i] 'redo' (henceforth "s-partners" since they involve suffixation). Whereas most traditional analyses (Vinogradov 1938, Šaxmatov 1941, Švedova et al. 1980, Bondarko 1983, Čertkova 1996, Anna Zaliznjak & Šmelev 2000) plus virtually

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[8] This verb can be broken down as *po-pere-pis-yva-t'*, where *po-* and *pere-* are prefixes, *pis-* is the root, *-yva(j)* is a suffix, and *-t'* is a desinence. Note that an alternative interpretation of this word is as a distributive meaning 'rewrite all of'.

all dictionaries and textbooks accept both kinds of pairs, one of the most prominent scholars in the field of Russian aspect, Isačenko (1965: 130-175), argues that only the second kind of pair, formed via suffixation, represents a purely aspectual relationship in Russian. Isačenko's argument is based on introspective claims that a) the addition of a prefix always brings associated meaning to the prefixed verb thus making it non-identical in meaning to the simplex imperfective, and that b) the prefixed perfective is not a perfective "replacement" for the simplex imperfective in all contexts. The Isačenko hypothesis receives direct support from Andrej Zaliznjak (1980: 6, 136) who implements this distinction throughout his famous grammatical dictionary, recognizing only aspectual pairs consisting of a prefixed perfective and a suffixed secondary imperfective. In a recent authoritative grammar of Russian, Timberlake (2004: 410-411) takes an intermediary stance on the question of whether there are aspectual pairs formed via prefixation. According to Timberlake, prefixed perfectives and their secondary imperfectives fulfill the criteria of aspectual pairs, but simplex imperfectives and corresponding prefixed perfectives form "near-partners".

There are thus two opposed hypotheses on the formation of aspectual pairs in Russian:

(1)   Traditional Hypothesis: Aspectual pairs are formed either via prefixation of a simplex imperfective or via suffixation of a prefixed perfective.

(2)   Isačenko Hypothesis: Aspectual pairs are formed only via suffixation of a prefixed perfective.

The logical corollaries to these two hypotheses are as follows:

(1a)   Corollary to Traditional Hypothesis: The two kinds of pairs (p-partners and s-partners) are identical in function and should behave identically.

(2a)   Corollary to Isačenko Hypothesis: Prefixed perfectives paired with suffixed imperfectives (s-partners) are the only pairs in the system; since simplex imperfectives and corresponding prefixed perfectives (p-partners) represent a different relationship, they should behave differently.

The aim of this study is to test the two hypotheses based on the logic of the corollaries. We will examine available data in order to compare the behavior of p-partners with s-partners. If our data shows no difference in the behavior of p-partners in comparison with s-partners, that is evidence in support of the traditional hypothesis. If our data shows a difference in the behavior of p-partners in comparison with s-partners, that is evidence in support of the Isačenko hypothesis. In order to test

the hypotheses, we use data on the corpus frequency of inflected forms of verbs. But before turning to the data and analysis, it is necessary to justify the choice of subparadigms on theoretical grounds.

2.2 Aspect and the subparadigms

As mentioned in section 1.0, there are solid distributional grounds for excluding the gerunds and participles from this study. However, the remaining subparadigms of the Russian verb are not merely a convenient residue, for they also represent exactly the categories that we most expect to interact with aspect in significant ways, namely tense (non-past and past) and mood (infinitive, imperative, and indicative[9]). The special relationship between aspect, tense, and mood (the "TAM" categories) is well-established cross-linguistically (Comrie 1976, Chung & Timberlake 1985, Binnick 1991, Bybee et al. 1994, Nuyts 2001 & 2007), and is also central to the Russian verbal system. Note that Timberlake's (2004) reference grammar of Russian has only seven chapters, but one of them is titled "Mood, tense, and aspect" and extends over seventy-three pages, with numerous detailed descriptions of how both mood and tense interact with aspect. Timberlake (2004: 373) identifies three moods expressed morphologically in Russian: realis (non-past and past inflected forms), imperative, and infinitive. The imperative mood is claimed to be dominated by perfective verbs, though certain contexts (negation, politeness, insistence) may prefer imperfective verbs (Timberlake 2004: 374-376). The aspect of the infinitive is often influenced by modal markers (*nelzja* 'it is not permitted', *nado* 'it is necessary'), and only imperfective infinitives are permitted in conjunction with phasal verbs (*načat'* 'begin', *perestat'* 'stop') and the future auxiliary (*budu* 'I will' and remaining forms of the paradigm; Timberlake 2004: 360-370). In terms of tense, Russian verbs distinguish only non-past from past in their inflection. Aspect disambiguates the present (imperfective non-past) from the future (perfective non-past), although there are other uses of both aspects in the non-past (such as the historical present expressed primarily by imperfective non-past forms and the habitual-chain construction, where perfective non-past signals repeated sequences of events; cf. Dickey 2000: 126-154, 52-68 and Comrie 1976: 73-78). Overall, there seems to be an association of the

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[9] Subjunctive mood is not expressed inflectionally in Russian, but by paraphrastic means.

imperfective with present [= non-past] tense and the perfective with past tense (Comrie 1976: 83-84).

This array of interactions between aspect and the inflectional subcategories of Russian verbs has not been examined from the perspective of a large-scale corpus analysis. In this study we use data that compares the frequencies of the subparadigms of perfective and imperfective verbs to test the traditional vs. Isačenko hypotheses, and also to shed light on some of the specific claims about the interaction of tense, mood, and aspect in Russian.

3.0 Databases

For the purpose of this study, we constructed two databases, one with data about p-partners (simplex imperfectives paired with prefixed perfectives) and one with data about s-partners (prefixed perfectives and suffixed secondary imperfectives). Both databases are based on the Modern subcorpus (1950-2007) of the Russian National Corpus (www.ruscorpora.ru; henceforth "RNC", the source of all examples herein), which contains 92 million words. Each database includes information about the frequency of the following grammatical forms:

- Ipfv_NonPast: the sum of 1sg, 2sg, 3sg, 1pl, 2pl, 3pl imperfective non-past frequencies
- Ipfv_Past: the sum of masculine, feminine, neuter singular and plural imperfective past form frequencies
- Ipfv_Inf: imperfective infinitive form frequency
- Ipfv_Imper: the sum of 2sg, 2pl, 1pl (–*mte*) imperfective imperative form frequencies
- Pfv_NonPast: the sum of 1sg, 2sg, 3sg, 1pl, 2pl, 3pl perfective non-past form frequencies
- Pfv_Past: the sum of masculine, feminine, neuter singular and plural Perfective past form frequencies
- Pfv_Inf: Perfective infinitive form frequency
- Pfv_Imper: the sum of 2sg, 2pl, 1pl (–*mte*) Perfective imperative form frequencies

Because there are rare verbs represented in the RNC that might misrepresent the data, we applied a frequency threshold in the construction of both databases in order to ensure that our data was representative of overall trends in Russian. We removed from

the study all potential pairs where either the total frequency of finite perfective forms or the total frequency of finite imperfective forms in the RNC is less than 100 (e.g. *arkanit'*[i] 'lasso' with only 2 imperfective forms and its perfective partner *zaarkanit'*[p] with only 21 forms). There were several additional measures that needed to be taken in order to create databases that would facilitate accurate and meaningful comparisons. These measures are described in the following two subsections.

3.1 Database of p-partners (simplex imperfectives & prefixed perfectives)

The first task in constructing this database was to obtain a list of all p-partners. The "Exploring Emptiness" database at the University of Tromsø is just such a list. The "Exploring Emptiness" database contains 1981 aspectual pairs, each consisting of an imperfective base verb and the corresponding Natural Perfective, aggregated from two dictionaries (Evgen'eva 1999 and Ožegov & Švedova 2001) and a list (Cubberly 1982) and acknowledged by a panel of native speakers.[10] From this list, we removed the following items in order to reduce "noise" in the database:

a) verbs that are not attested in the RNC or do not meet the criterion of the above-mentioned frequency threshold;

b) verbs for which no unique pair could be identified due to the existence of two or more prefixed forms (for example, *valit'*[i] 'topple', which has two perfectives with two different prefixes: *svalit'*[p] and *povalit'*[p]; verbs of this sort would yield multiple perfectives for a given imperfective, misrepresenting the data);

c) verbs with aspectual relations that were either irregular or could not be accurately disambiguated in our data (this includes biaspectual verbs like *arendovat'*[i/p] 'lease' and verbs with aspectual homophony like *sxodit'*[i/p] 'descend[i]; walk someplace and come back once[p]', and verbs like *sžat'*[p] which is homophonous in much of its paradigm, meaning either 'squeeze' or 'harvest').[11]

It was necessary to take the above measures in order to avoid collecting ambiguous data and to make the two databases parallel to each other. The "cleaned" version of the p-partner database includes only candidate partners that consist of just

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[10] The panel included members of the "Exploring Emptiness" research group at the University of Tromsø: Olga Lyashevskaya, Julia Kuznetsova, Svetlana Sokolova, and Anastasia Makarova.

[11] Given that we had nearly six million verb forms in our database, it was not possible to undertake such disambiguation by hand.

two uniquely identifiable verbs, making it parallel with the s-partner database, where challenges to unique pairedness are very rare. Aspectual pairs formed by suffixation pairs almost never present problems such as multiple aspectual markers (avoided by measure b) and unambiguatable homophonous forms (avoided by measure c). After the application of these measures, the database of p-partners contains over 1.6 million datapoints representing 264 aspectual pairs and the frequencies of their subparadigms. This data reliably reflects the p-partners and facilitates straightforward comparison with parallel data for s-partners.

3.2 Database of s-partners (prefixed perfectives & suffixed secondary imperfectives)

As with the database of p-partners, the first task was to get a list of all potential s-partners. This was done on the combined basis of Zaliznjak 1980 (who lists s-partners uniquely) and the RNC, yielding 19,208 pairs. However, many of these verbs are of low frequency and in a few rare cases some prefixed verbs can use more than one suffix to derive imperfectives.[12] When the above-mentioned frequency threshold was applied and verbs with multiple suffixed partners were removed, the database of s-partners was reduced to 1,311 pairs.

