We wish to thank both of the anonymous reviewers for JSL and the editor Stephen Dickey for their useful comments and advice. In this letter we list in condensed form all of the comments from all three and explain how we have used these comments to improve the manuscript. Comments are given in Cambria. Our responses are given in American Typewriter. All changes to the manuscript also appear in yellow highlighting in the revised document.

Reviewer #1:

1) The general assumptions and the background of the phenomenon need to be more explicit. A few introductory remarks discussing general patterns in aspectual marking and aspectual meaning in Russian are indispensable. The brief addition would open up this interesting work to a much broader audience, and make the assumptions more explicit for the more weathered audience.

The Introduction has been expanded to include a discussion of general assumptions and background, as well as introductory remarks concerning general patterns of aspectual marking. We have also made the definition of “emptiness” clearer (see 4) below). Here is the relevant expanded and revised text from the Introduction:

In terms of aspectual morphology, the Russian verbal lexicon is built from a set of simplex verbs, most of which are imperfective (like *pisat’* ‘write’), to which prefixes and suffixes can be added. Prefixes usually perfectivize a verb and may or may not change the lexical meaning of the verb. For example, *napisat’* ‘write’ uses the prefix *na*- to perfectivize the verb without changing its meaning, whereas *perepisat’* ‘rewrite’ uses the prefix *pere-* to both perfectivize and alter the meaning of the verb. The inventory of perfectivizing prefixes is discussed in 2.1. Three imperfectivizing suffixes (-*aj*, -*vaj*, and -*ivaj*) derive imperfective verbs from perfectives. The resulting verbs are usually referred to as “secondary imperfectives” and differ from their perfective correlates only in terms of aspect, as we see with *perepisyvat’* ‘rewrite’. It is commonly assumed that aspectual “pairs” can be formed both by prefixation, when the prefix does not add new meaning, as in *pisat’* (imperfective) > *napisat’* (perfective) ‘write’, and by suffixation of prefixed perfectives, as in *perepisat’* (perfective) > *perepisyvat’* (imperfective) ‘rewrite’. Schematically the two types of aspectual pairs can be represented thus:

|  |  |  |  |
| --- | --- | --- | --- |
|  | simplex | prefix+simplex | prefix+simplex+suffix |
| ‘write’ | *pisat’* | *napisat’* |  |
| ‘rewrite’ |  | *perepisat’* | *perepisyvat’* |
|  | imperfective | perfective | secondary imperfective |

This article focuses on the use of prefixes to form “purely aspectual” perfective partners to simplex imperfective verbs. Prefixes used for this purpose are claimed by many scholars to be devoid of meaning (beyond marking the verb as perfective) and thus semantically “empty” (Šaxmatov 1952, Avilova 1959 & 1976, Tixonov 1964 & 1998, Forsyth 1970, Vinogradov 1972, Švedova et al. 1980, Čertkova 1996, Zaliznjak & Šmelev 2000, Mironova 2004). The view that prefixes are “empty” when they serve the function of creating aspectual pairs rests upon a logical argument in which we assume that meanings are like mathematical values. Thus if “m” is the lexical meaning of a simplex verb “s”, we can assume that m = s (for example, ‘write’ = *pisat’*). If we perfectivize “s” by adding a prefix “p”, the result, it is claimed, is a perfective verb that has the same lexical meaning as “s”, so m = p + s (‘write’ = *napisat’*). Since both “s” and “p + s” equal “m”, the value of “p” by this logic is necessarily zero. In other words, the prefix has no meaning because the lexical meaning of the verb is not changed when it is added. All the prefix adds is the grammatical value “+ perfective”, but that does not change the lexical meaning of the verb.

This is an elegant, attractive argument, but there are a number of phenomena it cannot explain. For example, why does Russian need more than one marker for “+ perfective”? Why do some verbs have more than one perfective partner verb, like *gruzit’* ‘load’, which has three: *nagruzit’, zagruzit’*, and *pogruzit’*, all of which can be glossed as ‘load’? Why is it the case that all of the prefixes that serve as “purely aspectual markers” can also form new lexical verbs in combination with other simplex verbs (cf. the meaning of ‘accumulation’ in a verb like *nagrešit’* ‘commit many sins’ vs. the “purely apsectual” use of *na-* in *napisat’* ‘write’)? How do speakers of Russian know which prefix to use when a new verb is borrowed (as in *zaasfal’tirovat’* ‘asphalt’ and *profil’trovat’* ‘filter’)? These facts are better accounted for by an alternative model, according to which the prefixes do bear meaning even when they are used to create aspectual pairs (Vey 1952; van Schooneveld 1958; Isačenko 1960; Timberlake 2004, 410-411). Under this alternative model, it is hypothesized that the meanings of the prefixes overlap with the meanings of the simplex verbs (for example, one could say that the prefix *na-* is associated with accumulation on a surface, and *pisat’* ‘write’ is about accumulating symbols on a surface, motivating *napisat’* ‘write’). Conceptual overlap works like camouflage, creating the illusion that the prefix is “empty” even though it is not.

These arguments against “empty” prefixes are not new, but they have not succeeded in reorienting the direction of scholarship in Slavic linguistics. Our goal is to provide both a new argument and a new methodology that takes this debate beyond the realm of a polemical essay by looking at a statistical analysis of the relationships between prefixes that are used to form aspectual pairs and semantic classes. This study is part of a series of studies that give evidence in support of the overlap model.

The semantic profiling method described in this article is part of a suite of related methodologies for probing the statistical behavior of linguistic units, including also constructional profiling (Janda & Solovyev 2009, Sokolova et al. forthcoming), grammatical profiling (Janda & Lyashevskaya 2011), and radial category profiling (Nesset et al. 2011, Endresen et al. submitted). These methodologies are inspired by behavioral profiling, which investigates the distribution of a variety of features (morphological, semantic, syntactic, lexical, etc.) in connection with linguistic units, particularly as developed by Divjak and Gries (Divjak & Gries 2006, Gries & Divjak 2009).

2) Exclusion of vy- and iz- needs to be explained better. They co-evolved closely and thus cannot be considered fully independent of each other.

See 5) below and see this addition:

Including both *vy*- and *iz*- would run us afoul of the assumption of independence of observations, since these two prefixes are not independent of each other and *iz*- has sparse data. So there are good reasons to remove *vy-* and *iz-* from this study.

3) There is a continuum connecting Natural Perfectives to other perfectives and this needs to be recognized.

The presentation of Natural vs. other perfectives has been elaborated with the following additions:

Natural Perfectives tend to behave like a closed-class category, with a limited type frequency (under 2,000 verbs, see below) and relatively high token frequency (the average median frequency of a Natural Perfective in the Russian National Corpus is 107), whereas other perfectives are an open class with unlimited type frequency (permitting occasionalisms) and relatively low token frequency (average median token frequency 9.7; cf. Kuznetsova 2010). Admittedly there is no perfect dividing line between Natural Perfectives and other perfectives, however, there are very strong tendencies in this system, and the case of most verbs is clear despite the existence of some controversial examples.

...

Whereas a distinction between Natural Perfectives and all other prefixed perfectives is well motivated, regardless of what tradition one adheres to, there is a challenge in finding a method that will yield an uncontroversial list of all and only the Natural Perfectives in Russian. Our approach was to compare all perfectives listed in authoritative sources and further subject this list to review by native speakers in order to get as exhaustive a list of Natural Perfectives as possible by starting from objective third-party sources.

4) The definition of “emptiness” needs to be clearer.

See 1) above.

5) The reason for excluding verbs that use more than one prefix needs to be made clearer. (= 15 below)

See this addition to the beginning of 2.:

Additionally we need to observe the assumptions and limitations of the statistical model that we use to test the significance of the outcome. Any statistical model makes some absolute requirements on the structure of the data, and they must be observed because any violation will invalidate the use of the model. In other words, the findings would be falsified and it would be fraudulent to report such findings if the assumptions and limitations are not taken into account.

And these changes in 2.1:

Thus *gruzit’* ‘load’ is illegally stuffing the ballot-box and invalidating the statistical model.

6) There needs to be some explanation of how speakers choose among the three prefixed Natural Perfectives of gruzit’.