We note in addition that there is a certain overlap in the two databases due to the existence of homophones. For example, *vyrasti*[p] can either mean 'grow (up)', in which case it is the prefixed perfective p-partner of *rasti*[i] 'grow'; or it can mean 'develop into; grow out of', in which case it has a suffixed secondary imperfective (s-partner) in *vyrastat'*[i].[13] There are thirty-eight verbs involved in this overlap.

Altogether we examined 1,575 pairs of verbs, which represent 5,951,250 verb forms in the RNC. Our analysis is based on this data.

4.0 Analysis

Table 2 presents the data from the verbs described in Sections 3.1 and 3.2.

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[12] An example of a prefixed perfective with multiple suffixed imperfective partners is *zagotovit'*[p] 'stockpile' with the derived imperfectives *zagotovljat'*[i] and *zagotavlivat'*[i].

[13] Though there is semantic overlap in such verbs, usually there is some distinction between the two imperfectives. For example, *rasti*[i] 'grow' is mainly associated with concrete uses, largely in reference to plants, whereas *vyrastat'*[i] 'develop into; grow out of' is more likely to be used in metaphorical contexts.

	Imperfective				Perfective			
	Ipfv_ NonPast	Ipfv_ Past	Ipfv_ Inf	Ipfv_ Imper	Pfv_ NonPast	Pfv_ Past	Pfv_ Inf	Pfv_ Imper
p-partners	475,893	397,409	195,926	36,427	72,439	317,570	114,460	24,280
	43%	35.9%	17.7%	3.3%	13.7%	60.1%	21.6%	4.6%
s-partners	854,123	517,965	286,934	39,290	302,731	1,654,717	573,857	87,229
	50.3%	30.5%	16.9%	2.3%	11.6%	63.2%	21.9%	3.3%

Table 2: Frequencies of verb forms extracted from the RNC

Table 2 is divided into four quadrants and shows us four distributions of verb forms across the subparadigms. In each quadrant we see the raw frequencies and the relative frequencies of forms (the latter adds to 100% in each quadrant). The upper left quadrant shows forms of p-partner imperfectives (simplex imperfectives) and can be compared to the lower left quadrant which shows forms of s-partner imperfectives (secondary imperfectives of Specialized Perfectives). A parallel comparison can be made across the right-hand quadrants, with the upper quadrant showing forms of p-partner perfectives (prefixed Natural Perfectives), as compared with the lower quadrant showing forms of s-partner perfectives (prefixed Specialized Perfectives). Figure 2 is a graphic representation of this data using the relative frequencies in order to put the data on the same scale for meaningful comparison.
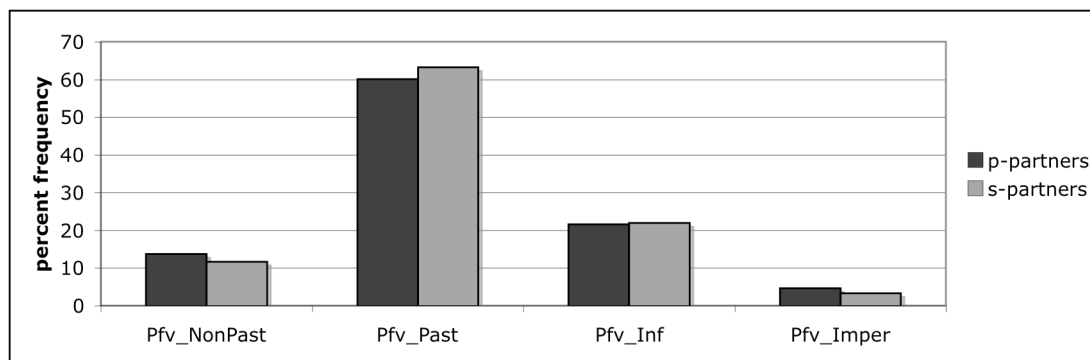
Imperfective

Perfective
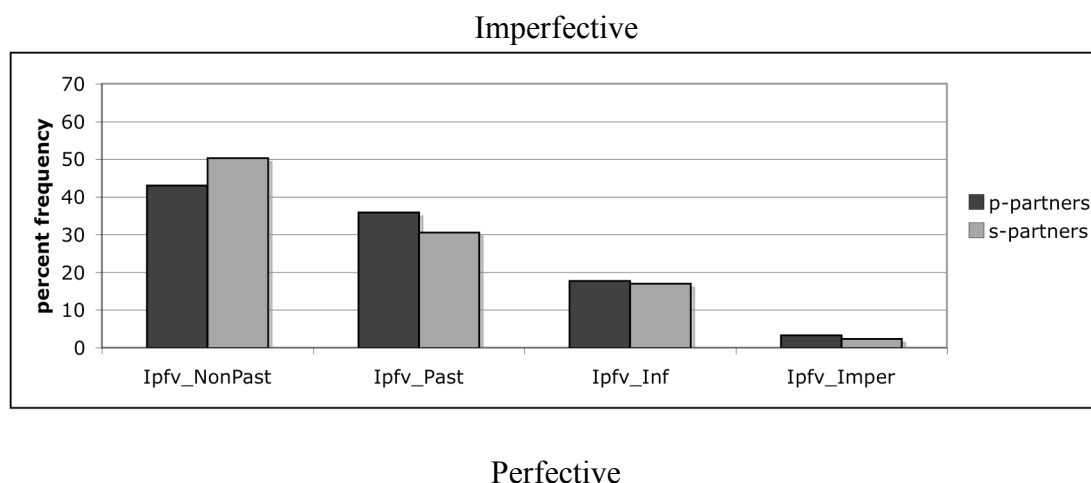
Figure 2: Distribution of of p-partner (dark grey) and s-partner (light grey) forms

Two analyses are based on this data, one that compares the behavior of the two types of partners, the p-partners and the s-partners, and one that examines verbs that behave as outliers in this distribution.

4.1 Grammatical profiles of aspectual pairs

Table 2 and Figure 2 show that the distribution of forms is different for the two aspects. The non-past forms dominate the distribution of imperfective verbs, whereas the past forms dominate the distribution of perfective verbs. This finding is in keeping with Comrie's (1976: 84) theoretical conjecture on the relationship between tense and aspect. Thus our empirical study confirms this assumed relationship on the basis of a large database.

Before proceeding to the statistical analysis it is necessary to understand the relationship between sample size and effect size. With a large sample size, one has so much statistical power that one runs the risk of detecting effects that are so small as to not be meaningful (cf. Baayen 2008: 114-16; Tabachnik & Fidell 2007: 54-55). The chi-square model is designed to detect significant differences in distributions. The more data one has available, the better chi-square is at detecting ever smaller differences; as the data heads toward infinity, the differences that can be detected are infinitely small. The Cramer's V measure has been developed in order to check on the size of the effect detected by a chi-square test, and is especially important in situations when there are thousands or millions of datapoints. Cramer's V balances the chi-square value against the number of datapoints, giving a measure that can theoretically vary between 0 and 1. It is customary to consider a Cramer's V value of 0.5 as representing a large effect, 0.3 as representing a moderate effect, and 0.1 as

representing a small effect (Cohen 1988: 215-271; Cohen et al. 2003: 182; King & Minium 2008: 327-330).

A chi-square test comparing the behavior of p-partner vs. s-partner imperfectives (cf. top portion of Figure 2) yields a result that is statistically significant (chi-squared = 16155.13, df = 3, p-value < 2.2e-16), but tiny, since the Cramer's V value (0.076) does not reach the threshold for a small effect. We get parallel results when we compare the behavior of p-partner and s-partner perfectives (cf. bottom portion of Figure 2). Again the result is statistically significant (chi-squared = 4365.078, df = 3, p-value < 2.2e-16), but the effect size (Cramer's V = 0.037) falls far short of the threshold for a small effect. In both cases, we are dealing with a situation where the large quantity of data makes it too easy for the chi-square test to report results as significant. The Cramer's V test safeguards us from recognizing an effect that is so unimportant that it cannot even be regarded as "small". We must conclude that there is no appreciable difference between the distributions of imperfective vs. perfective forms that would distinguish p-partners from s-partners.

Looking again at Figure 2, we see that the overall distribution of forms confirms the parallelism of the p- and s-partners. In the imperfective subparadigm, both p- and s-partners show the same pattern, namely that the non-past forms have the highest frequency, followed by the past forms, then the infinitive forms and finally the imperative forms. The perfective subparadigm continues the parallelism precisely: the highest frequency for both p- and s-partners is among past forms, followed by infinitives, then non-past, and finally imperatives.

In short, the distribution of forms is basically the same, regardless of whether the verbs are p-partners or s-partners. This finding supports the traditional hypothesis that aspectual pairs are formed in Russian both by means of prefixation and by means of suffixation. Whereas there might be another measure that would find a difference in the behaviors of these two morphologically distinct types, our study did not find one. Thus we do not find support for the Isačenko hypothesis.

In the following section we use the same data to examine verbs with unusual distributions. Given the fact that there is no real difference between the p-partners and the s-partners, our discussion of outliers in that section merges data from both morphological types.

4.2 Outliers

This section is divided into eight subsections according to the eight combinations of aspect with tense or mood. Here we present new empirical data on the interaction of TAM categories in Russian and verbal semantics, since this is the first attempt to identify groups of verbs representing various hypothesized phenomena.

In each subsection, we identify individual verbs that behave as outliers and discuss their properties. Here we define outliers as the points that are displaced beyond 1.5 times the interquartile range (the interquartile range includes 50% of a distribution, with one quartile above the median and one below, cf. King & Minium 2008: 71-72, 76-78). All of the following subsections will focus only on verbs that meet this criterion. Each subsection is illustrated by a figure showing a boxplot of the distribution of verbs. The median is the boldfaced line inside the box, the edges of the box represent the edges of the interquartile range, the whiskers extend to ±1.5 times the interquartile range, and the small circles represent outliers (Baayen 2008: 30). The actual outlier verbs are presented in tables that give the verb, its gloss, the absolute frequency of relevant forms, and the percentage of total forms for that verb in the given subparadigm.