See this footnote added to the end of 2.1:

There are other ways to approach the meanings of prefixes in the context of prefix variation. For example, it is possible to explore the semantics of simplex verbs that engage in prefix variation and analyze to what extent the meanings of the prefixes create verbs that are interchangeable or contrastive in various environments, as in Janda & Lyashevskaya 2011b. Another alternative is to explore differences in the grammatical constructions associated with competing Natural Perfectives. For example, Sokolova et al. (forthcoming) show on the basis of a logistic regression model that whereas the three Natural Perfectives of *gruzit’* ‘load’ can all be used with both the theme-object construction (*gruzit’ seno na telegu* ‘load hay onto the cart’) and the goal-object construction (*gruzit’ telegu senom* ‘load the cart with hay’), they show distinctly different preferences: *pogruzit’* has a very strong preference for the theme-object construction, *nagruzit’* has a preference for the goal-object construction, and *zagruzit’* has a more balanced distribution between the two constructions (strong affected by metaphorical uses). These findings, however, go beyond the scope of the present study.

7) Speech and Sound clearly move through time, but it is not so clear how they move through space. This point should be omitted or further justified.

The offending references have been removed. See section 4.1.

8) Clarification on what the labels "attenuative", "delimitative", "resultative", "ingressive", etc. stand for is necessary.

See additions made in 4.2.4.

9) The authors exclude verbs with multiple Natural Perfectives, but do not exclude verbs with polysemous meanings. Why not?

From the context of cognitive linguistics, we could argue that ALL verbs are polysemous (or potentially polysemous). There is no clear objective way to distinguish between polysemous and non-polysemous verbs.

Reviewer #2:

10) The concept of Natural Perfectives and of “emptiness” needs to be clearer, as does the relationship between Natural Perfectives and Specialized Perfectives. (= 1, 3, 4 above)

See 1) and 3) above.

11) Section 2.1 discusses which prefixes form Natural Perfectives in Russian. This should be foreshadowed in 1. Introduction.

See 1) above. Note that the following is now the fourth sentence in the Introduction:

The inventory of perfectivizing prefixes is discussed in 2.1.

12) It is not clear whether all of the Natural Perfectives in the CLEAR database have also been searched in the RNC, nor whether the CLEAR database contains all Natural Perfectives in Russian.

Yes, the database contains all of the Natural Perfectives and we used all of the Natural Perfectives in the database.

See 3) above.

See also these additions:  
This study uses the Exploring Emptiness database as the point of departure and the full range of relevant Natural Perfectives represented there.

...

The full list of Natural Perfectives in the Exploring Emptiness database was compared with the inventory of verbs found in the RNC. On the basis of this comparison we found that 92% of the Natural Perfectives attested in the RNC have been assigned a semantic tag

13) The exclusion of o/ob/obo is insufficiently motivated. Summary of Baydimirova 2010 would be desirable. Can’t this data be included even though it will violate the independence assumption?

See 5) above.

See this footnote that has been added and summarizes Baydimirova 2010:

Many major Russian grammars and scholarly works treat *о-/ob-/obo-* as a single prefix, including Zaliznjak & Šmelev 1997: 73; Zaliznjak & Šmelev 2000: 83; Wade 1992: 277; Timberlake 2004: 404; Townsend 1975: 127; Grammatika russkogo jazyka 1952: Vol. 1 589 – 592; Isačenko 1960: 148; Barykina, Dobrovol’skaja, Merzon 1989; Hougaard 1973, and Roberts 1981. Alexeeva 1978, Andrews 1984 and Krongauz 1998: 131 – 148 present the opposing view that there are two distinct prefixes. Baydimirova (2010) conducted a comprehensive review of both Natural and Specialized perfectives prefixed in *о-/ob-/obo-*, complemented by a psycholinguistic experiment using nonce words; her results show that all three variants cover all available submeanings, thus supporting the majority view that they are variants rather than distinct prefixes. In considering *vz*- and *voz*- to be a single prefix, we follow Townsend (1975: 123). By contrast, Isačenko (1960: 149), Švedova et al. (1980: 357-358), and Vinogradova (1984: 24-26) list *vz*- and *voz*- as two prefixes that differ in register. Endresen & Sokolova (2011) have revisited this problem and concluded that despite minor differences, the two variants overlap in all their meanings.