Since this section focuses on outliers, the order of presentation reflects the number of outliers found in the various subparadigms of imperfective and perfective verbs. We find the most outliers among the imperative forms, followed by the non-past, the infinitive, and the past, and the discussion follows this cline. While the tables in each section list verbs in their infinitive forms, they are cited in appropriate forms from the given subparadigm in the discussion.

4.2.1 Imperfective imperative

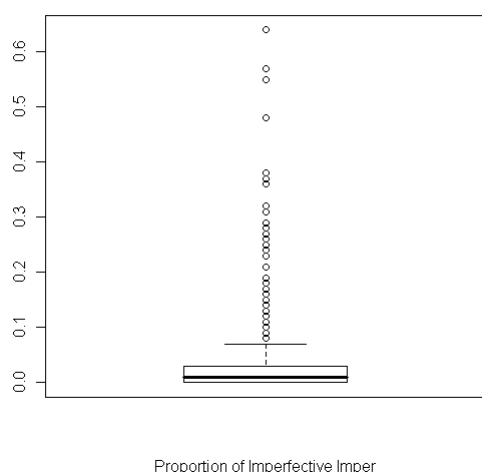Proportion of Imperfective Imper

Figure 3: Distribution of imperfective imperatives

This intersection of imperfective aspect and imperative mood yields over two hundred verbs that behave as outliers because their usage exceeds 1.5 times the semi-interquartile range above the third quartile (small circles in Figure 3; the full list is found in Appendix A). While many of these verbs confirm the standard claims made in the scholarly literature, the data suggest some additional phenomena that have received less attention. Furthermore, the lexical classes that turn up among these outliers give us insights into the motives even for the expected outcomes.

Linguistic analyses of Russian aspect make three claims about the use of imperfective aspect with imperatives: that imperfective is associated with negation when it is categorical, that imperfective is used in order to show politeness, and that imperfective is also used to signal urgency or insistence (cf. Bondarko & Bulanin 1967: 127-128; Padučeva 1996: 12-17; Timberlake 2004 374-375). The latter two claims, namely that imperfective imperatives can be used to signal both politeness and rudeness, seem contradictory. Šatunovskij (2002, 2009) suggests a solution to this problem. According to Šatunovskij, the underlying motive for both the polite and rude uses has to do with the hearer's understanding that the proposed action should take place. If the hearer understands that s/he is supposed to act, then imperfective is required, regardless of whether the use is construed as polite or rude. In certain contexts, like visiting a friend, the hearer already knows a lot about what will happen: s/he will come in, sit down, eat or drink something, etc. The speaker's directions in these contexts are interpreted as polite. In other contexts, the hearer has failed to act appropriately, despite clear indications, and the speaker's choice of imperfective

aspect is rude because it implies insistence. In still other cases the hesitation is less problematic and the speaker merely offers encouragement for something the hearer already intends to do: this yields imperfective imperatives with neutral affect. Our data support Šatunovskij's analysis, but also extend it.

In the case of politeness, our data suggest that this phenomenon is largely driven by a single frame, namely that of being a guest or visitor. Under these circumstances, the imperatives do not provide new information, but rather invite the guest to do what both the host and guest already expect to happen. This includes getting out of and into outerwear (*razdevajsja(/tes')* 'take off one's coat'), changing body positions (*sadi(te)s'* 'sit down'), joining people at the table (*prisoedinjajsja(/tes')* 'come join at the table'), consuming things (*zakusyvaj(te)* 'eat chasers', *zakurivaj(te)* 'smoke'), and traveling (*zaezžaj(te)* 'stop by', *zalezaj(te)* 'get into the car'). There are however some additional injunctions that are specifically polite, such as requests for assistance (*vyručaj(te)* 'help') and kind wishes (*vyzdoravlivaj(te)* 'get well') that cannot be motivated in Šatunovskij's model.

Many high-frequency uses of imperfective imperatives are simply familiar or even specifically rude. Familiar uses involve requests to get moving (*stupaj(te)* 'get going'), to focus on a new topic of conversation (*gljadi(te)* 'look'), and to take something that is offered (*zabiraj(te)* 'take'). These uses illustrate neutral affect. Rude uses have a distinctly insistent flavor, often telling the interlocutor to leave (*provalivaj(te)* 'get out of here') or stop doing something (*končaj(te)* 'stop'). However, over half of the rude uses are associated with negation, carrying the implication that the interlocutor is misbehaving, especially in discourse interactions (*ne perebivaj(te)* 'don't interrupt', *ne prikidyvajsja(/tes')* 'don't pretend to be something you aren't', *ne peredergivaj(te)* 'don't distort the facts'). This group is not included in Šatunovskij's analysis, which treats negation separately, stating that all imperatives are normally imperfective when negated, unless they refer to things that are hard to control and represent immediate threats. As concerns other negated imperatives in our data, these mostly represent injunctions not to be upset (*ne rasstraivajsja(/tes')* 'don't get upset') or not to be afraid (*ne stesnjajsja(/tes')* 'don't hesitate'), though a few other types appear such as *ne leni(te)s'* 'don't be lazy' and *ne zabyvaj(te)* 'don't forget'. The verbs with rude meanings also have a stronger tendency to appear in singular form (which is necessarily familiar) rather than plural

(which can signal either plurality or politeness). For example *otvalivaj(te)* 'get out of here' has 95% of its imperative forms in the singular.

A residue of verbs appear in fixed grammatical or idiomatic expressions. The imperative of *davat'* 'give' is used as an auxiliary verb in forming periphrastic imperatives, as in *davaj posmotrim* 'let's take a look' or *davajte ja vam pomogu* 'let me help you'. As Barentsen (2006) points out, this expression specifically takes the interlocutor's perspective into account, yielding polite suggestions and offers, as the verbs that collocate most frequently with *davaj(te)* indicate: *pomogu* 'help', *rasskažu* 'tell', *pokažu* 'show', *pozvonju* 'call', *sdelaju* 'do'. Thus this idiomatic use of *davaj(te)* is also consistent with the polite use of imperfective imperatives overall. The imperative *proščaj(te)* functions idiomatically as a farewell greeting and is thus somewhat detached from the meaning of the verb 'forgive'. Three imperfective imperatives have specific cultural anchors: *obogaščajsja* 'be prosperous' was a buzz word of the Soviet New Economic Policy in the 1920s; *soedinjajtes'* 'unite' belongs to the communist slogan *proletarii vsex stran soedinjajtes'* 'workers of the world unite', and *zapevaj* 'sing' is an army command, since Russian soldiers are often required to sing in unison. Three other imperfective imperatives frequently occur in aphorisms: *ne pominaj lixom* 'bear no ill will [lit: don't remember evil]' and *ne pominaj, kak zvali* 'they just vanished [lit: don't remember, what they were called]'; *spasajsja, kto možet* 'every man for himself [lit: save himself, he who can]'; *na čužoj karavaj rot ne razevaj* 'don't take others' belongings [lit: don't open your mouth at others' bread]'.

4.2.2 Perfective imperatives
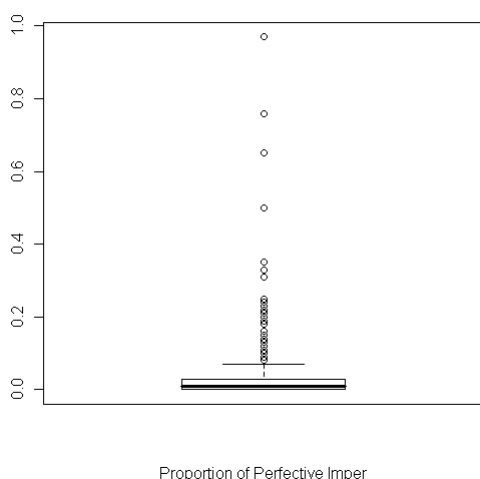
Proportion of Perfective Imper

Figure 4: Distribution of perfective imperatives

This group gives us the most skewed distribution, with over three hundred verbs acting as outliers. The entire list is presented in Appendix B. Relatively little has been written about perfective imperatives in the aspectual literature, beyond that they can be rude or that they can be used to give instructions; Šatunovskij (2002), after spending nearly thirty pages on the imperfective imperative, gives only a few cursory remarks on the perfective imperative (cf. also Padučeva 1996 and Timberlake 2004). The list of verbs thus sheds new light on just exactly what kind of relationship between aspect and mood these forms represent.

　　As expected, two of the largest groups involve rude expressions and neutral instructions. The rude expressions are dominated by verbs used to tell someone to leave one alone (*otstan'(te)*) or let someone go (*otpusti(te)s'*) or stop doing something (*perestan'(te)* 'stop'). Here the perfective aspect heightens the harshness of the command. The neutral instructions show evidence for a number of frames where perfective imperatives are common: cooking (*vskipjati(te)* 'bring to a boil'), exercising (*sogni(te)* 'bend'), official transactions (*raspiši(te)s'* 'sign for'), and text instructions (*rassmotri(te)* [grafik x] 'see [figure x]').

　　In addition to confirming the theoretical expectations about perfective imperatives, we also found several other groups of verbs that are often found in this form. These include a fairly large group of specifically polite expressions, involving requesting forgiveness (*izvini(te)*), patience (*poterpi(te)*), and use of imagination (*predstav'te)*). There are also groups of verbs that are used to direct the attention of the interlocutor or to signal transitions in discourse, paralleling this phenomenon

identified by Stefanowitsch & Gries (2003: 233-234) among English imperatives. The attention-directing type mainly involves verbs used to ask the hearer to look at something (*posmotri(te)*) or listen to something (*vslušaj(te)s'*), though other channels of perception (*ponjuxaj(te)* 'sniff') and imagination (*ugadaj(te)* 'guess') are also invoked. The verbs used as discourse markers include items like *požaluj* which serves as a modal meaning 'perhaps' in this form, verbs used to take the floor like *razreši(te)* 'allow' (in consruction with a following infinitive), verbs used to encourage the interlocutor to speak up like *podskaži(te)* 'prompt, tell', and verbs signalling a request to end a topic of conversation like *uvol'(te)* 'spare'.

Two smaller yet important groups include religious and idiomatic expressions. Both involve formulaic expressions, which in the case of the religious expressions come directly from liturgical texts, as in *Gospodi pomiluj* 'Lord have mercy' and *blagoslovi otče* 'father bless'. Idiomatic expressions include items that occur only in specific constructions like *xot' zalejsja/zavalis'* meaning 'a very large amount' [lit: at least be poured/be toppled], *razlit'* 'spill' in *ne razlej voda* 'really close friends' [lit: water don't spill] and *razodrat'* 'tear up' in *čert razderi* 'to hell with it' [lit: devil tear]. Finally there is one verb, *dat'* 'give' that is used as an auxiliary verb in a specific construction where many perfective verbs can appear, as in *daj posmotrju* 'let me take a look' [lit: give I will look]. Barentsen (2006) shows that the vebs that collocate most frequently with this construction indicate that the speaker is motivated by his/her own desires (rather than the addressee's): *poceluju* 'kiss', *posmotrju* 'take a look', *pogljažu* 'take a look', *vzgljanu* 'take a look'. These expressions are not directly rude; they minimize consideration for the interlocutor's perspective and are thus neutral.

4.2.3 Imperfective non-past
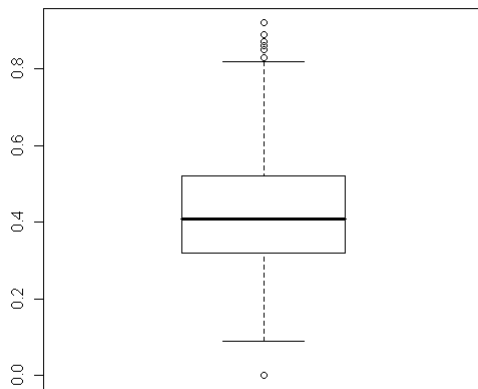
Proportion of Imperfective NonPast

Figure 5: Distribution of imperfective non-past

Figure 5 shows that there are some imperfective verbs with an unusually high
proportion of forms in the non-past subparadigm, and one verb with an unusually low
proportion of forms in this subparadigm. Table 3 lists these verbs and their
frequencies.

verb (3sg)	gloss	raw freq	% freq
javljat'sja (javljaetsja)	'be'	39543	92%
okazyvat'sja (okazyvaetsja)	'turn out to be'	10869	85%
podtverždat'sja (podtverždaetsja)	'be confirmed'	677	83%
vyjasnjat'sja (vyjasnjaetsja)	'be explained'	805	89%
kasat'sja (kasaetsja)	'concern'	9719	87%
isčerpyvat' (isčerpyvaet)	'exhaust'	100	89%
predopredeljat'sja (predopredeljaetsja)	'be predetermined'	34	85%
objazyvat'sja (objazyvaetsja)	'be obliged to'	480	92%
zatrudnjat'sja (zatrudnjaetsja)	'be made difficult'	275	86%
vleč' (vlečet)	'entail'	1555	85%
slyxat' (slyxaet)	'hear'	1	0%

Table 3: Imperfective verbs with very high or low incidence of non-past forms

The ten imperfective verbs with unusually high representation in non-past forms all
instantiate a single phenomenon that is expressed in Russian exclusively via the
combination of imperfective aspect and non-past tense. This is the gnomic
construction, which describes timeless truths.[14] Examples 1 and 2 illustrate the
gnomic use of such verbs.

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[14] For a discussion of gnomic uses of imperfective aspect, see Janda 2004.

(1) *Drugimi slovami, ja by xotel sprovocirovat' diskussiju, to vsegda <u>javljaetsja</u> naibolee produktivnoj formoj naučnogo obsuždenija problemy.*
'In other words, I would like to provoke a discussion, which <u>is</u> always the most productive form for scholarly debate on an issue.'

(2) *Kak pravilo, dannoe obstojatel'stvo <u>vlečet</u> za soboj negativnye posledstvija dlja klientov.*
'As a rule, this situation <u>entails</u> [lit: <u>drags</u> after itself] negative consequences for the clients.'

The verb *javljaetsja* 'is' can only be used to identify the category that something is classified in; here, a *discussion* is classified as *the most productive form for scholarly debate*. The first six verbs in Table 3 are all variants on gnomic statements like this that claim 'X is Y'. The remaining four verbs with high frequency in the imperfective non-past have the meaning 'X causes/entails Y', as illustrated by example 2.

These verbs can also be organized according to their conventional uses. Three of the verbs appear in fixed constructions: *okazyvaetsja* 'turns out to be'; *vyjasnjaetsja, čto* 'turns out that'; and *čto kasaetsja X* 'as far as X is concerned'. Two of the verbs are prominent in certain contexts. A stock phrase of mediated negotiations is *storony objazujutsja* 'the parties are obliged to'. When opinion polls are conducted, one of the standard choices is *zatrudnjajus' otvetit'* 'not sure' [lit. I have difficulty answering].

The one verb that is an outlier at the bottom end of the scale, with only one non-past form, *slyxat'* 'hear', is a morphological anomaly. This verb simply does not have non-past forms. This anomaly is motivated by the fact that this verb has the evidential function of reporting hearsay, which is connected with the past tense (cf. 4.2.7 where this verb appears as an outlier on the top end of the scale for imperfective past tense forms). The neutral verb for 'hear' is *slyšat'*.

4.2.4 Perfective non-past
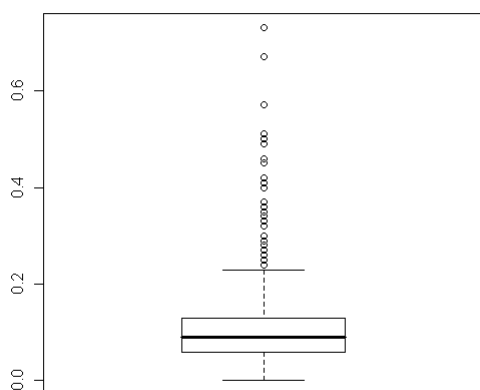
Proportion of Perfective NonPast

Eighty-four perfective verbs, listed in Appendix C, qualify as outliers due to their unusually strong representation in the non-past subparadigm. These verbs reflect the default interpretation of perfective non-past as referring to the future, since most of them are used in expressing predictions and promises. Predictions can be parametric, involving increasing (*prevysit* 'will exceed'), decreasing (*umen'šitsja* 'will decrease') and length of continuation (*prodlitsja* 'will last'). Predictions also often target expected improvements (*naladitsja* 'will work out well', *vyzdoroveet* 'will get well'), problems (*zatrudnit* 'will make things difficult', *razoritsja* 'will go broke') and needs (*potrebuetsja* 'will be necessary'). A problem that is often predicted is death; five verbs such as *podoxnet* and *zagnetsja*, both meaning 'will die', are used to announce impending mortality. Closely related to verbs signalling needs are two verbs that appear in impersonal modal constructions: *pridetsja* 'will be necessary' and *(ne) obojdetsja (bez)* 'will (not) manage (without)'. Promises are a specialized kind of prediction, as in *upravitsja* 'will take care of something' and *postaraetsja* 'will try'. Threats are in a sense negative promises, and this group includes items like *rasterzaet* 'will tear to pieces' and *prokljanet* 'will curse'. Many of the verbs involving death or threats are also metaphorical or metonymic: *sožret* is literally 'will eat up', but is parallel to the English expression *will eat X alive*, which is a warning of various kinds of danger, but usually does not refer to beasts devouring people; *sgniet* 'will rot' refers to death via the prediction of what happens afterward. Also related to promises are verbs used as performatives in discourse, usually in first person singular forms such as *osmeljus'* 'I (will) dare, I (will) take the liberty of' or *procitiruju* 'I (will) quote'. Several of the verbs are found among the outliers for this subparadigm

because they occur in fixed expressions: *ne pridereššja* 'don't find fault with', *ostal'noe priložitsja* 'the rest will come', *ot tebja ne ubudet* 'nothing is going to happen to you', *ne otvalitsja* 'won't fall off', *pojdet* 'that will work', *tak ne pojdet* 'that won't work', *vragu ne poželaeš'* 'I wouldn't wish it on my worst enemy'. Finally there is a residue of verbs with lexical meanings that don't seem to fit into any of the above-mentioned groups, such as: *vysoxnet* 'will dry out', *poletit* 'will fly/take off'.

4.2.5 Imperfective infinitive
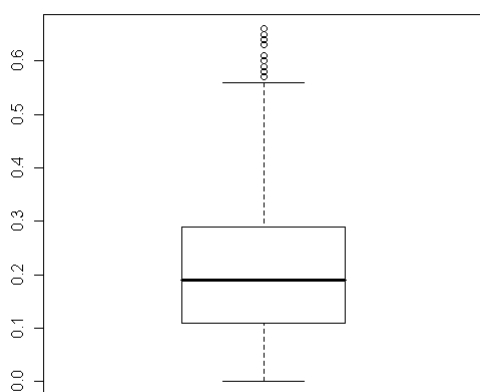
Proportion of Imperfective Inf

verb	gloss	raw freq	% freq
plevat'	'spit'	900	0.65
vvjazyvat'sja	'get mixed up in'	124	0.66
izyskivat'	'search out, try to find'	92	0.64
ispravljat'	'repair, carry out'	283	0.61
peredelyvat'	'redo, alter'	230	0.57
peresmatrivat'	'revise, reconsider'	198	0.66
razvivat'	'develop'	1363	0.57
razmeščat'	'place, distribute'	272	0.58
raspoznavat'	'recognize, identify'	113	0.59
sobljudat'	'observe, conform to'	1013	0.6
soglasovyvat'	'conform to, agree with'	176	0.63
učityvat'	'take into account, bear in mind'	1850	0.66