See also this addition:

It would be difficult, or maybe even impossible to include *o-/ob-/obo*- in this dataset without violating the independence assumption of our statistical model and thus invalidating the entire study.

14) It should be mentioned that pogruzit’, nagruzit’, and zagruzit’ are associated with different grammatical constructions.

See 6) above.

15) Removing verbs that take multiple prefixes means removing some of the data. Can this data be addressed in some other way?

See 5) above.

Stephen Dickey:

16) Revise pp. 8-11 to make the explanation of Tables 1 and 2 clearer. Table 1 should be explained before moving on to Table 2.

See these additions:

Table 1 presents the distribution of our five prefixes vs. the four semantic classes. The top portion of the table gives the raw scores, which are the numbers of verbs with the given prefixes and the given semantic classes. In other words, if we look at the top row of figures in Table 1, it tells us that of the verbs prefixed in *po-*, 11 have the impact tag, 62 have the changest tag, 11 have the behav tag, and 37 have the sound and speech tags.

...

The second portion of Table 1, labeled “Expected Values”, shows the expected value for each cell. The expected value in any cell can be calculated according to this formula: expected value = (row sum x column sum) / total sum. So, for example, look at the upper right-hand cell of Table 1, where we have 11 *po*-prefixed verbs with the impact tag. The total number of observations in this row is 11 + 62 + 11 + 37 = 121. The total number of observations in this column is 11 + 23 + 31 + 47 + 10 = 122. The total number of observations in the table is 382. So the expected value for this cell (the value we would get if the data were distributed evenly) is (121 x 122) / 382 = 38.64398, which we can round to 39, and that is the number we find in the corresponding cell of the second portion of Table 1. Crucially we see that the lowest expected value is 8 (for the prefix *na*- and the semantic class behav), so all expected values exceed 5. This means that the distribution of data is indeed appropriate for use of the chi-square test described above.

The third portion of Table 1, labeled “Observed - Expected” lists the difference between the number of verbs found with the given combination of prefix and semantic class, minus the expected value for the same cell in the matrix. If we look again at the cell representing *po*-prefixed impact verbs, we see that the observed number is 11, and the expected value is 39, so the difference is 11 - 39 = -28, which is also the lowest number in this portion of the table. Positive values here indicate attraction, whereas negative values indicate repulsion. For example, the largest positive value is found for verbs with the *pro*- prefix and the sound&speech semantic tag, since the observed value (51) is 33 more than what would be expected (18). The least deviation from overall frequency-based expectations is for verbs prefixed in s- with the impact class, since the actual number of 23 is very close to the expected number of 21.

...

Fisher test p-values were computed using the following online calculator: http://research.microsoft.com/en-us/um/redmond/projects/mscompbio/FisherExactTest/.

...

For example, *pro-*prefixed verbs with the sound&speech tag show the strongest attraction, and all other attractions are listed below that one. By contrast, *za*-prefixed verbs with the sound&speech tag show the strongest repulsion, and *s*-prefixed verbs with the changest tag are the most neutral relationship.

17) How are the expected values calculated?

See 16) above.

18) Dickey 2005 does not address Russian s-.

Sorry about that! We have eliminated the faulty references and changed some text, such as this:

The meanings of the larger prefixes, particularly *po*- (which is becoming a “default” perfectivizer in Russian, cf. Dickey 2006 & 2007),

19) Additional references for the link between resultative and delimitative for po-: Rassudova makes this point in (1968: 97) Avilova does it in (1976: 204–206) cf. also Petruxina (2000: 148–149, 186–187); my Glossos 7.1 paper discusses this issue at length as well.

These references have been added.

Additional comments:

1) We have updated references. Some of the works that were listed as forthcoming have since been published. Also note that Baydimirova has changed her last name to Endresen and uses that name in all publications after 2010.

2) There was one small inconsistency in the data, namely that we had in one place listed po-/impact as neutral and po-/behav as a repulsion, when they are actually the reverse. We have made corresponding rearrangements.

3) To be more precise and clear, we have made a global change of “Fisher Test value” to “Fisher Test p-value”.