Table 4: Imperfective verbs with very high incidence of infinitive forms

Twelve imperfective verbs, listed in Table 4, have an unusually high proportion of infinitive forms. The first verb in the table appears to be motivated by a fixed construction, namely *mne plevat'* 'I don't give a damn' [lit: I (feel like) spitting]. The remaining verbs are associated with modal constructions that consist of an infinitive

in conjunction with a modal word like the following: *nado* 'have (to)', *nužno* 'need (to)', *dolžen* 'supposed (to)', *možno* 'can/is possible (to)', *nel'zja* 'not possible/not allowed (to)', *prixoditsja/pridetsja* 'is/will be necessary (to)', *sleduet* 'ought, should'. Contrary to typological trends, the default aspect for modal expressions in Russian is perfective, although imperfective is also permissible (cf. Divjak 2009 for a comparison of Russian with usual typological observations). Šmelev & Zaliznjak (2006) point out that in such modal constructions the perfective aspect describes "alethic" (also known as "dynamic") modality, in other words physical necessity or possibility, whereas the imperfective expresses deontic modality, in other words social or moral desirability. Šmelev & Zaliznjak claim that this difference is accounted for by controllability, namely that perfectives are used in contexts where the event is out of the subject's control, whereas imperfectives are used when the subject is in control. This introspective analysis seems to work for the minimal-pair-type examples that Šmelev & Zaliznjak offer, such as *Nel'zja razbudit' otca* 'It is impossible to wake father' (he physically cannot be wakened) vs. *Nel'zja budit' otca* 'Don't wake father' (it is the wrong thing to do). In a quantitative analysis, Divjak (2009) shows that it is not controllability, but rather specificity that predicts the aspect of infinitives in such constructions. In other words, because the Russian perfective aspect is associated with specific situations, it favors interpretations in terms of individual capacity. The imperfective aspect is associated instead with generic situations (like the gnomic uses discussed in 4.2.3), and this favors an interpretation in terms of overall norms of responsibility and desirability, as illustrated in example 3. Divjak coded a database of corpus examples according to various factors and fitted a mixed effects logistic regression model to the data to predict aspect. She found that the one factor that was crucial was specificity. Our study provides new data that supports Divjak's (2009) analysis. The eleven verbs in Table 4 that are used in modal expressions do not all express actions that are necessarily controllable; *vvjazyvat'sja* 'get mixed up in', *raspoznavat'* 'recognize, identify', and *soglasovyvat'* 'conform to, agree with' can all describe actions beyond the subject's conscious control. Divjak's (2009) hypothesis that imperfective infinitives are used in expressions of circumstances because they refer to generic obligations and possibilities is supported by the lexical meanings of our eleven verbs. These verbs target actions such as abiding by rules (*sobljudat'* 'observe, conform to'), revising and repairing things (*peredelyvat'* 'redo', *ispravljat'* 'repair') and in general trying to behave properly and

make things better (*učityvat'* 'take into account'). In addition one of the verbs in our list for imperfective infinitives is paired with a verb that also appears on the list in the following subsection of perfective infinitives: *sobljudat'*[i] vs. *sobljusti*[p] 'observe, conform to'. Examples comparing the use of these two infinitives in modal constructions appear in 3 and 4.

3) *Po-moemu esli ty dejstvitel'no verujuščij čelovek, to konečno <u>nado sobljudat'[i]</u>, kak velit cerkov'.*
'In my opinion if you really are a religious person, then of course you <u>need to conform to</u> what the church commands.'

4) *Edinstvennoe pravilo, kotoroe vy pri ètom <u>dolžny sobljusti[p]</u>: stil' vašej odeždy dolžen byt' identičen obščemu stilju, prinjatomu na firme.*
'The only rule that you <u>need to observe</u> in this situation is this: the style of your clothing must be identical to the overall style that is customary at the firm.'

The appearance of both of these verbs as high-frequency items in modal constructions is important because this verb pair is lexically restricted to reference to circumstances: neither the imperfective nor the perfective can express physical necessity or capacity. Futhermore, neither of these verbs can express a non-controllable situation since observance of rules and norms can occur only through conscious effort, not by accident. Yet still we see an aspectual difference in modal constructions, and that difference conforms to Divjak's (2009) findings. Example 3 describes a generalized rule for all behavior lacking any specific context, and this is where we find the imperfective. Example 4, with the corresponding perfective, describes the choice of clothing (skirt vs. slacks) for a professional woman in a very specific business situation.

4.2.6 Perfective infinitive
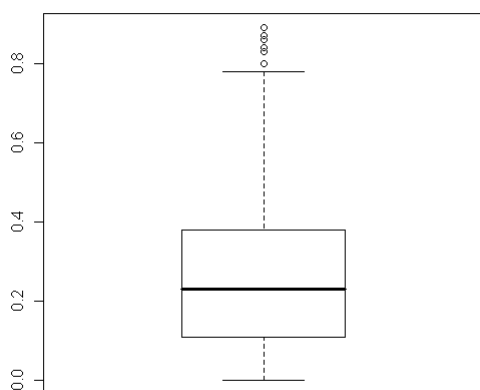
Proportion of Perfective Inf

verb	gloss	raw freq	% freq
naplevat'	'spit'	860	0.89
sovmestit'	'combine'	385	0.87
predotvratit'	'prevent'	792	0.86
vossozdat'	'reconstruct'	248	0.84
pomyslit'	'contemplate'	129	0.84
sobljusti	'observe, conform to'	200	0.84
sootnesti	'correlate'	118	0.84
vozmestit'	'compensate'	304	0.83
vospolnit'	'fill in'	171	0.8
podrabotat'	'earn additionally, work up'	91	0.8
srazit'sja	'fight, join in battle with'	108	0.8
ustranit'	'remove'	686	0.8

Table 5: Perfective verbs with very high incidence of infinitive forms

In some ways this group parallels the verbs that show high incidence of imperfective infinitives. The verb *naplevat'*[p] 'spit' is the paired aspectual correlate of the imperfective *plevat'*[i] and its presence is motivated by the same fixed phrase (which can appear in both aspects): *mne naplevat'* 'I don't give a damn'. The remaining verbs can all combine with modals, in which case the perfectives refer to specific situations as opposed to the imperfectives (cf. the comparison of examples 3 and 4 above). However, these perfective infinitives are associated with some additional constructions, all of which favor the perfective aspect. These constructions, illustrated in examples 5, 6, and 7 with the verb *vospolnit'* 'fill in', involve the so-called "tentative" verbs (meaning trying, wanting, etc.), *čtoby* 'in order to [achieve X]' and various adverbs describing how important or difficult it is to achieve X.

5) *Poètomu my* popytaemsja vospolnit' *ètot probel, opirajas' na fakty i cifry, privedennye v rabotax sovremennyx istorikov.*
'That is why we are going to try to fill in that gap by relying on the facts and figures cited in the works of contemporary historians.'

6) *Posle zanjatija možno vypit' vody,* čtoby vospolnit' *ee poterju.*
'After working one can drink some water in order to make up for its loss.'

7) *Fruktami istinnyj deficit kalija* vospolnit' *očen' tjaželo, praktičeski nevozmožno.*
'It is very difficult, practically impossible, to make up for a real calcium deficiency by [eating] fruit.'

Divjak (2004: 256) shows that tentative verbs strongly favor the use of perfective infinitives in examples like 5. The constructions in examples 6 and 7 both describe achievements, so the choice of the perfective is natural.

4.2.7 Imperfective Past
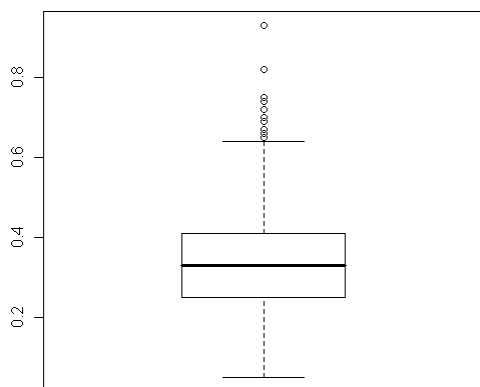
Proportion of Imperfective Past

verb	gloss	raw freq	% freq
slyxat' (slyxal)	'hear'	1161	0.93
slyt' (slyl)	'have a reputation for'	212	0.72
prosiživat' (prosižival)	'sit up repeatedly'	123	0.67
proxaživat'sja (proxaživalsja)	'go for strolls'	207	0.69
belet' (belel)	'show white'	366	0.7
mračnet' (mračnel)	'show dark, glower'	99	0.75
černet' (černel)	'show black'	348	0.75
svešivat'sja (svešivalsja)	'hang, dangle'	105	0.74
nadvigat'sja (nadvigalsja)	'be approaching'	260	0.66
pomyšljat' (pomyšljal)	'think, dream of'	189	0.69

unimat'sja (unimalsja)	'be stoppable'	381	0.82
ščurit'sja (ščurilsja)	'squint'	196	0.67
otšučivat'sja (otšučivalsja)	'make joking replies'	80	0.74

Table 6: Imperfective verbs with very high incidence of past tense forms

A variety of morphological, lexical and constructional factors contribute to the behavior of the outliers representing the imperfective past tense. The verb with by far the highest relative frequency in this group is *slyxal* 'heard', which, as we saw in section 4.2.3, lacks non-past forms. Its use is largely restricted to the past and infinitive due to its morphologically defective paradigm. Furthermore, both *slyxal* 'heard' and *slyl* 'had the reputation of being' serve as evidentials, which are typologically associated with the past tense (Aikhenvald 2003).

Most of the verbs on this list probably have larger-than-normal frequency in the past subparadigm partly because they lack imperative forms altogether. This includes *prosižival* 'sat up repeatedly', *proxaživalsja* 'went for strolls', *belel* 'showed white', *černel* 'showed black', *slyxal* 'heard', *slyl* 'had the reputation of being', *ne unimalsja* 'was unstoppable', *nadvigalsja* 'was approaching', *mračnel* 'showed dark, glowered', *svešivalsja* 'hung, dangled'.

Two of these verbs are habituals: *prosižival* 'sat up repeatedly' and *proxaživalsja* 'went for strolls'. Habituals are by definition imperfective and tend to be in the past because they require observation over a number of often discontinuous events. Danaher 2003 reports that habituals are strongly associated with the past tense in Russian.

Narration of observations motivate several verbs. Three verbs (*belel* 'showed white', *černel* 'showed black', and *mračnel* 'showed dark') are used to report the visibility of objects that appear either dark or bright to an observer. One verb describes an observed posture: *svešivalsja* 'hung, dangled', which is restricted in the kinds of subjects it can take to items like *bel'e* '(just washed) clothing' and *nogi* 'legs'. A further verb is used to report meteorological observations, as in *groza nadvigalas'* 'a storm was aproaching'. The reporting of such observations is typically given in the past tense, and since these verbs describe characteristics rather than unique events, imperfective is the appropriate aspect.

Two verbs, *(ne) pomyšljal* '(not) thought about, dreamt of' and *(ne) unimalsja* 'there was no stopping X' are strongly associated with the use of negation to make categorical statements. These verbs instantiate the acknowledged relationship between

negation and imperfective aspect (cf. Janda 2004 and references therein). Past tense is prioritized because these verbs describe an expectation that was not fulfilled over a period of time.

Finally there are some extended behaviors that are observed in the course of accompanying dialog: *ščurilsja* 'squinted', *otšučivalsja* 'made joking replies', *mračnel* 'glowered'.

4.2.8 Perfective past
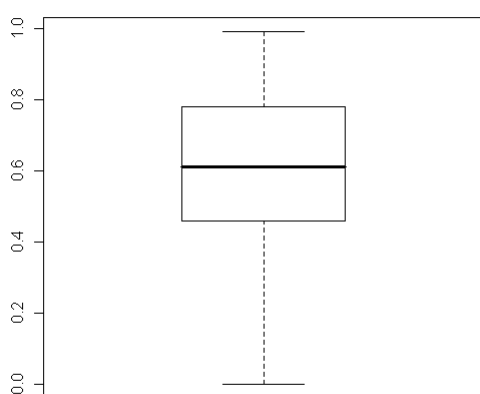
Proportion of Perfective Past

For this group, the median and variance are such that ±1.5 times the interquartile range covers the entire spectrum of possibilities, from 0% to 100%, so there are no outliers.

5.0 Conclusions

The findings in this article argue for the subparadigm as the appropriate level of granularity for corpus data on TAM categories in Russian. The subparadigm is the level at which the major verbal categories are realized (tense, finiteness, voice). The subparadigm gives us valuable insights into both the overall behavior of aspect and the lexical classes that are most driven by the interaction of aspect with tense and mood.

A database of nearly six million uses of forms representing verb pairs derived via prefixation (p-partners) as opposed to suffixation (s-partners) sheds new light on a long-standing debate in Russian linguistics. According to the traditional hypothesis both types of derivation lead to aspectual pairs, whereas according to the Isačenko

hypothesis aspectual pairs are created only via suffixation. Our data finds no appreciable difference in the behavior of the two kinds of partners, thus supporting the traditional hypothesis. Given these findings, it makes sense to ask why Isačenko suggested that there should be a difference between p- and s-partners in the first place. The reason is that Isačenko (1965: 130-175) was opposed to the traditional claim that the prefixes in the p-partners were semantically "empty". Isačenko made his protests with good reason, insisting that the prefixes must contribute meaning since the same prefixes are uncontroversially non-empty in the formation of Specialized and Complex Act Perfectives. Thus Isačenko reasoned that the p-partner relationship was not "purely aspectual" since it involved a lexical contribution from the prefix. However, there is a third logical possibility that can reconcile the traditional hypothesis with the Isačenko hypothesis, namely that the prefix, while retaining its lexical meaning, overlaps in meaning with the base verb to the extent that its meaning does not significantly change the meaning of the prefixed verb beyond signalling perfectivity. This third option, originally proposed by Vey (1952) and van Schooneveld (1958) has received new empirical support from Janda and Nesset (forthcoming), and is also compatible with our findings.

The database of verb forms was probed for outliers: lexical items that exceeded ±1.5 times the interquartile range in their representation in the various subparadigms. The findings here are highly relevant to ongoing debates on the interrelations of lexical meaning with tense, mood, and aspect in Russian. Our data support some scholarship in this area, challenge other works, and suggest some new areas for further research.

Outliers among imperfective imperatives confirm Šatunovskij's (2002, 2009) introspective analysis, but also extend the list of polite injunctions for "scripted" behaviors that typify this intersection of mood and aspect to include requests for assistance and kind wishes. The examples of rude forms give new evidence of what kinds of actions are included here. Additionally we find a group of imperfective imperatives that are neither polite nor rude, but simply familiar. This latter group has not been the subject of previous research. Perfective imperatives present a similarly large and revealing group of outlier verbs. Whereas previous research has focused on rude and neutral uses, we can detail which contexts call for neutral perfective imperatives, and we also find that there are some uses that are specifically polite. In

addition, we find a parallel to English (Stefanowitsch & Gries 2003) in the use of imperatives for attention-directing.

The main driving force for outliers among imperfective non-past forms is apparently gnomic reference, which is a bit surprising given the fact that the ongoing-durative meaning of the imperfective is usually considered the most prototypical use. Perfective non-past forms appear to be motivated by various kinds of predictions, among them predictions of improvements and problems, as well as threats and promises. In discourse the perfective non-past also serves a performative function.

Due to the lack of modal verbs in Russian (cf. Divjak 2004), modal expressions rely on a variety of constructions containing infinitives, which can be either imperfective or perfective. Scholars have presented different proposals concerning the role of aspect in such constructions, but our data supports the hypothesis that imperfective infinitives are used primarily for expressing generic circumstances, as opposed to perfective infinitives which are used for specific situations, where they can express either circumstances or physical necessity/capacity. Perfective infinitives participate in a number of other constructions, including those containing tentative verbs and adverbs describing the diffculty or importance of an achievement.

Only imperfective verbs surface as outliers in the past subparadigm, and these are associated with evidentials, habituals and the narration of observations.

All outlier groups exhibit some lexical items that are strongly metaphorical and/or appear in fixed idiomatic phrases, and many of these items are strongly associated with certain discourse situations.

These results are valuable both for their linguistic insights and for their potential in language teaching, where instruction can be tailored to target the forms given verbs are most likely to appear in.

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Appendix A: Imperfective imperative

bljusti	*bljudi(te)*	'observe (the laws); take care (of yourself)'	21	10%	0.71
bojat'sja	*boj(te)s'*	'be afraid'	1690	8%	0.69
brosat'	*brosaj(te)*	'throw; stop doing that'	361	9%	0.66
vnimat'	*vnimaj(te)*	'pay attention'	36	9%	0.67
volnovat'sja	*ne volnujsja(tes')*	'don't be nervous'	1039	28%	0.54
vstavat'	*vstavaj(te)*	'stand up'	702	14%	0.80
vstrevat'	*ne vstrevaj(te)*	'don't butt in'	19	16%	0.89
vybirat'	*vybiraj(te)*	'choose'	473	9%	0.52
vydumyvat'	*ne vydumyvaj(te)*	'don't invent excuses'	70	12%	0.74
vyzdoravlivat'	*vyzdoravlivaj(te)*	'get well'	62	27%	0.56
vykladyvat'	*vykladyvaj(te)*	'tell'	140	23%	0.76
vyključat'	*vyključaj(te)*	'turn off'	33	9%	0.58
vykručivat'sja	*vykručivajsja(tes')*	'slip out'	14	8%	0.57
vyručat'	*vyručaj(te)*	'help; try to help me'	80	14%	0.76
vysovyvat'sja	*ne vysovyvajsja(tes')*	'don't make yourself out to be better than you are'	51	11%	0.78
vysylat'	*vysylaj(te)*	'send'	32	10%	0.25
gljadet'	*gljadi(te)*	'look'	1260	16%	0.83
gresti	*grebi(te)*	'row; get out of here'	57	11%	0.82
gruzit'sja	*gruzis'(tes')*	'embark; worry'	17	11%	0.82
davat'	*davaj(te)*	'give; 'let's do smth.'	4964	15%	0.73
dogovarivat'	*dogovarivaj(te)*	'finish; speak'	32	24%	0.53
doedat'	*doedaj(te)*	'finish eating'	18	13%	0.72
žat'	*žmi(te)*	'squeeze; hurry up'	125	12%	0.84
zabirat'	*zabiraj(te)*	'take'	259	15%	0.68
zabyvat'	*ne zabyvaj(te)*	'don't forget'	690	14%	0.43
zaezžat'	*zaezžaj(te)*	'call in on the way'	42	11%	0.48
zakurivat'	*zakurivaj(te)*	'smoke'	26	9%	0.65
zakusyvat'	*zakusyvaj(te)*	'eat chasers'	55	11%	0.76
zalezat'	*zalezaj(te)*	'get into (the car)'	56	14%	0.66
zapasat'sja	*zapasajsja(tes')*	'take'	11	11%	0.09
zapevat'	*zapevaj(te)*	'start singing'	16	12%	0.75
zapisyvat'	*zapisyvaj(te)*	'write down'	173	8%	0.42
zapominat'	*zapominaj(te)*	'remember'	93	13%	0.69
zaprjagat'	*zaprjagaj(te)*	'harness; let's get started'	18	13%	0.78
zvonit'	*zvoni(te)*	'ring'	794	9%	0.43
idti	*idi(te)*	'go; come'	6507	8%	0.69
izvinjat'	*izvinjaj(te)*	'excuse'	62	48%	0.18

končat'	*končaj(te)*	'stop'	362	25%	0.82
lenit'sja	*ne lenis'(tes')*	'don't be lazy'	32	15%	0.75
ložit'sja	*ložis'(tes')*	'lie down'	544	18%	0.77
lopat'	*lopaj(te)*	'eat up'	14	11%	0.79
nagovarivat'	*ne nagovarivaj(te)*	'don't slander'	9	8%	0.67
nakručivat'	*ne nakručivaj(te)*	'don't exaggerate'	18	11%	0.44
nalivat'	*nalivaj(te)*	'fill (with wine)'	163	17%	0.74
naslaždat'sja	*naslaždajsja(tes')*	'enjoy'	99	9%	0.39
obižat'	*ne obižaj(te)*	'don't offend'	104	9%	0.55
obižat'sja	*ne obižajsja(tes')*	'don't be offended'	460	25%	0.58
obogaščat'sja	*obogaščajsja(tes')*	'be prosperous'	24	17%	0.04
obraščat'	*obraščaj(te)*	'mind'	375	9%	0.45
ogorčat'sja	*ne ogorčajsja(tes')*	'don't get upset'	123	29%	0.41
odevat'sja	*odevajsja(tes')*	'get dressed'	176	11%	0.67
otvalivat'	*otvalivaj(te)*	'get out of here'	22	19%	0.95
otvlekat'sja	*ne otvlekajsja(tes')*	'don't distract'	66	12%	0.61
otvorjat'	*otvorjaj(te)*	'open (the gate)'	18	18%	0.89
otpravljat'sja	*otpravljajsja(tes')*	'go'	169	8%	0.45
otčaivat'sja	*ne otčaivajsja(tes')*	'don't despair'	81	37%	0.41
perebivat'	*ne perebivaj(te)*	'don't interrupt'	139	18%	0.65
peredergivat'	*ne peredergivaj(te)*	'don't distort the facts'	18	15%	0.89
podavat'	*podavaj(te)*	'bring'	295	9%	0.78
podključat'	*podključaj(te)*	'link up'	14	8%	0.43
podsaživat'sja	*podsaživajsja(tes')*	'take a seat (near us)'	16	12%	0.31
podyxat'	*podyxaj(te)*	'kick the bucket'	18	13%	0.72
pozorit'	*ne pozor'(te)*	'don't dishonor (self or parents)'	26	13%	0.73
pominat'	*pominaj(te)*	'mention; bear no ill will; vanish into thin air'	117	21%	0.79
popravljat'sja	*popravljajsja(tes')*	'get well'	69	28%	0.59
prenebregat'	*ne prenebregaj(te)*	'neglect'	32	8%	0.13
pridirat'sja	*ne pridirajsja(tes')*	'don't nag; don't pick on'	23	9%	0.57
priezžat'	*priezžaj(te)*	'come'	899	13%	0.53
prikidyvat'sja	*ne prikidyvajsja(tes')*	'don't pretend to be smth. you aren't'	39	13%	0.87
prisoedinjat'sja	*prisoedinjajsja(tes')*	'come join us at the table'	90	14%	0.42
pristupat'	*pristupaj(te)*	'get busy'	94	12%	0.37
prisylat'	*prisylaj(te)*	'send'	119	14%	0.19
pritvorjat'sja	*ne pritvorjajsja(tes')*	'don't pretend'	58	8%	0.72
provalivat'	*provalivaj(te)*	'get out of here'	80	64%	0.79
proščat'	*proščaj(te)*	'adieu'	1324	55%	0.68
razdevat'sja	*razdevajsja(tes')*	'take off one's coat'	169	25%	0.53
razevat'	*ne razevaj(te)*	'don't open your mouth'	14	11%	1.00
rasstraivat'sja	*ne rasstraivajsja(tes')*	'don't get upset'	225	38%	0.51
robet'	*ne robej(te)*	'don't be shy'	52	19%	0.81
sadit'sja	*sadis'(tes')*	'sit down'	1854	31%	0.58

svalivat'	*svalivaj(te)*	'get out of here'	24	8%	0.75
serdit'sja	*ne serdis'(tes')*	'don't get annoyed'	351	21%	0.65
skidyvat'	*skidyvaj(te)*	'take off (shoes)'	10	8%	0.90
slezat'	*slezaj(te)*	'get out (of the car)'	86	32%	0.84
smet'	*ne smej(te)*	'don't do it'	476	21%	0.80
smotret'	*smotri(te)*	'look'	5881	13%	0.64
smuščat'sja	*ne smuščajsja(tes')*	'don't be shy'	37	11%	0.46
soedinjat'sja	*soedinjajsja(tes')*	'unite'	58	8%	0.00
soznavat'sja	*soznavajsja(tes')*	'tell the truth'	21	8%	0.71
spasat'sja	*spasajsja(tes')*	'save yourself'	80	14%	0.68
stesnjat'sja	*ne stesnjajsja(tes')*	'don't hesitate'	299	15%	0.42
stupat'	*stupaj(te)*	'get going'	663	57%	0.67
toropit'sja	*toropis'(tes')*	'be quick'	385	12%	0.53
ubirat'sja	*ubirajsja(tes')*	'get out of here'	206	36%	0.55
uvol'njat'sja	*uvol'njajsja(tes')*	'quit'	15	10%	0.87
utešat'sja	*utešajsja(tes')*	'be comforted'	14	10%	0.43
xvalit'sja	*ne xvalis'(tes')*	'don't brag'	16	8%	0.88
xvastat'	*ne xvastaj(te)*	'don't brag'	18	9%	0.39
jazvit'	*ne jazvi(te)*	'don't be sarcastic'	33	26%	1.00

Appendix B: Perfective imperative

blagoslovit'	*blagoslovi(te)*	'(God) bless you'	124	20%	0.81
brosit'	*bros'(te)*	'stop; leave, enough about it'	1289	12%	0.72
vgljadet'sja	*vgljadis'(tes')*	'look closely'	40	10%	0.43
vzvesit'	*vzves'(te)*	'weigh; consider'	36	10%	0.19
vzgljanut'	*vzgljani(te)*	'look'	428	9%	0.39
vlit'	*vlej(te)*	'pour in'	23	8%	0.43
voobrazit'	*voobrazi(te)*	'imagine'	183	18%	0.35
vskipjatit'	*vskipjati(te)*	'boil'	15	12%	0.40
vslušat'sja	*vslušajsja(tes')*	'listen'	39	25%	0.33
vsmotret'sja	*vsmotris'(tes')*	'look closely'	22	8%	0.09
vyključit'	*vyključi(te)*	'turn off'	112	10%	0.64
vysušit'	*vysuši(te)*	'dry up'	17	9%	0.65
dat'	*daj(te)*	'let'	7747	15%	0.68
dopustit'	*dopusti(te)*	'suppose'	3006	50%	0.01
zabyt'	*(ne) zabud'(te)*	'don't forget'	1413	9%	0.47
zavalit'sja	*zavalis'(tes')*	'be toppled'	40	9%	0.98
zavarit'	*zavari(te)*	'brew'	35	11%	0.40
zakryt'	*zakroj(te)*	'close'	438	8%	0.53
zalit'	*zalej(te)*	'fill up'	130	12%	0.12
zalit'sja	*zalejsja(tes')*	'be poured'	28	11%	1.00
zapastis'	*zapasis'(tes')*	'don't forget to take smth. with you'	21	8%	0.14
zapisat'	*zapishi(te)*	'write down'	285	9%	0.39

zapomnit'	*zapomni(te)*	'you must remember'	804	20%	0.60
izbavit'	*izbav'(te), izbavi*	'(God) forfend'	156	19%	0.86
izvinit'	*izvini(te)*	'forgive'	5367	97%	0.30
nalit'	*nalej(te)*	'pour'	313	14%	0.67
napomnit'	*napomni(te)*	'remind'	965	18%	0.03
naprjač'	*naprjagi(te)*	'tense; use your brain'	39	16%	0.54
nateret'	*natri(te)*	'rub'	20	12%	0.55
načertit'	*nacherti(te)*	'draw'	14	11%	0.36
obratit'	*obrati(te) (vnimanie)*	'notice'	900	16%	0.13
obyskat'	*obyšči(te)*	'search smb.'	22	8%	0.41
ostavit'	*ostav'(te)*	'stop; leave smb. alone'	1758	13%	0.39
otvalit'	*otvali(te)*	'push off; get out of here'	79	22%	0.87
otvorit'	*otvori(te)*	'open (the gate)'	36	10%	0.50
otdoxnut'	*otdoxni(te)*	'take a rest'	222	9%	0.66
otmetit'	*otmet'(te)*	'note'	884	9%	0.01
otpustit'	*otpusti(te)*	'let smb. go; forgive'	544	14%	0.57
otstat'	*otstan'(te)*	'get out of here'	325	23%	0.75
oxladit'	*oxladi(te)*	'chill'	25	9%	0.16
očistit'	*očist'(ite)*	'clean'	77	9%	0.35
perestat'	*perestan'(te)*	'stop'	891	10%	0.68
perečislit'	*perečisli(te)*	'enumerate'	100	9%	0.06
pobojat'sja	*pobojsja(tes')*	'do you not fear God'	54	8%	0.35
poverit'	*pover'(te)*	'believe'	1475	18%	0.29
pogljadet'	*pogljadi(te)*	'look'	406	15%	0.61
poguljat'	*poguljaj(te)*	'take a walk'	109	10%	0.40
podogret'	*podogrej(te)*	'warm up'	10	8%	0.20
podskazat'	*podskazhi(te)*	'tell'	324	16%	0.10
podumat'	*podumaj(te)*	'think of'	1898	8%	0.43
požalovat'	*požaluj(te)*	'come; perhaps'	170	21%	0.21
pozvat'	*pozovi(te)*	'call'	320	8%	0.54
pozvolit'	*pozvol'(te)*	'let'	1503	11%	0.11
pokljast'sja	*pokljanis'(tes')*	'take an oath; swear'	64	10%	0.63
pokurit'	*pokuri(te)*	'smoke'	104	14%	0.28
polenit'sja	*ne polenis'(tes')*	'don't be lazy'	46	15%	0.22
polit'	*polej(te)*	'pour (upon)'	23	8%	0.22
poljubovat'sja	*poljubujsja(tes')*	'look at smth.'	140	24%	0.46
pomilovat'	*pomiluj(te)*	'for goodness' sake'	441	76%	0.55
pomolit'sja	*pomolis'(tes')*	'pray'	59	16%	0.71
pomoč'	*pomogi(te)*	'help'	1600	8%	0.45
pomjanut'	*pomjani(te)*	'mention; mark my words'	123	23%	0.50
ponjuxat'	*ponjuxaj(te)*	'sniff'	47	10%	0.57
posvetit'	*posveti(te)*	'hold a light'	22	20%	0.73
posmotret'	*posmotri(te)*	'look'	4251	16%	0.42
postarat'sja	*postarajsja(tes')*	'try'	899	23%	0.32

postoronit'sja	*postoronis'(tes')*	'step aside'	35	18%	0.89
postojat'	*postoj(te)*	'wait'	858	33%	0.66
poterpet'	*poterpi(te)*	'be patient'	351	24%	0.68
potoropit'sja	*potoropis'(tes')*	'hurry up'	55	13%	0.49
poščadit'	*poščadi(te)*	'spare one's life'	66	22%	0.52
poščupat'	*poščupaj(te)*	'touch'	28	8%	0.75
predstavit'	*predstav'(te)*	'imagine'	2852	21%	0.24
prekratit'	*prekrati(te)*	'stop it'	518	16%	0.50
prigljadet'sja	*prigljadis'(tes')*	'look closely'	59	15%	0.47
prideržat'	*priderži(te)*	'restrain; curb (your dog)'	34	11%	0.79
prikinut'	*prikin'(te)*	'go figure'	240	31%	0.77
prilaskat'	*prilaskaj(te)*	'caress'	13	8%	0.62
prislušat'sja	*prislušajsja(tes')*	'listen'	96	8%	0.25
prismotret'	*prismotris'(tes')*	'take care of smb.'	27	19%	0.63
prismotret'sja	*prismotris'(tes')*	'regard smb. closely'	107	19%	0.28
prišit'	*prišej(te)*	'sew (to)'	43	12%	0.72
proverit'	*prover'(te)*	'check'	444	9%	0.36
prokonsul'tirovat'sja	*prokonsul'tirujsja(tes')*	'consult'	29	15%	0.14
promyt'	*promoj(te)*	'wash out'	44	12%	0.07
prostit'	*prosti(te)*	'excuse'	5474	65%	0.40
proteret'	*protri(te)*	'wipe; take a better look'	52	11%	0.52
pustit'	*pusti(te)*	'let smb. go'	475	12%	0.64
razbavit'	*razbav'(te)*	'dilute'	10	10%	0.30
razvjazat'	*razvjaži(te)*	'untie'	56	9%	0.57
razlit'	*razlej(te)*	'pour out'	35	8%	0.74
razogret'	*razogrej(te)*	'warm up'	14	9%	0.57
razodrat'	*razderi(te)*	'tear; damn'	10	9%	1.00
razrešit'	*razreši(te)*	'allow'	797	18%	0.09
raspisat'sja	*raspišis'(tes')*	'sign'	109	16%	0.23
rasskazat'	*rasskaži(te)*	'tell'	1915	10%	0.45
rasslabit'	*rasslab'(te)*	'relax (tight muscles)'	43	31%	0.21
rasslabit'sja	*rasslab'sja(tes')*	'relax'	168	15%	0.52
rassmotret'	*rassmotri(te)*	'see (figure x)'	849	24%	0.01
rastvorit'	*rastvori(te)*	'dissolve'	18	10%	0.33
rasteret'	*razotri(te)*	'rub'	29	12%	0.38
slit'	*slej(te)*	'pour off'	26	9%	0.15
smazat'	*smaž'(te)*	'smear (the door)'	29	9%	0.24
soglasit'sja	*soglasis'(tes')*	'you must admit'	1004	8%	0.16
sognut'	*sogni(te)*	'bend'	33	13%	0.27
sogret'	*sogrej(te)*	'warm'	22	8%	0.77
spasti	*spasi(te)*	'save'	504	8%	0.63
stancevat'	*stancuj(te)*	'dance'	17	11%	0.71
ubrat'	*uberi(te)*	'hands off; get this out of here'	508	14%	0.50

uvolit'	uvol'(te)	'stop, I don't want to speak about it'	136	12%	0.12
ugadat'	ugadaj(te)	'guess'	167	10%	0.67
umnožit'	umnož'(te)	'multiply'	20	11%	0.40
umyt'sja	umojsja(tes')	'wash up'	48	10%	0.81
unjat'sja	ujmis'(tes')	'keep still'	59	35%	0.76
uspokoit'sja	uspokojsja(tes')	'calm down'	848	24%	0.68
utešit'sja	uteš'sja(tes')	'be comforted'	11	8%	0.82
učest'	učti(te)	'keep in mind'	735	24%	0.51

Appendix C: Perfective non-past

vleč'	vlečet	'entail'	1555	85%
vozrasti	vozrastet	'grow'	490	24%
vozrodit'sja	vozroditsja	'revive'	75	27%
vosstanovit'sja	vosstanovitsja	'be restored'	81	25%
vygnat'	vygonit	'drive out, expel'	428	24%
vyzdorovet'	vyzdoroveet	'get well'	110	28%
vykrutit'sja	vykrutitsja	'get oneself out of trouble'	66	29%
vylit'sja	vyl'etsja	'flow out'	132	27%
vymeret'	vymret	'die out'	96	27%
vysoxnut'	vysoxnet	'dry up'	132	29%
vyjasnjat'sja	vyjasnjaetsja	'be explained'	805	89%
dožit'	doživet	'live until, come to'	369	26%
dotjanut'	dotjanet	'hold out until'	103	25%
zagnut'sja	zagnetsja	'die'	59	49%
zamerznut'	zamerznet	'freeze to death'	232	25%
zapolnit'sja	zapolnitsja	'fill up'	35	29%
zatrudnit'	zatrudnit	'make things difficult'	83	50%
zatrudnjat'sja	zatrudnjaetsja	'be made difficult'	275	86%
isčerpyvat'	isčerpyvaet	'exhaust'	100	89%
kasat'sja	kasaetsja	'concern'	9719	87%
naladit'sja	naladitsja	'work out well'	193	40%
obojtis'	obojdetsja	'I'll manage without'	1642	32%
obslužit'	obslužit	'serve'	40	26%
objazyvat'sja	objazyvaetsja	'be obliged to'	480	92%
ogovorit'sja	ogovorjus': ...	'make a reservation'	112	33%
ograničit'sja	ograničus' liš' tem ...	'not go beyond'	305	25%
okazyvat'sja	okazyvaetsja	'turn out to be'	10869	85%
okupit'sja	okupitsja	'will be rewarded, will pay off'	130	73%
osmelit'sja	osmeljus' zametit'...	'dare, take the liberty of'	239	35%
otvalit'sja	otvalitsja	'fall off'	86	26%
otpugnut'	otpugnet	'frighten off'	34	27%
otrazit'sja	otrazitsja	'be reflected'	372	27%
oštrafovat'	oštrafuet	'fine'	41	25%
pereseč'sja	peresečetsja	'intersect'	54	27%

pobojat'sja	*ne pobojus' skazat' ...*	'don't fear'	168	24%
povleč'	*povlečet*	'entail'	181	25%
povtorit'sja	*povtorjus', chto ...*	'repeat'	569	46%
povysit'sja	*povysitsja*	'rise'	165	27%
podoxnut'	*podoxnet*	'die'	106	45%
podpustit'	*podpustit*	'allow to approach'	77	33%
podrasti	*podrastet*	'grow a little'	182	32%
podskazat'	*podskažet*	'tell'	549	27%
podtverždat'sja	*podtverždaetsja*	'be confirmed'	677	83%
poželat'	*vragu ne poželaeš'*	'I wouldn't wish it on my worst enemy'	498	24%
pozvolit'	*pozvolju zametit'...*	'let oneself'	4491	34%
pojti	*tak ne pojdet*	'that won't work'	12107	24%
poletet'	*poletit*	'fly'	623	25%
polučit'sja	*polučitsja*	'turn out'	3539	28%
pomeret'	*pomret*	'die'	479	35%
pomestit'sja	*pomestitsja*	'fit in, find a place'	122	33%
pomoč'	*pomožet*	'help'	4964	26%
popravit'sja	*popravitsja*	'get better, put on weight'	183	26%
posmet'	*posmeju zametit'*	'dare'	284	34%
posposobstvovat'	*posposobstvuet*	'assist'	29	24%
postarat'sja	*postaraetsja*	'try'	1372	35%
potrebovat'sja	*potrebuetsja*	'be necessary'	1385	57%
prevysit'	*prevysit*	'exceed'	256	24%
predopredeljat'sja	*predopredeljaetsja*	'be predetermined'	34	85%
predstavit'sja	*predstavitsja*	'arise'	993	37%
pridrat'sja	*ne prideresh'sja*	'won't find fault with'	69	28%
prijtis'	*pridetsja*	'have to'	10292	42%
priložit'sja	*priložitsja*	'put near'	78	27%
pripomnit'	*pripomnit*	'remind'	351	29%
prišit'	*priš'et*	'kill, judge unjustly'	90	26%
prodlit'sja	*prodlitsja*	'last'	318	67%
prodolžit'sja	*prodolžitsja*	'continue'	229	49%
prokljast'	*prokljanet*	'curse'	58	28%
prorasti	*prorastet*	'sprout'	50	25%
procitirovat'	*procitiruju ...*	'quote'	114	25%
razmazat'	*razmažet*	'spread'	31	26%
razobrat'sja	*razberetsja*	'make sense of'	1393	27%
razorit'sja	*razoritsja*	'go broke'	74	29%
razrešit'sja	*razrešitsja*	'be solved'	82	26%
razrušit'sja	*razrušitsja*	'collapse'	45	24%
rasterzat'	*rasterzaet*	'tear to pieces'	37	27%
svestis'	*svedetsja*	'come to something'	54	24%
sgnit'	*sgniet*	'rot; die'	75	33%
skazat'sja	*skažetsja*	'will have an effect'	399	25%
slopat'	*slopaet*	'devour'	41	25%

sogret'	*sogreet*	'warm up'	78	27%
sožrat'	*sožret*	'devour'	161	36%
spast'	*spaset*	'save'	89	51%
spravit'sja	*spravitsja*	'cope'	991	27%
stancevat'	*stancuet*	'dance'	40	27%
ubyt'	*ot tebja ne ubudet*	'nothing is going to happen to you'	63	35%
užit'sja	*uživetsja*	'get on (with someone)'	34	24%
ulučšit'sja	*ulučšitsja*	'improve'	138	24%
umen'šit'sja	*umen'šitsja*	'decrease'	255	24%
upravit'sja	*upravitsja*	'take care of smth.'	159	41%
utait'	*utait*	'conceal'	65	30%
utešit'sja	*utešitsja*	'be comforted'	40	28%
uxudšit'	*uxudšit*	'get worse'	38	28%
javljat'sja	*javljaetsja*	'be'	39543	92%