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Construal vs. redundancy: Russian aspect in context

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Abstract: The relationship between construal and redundancy has not been previously explored empirically. Russian aspect allows speakers to construe situations as either Perfective or Imperfective, but it is not clear to what extent aspect is determined by context and therefore redundant. We investigate the relationship between redundancy and open construal by surveying 501 native Russian speakers who rated the acceptability of both Perfective and Imperfective verb forms in complete extensive authentic contexts. We find that aspect is largely redundant in 81% of uses, and in 17% of contexts aspect is relatively open to construal. We contend that anchoring in redundant contexts likely facilitates the independence of construal in contexts with less redundancy. However further research is needed to discover what makes contexts redundant since known cues for aspect are absent in the majority of such contexts. Native speakers are fairly consistent in giving the original aspect high ratings, but less consistent in rating the non-original aspect, indicating potential problems in testing the reactions of speakers to non-authentic data.

Keywords: construal, redundancy, Russian, aspect

1 Introduction: Open construal, redundancy, and Russian aspect

Cognitive linguists readily acknowledge the pervasiveness of construal and redundancy in language (Croft and Cruse 2004; Langacker 2008, Langacker 2015; Verhagen 2007). However, little attention has been paid to the relationship between construal and redundancy. We argue that redundancy actually facilitates construal, and back this argument up with an empirical study of the relationship between redundancy and construal, showing how redundancy

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anchors the meanings available for construal. In this section, we review the concepts of construal and redundancy, as well as the distinction between Perfective and Imperfective aspect in Russian, which serves as the topic of our investigation. Section 2 presents our experiment and how it was carried out. Our data is analyzed using the *gam* (generalized additive mixed model) function of the *mcgv* package in R in Section 3. Section 4 focuses on the relationship between redundancy and construal as evidenced in our data. Consistency vs. variation across speakers is the topic of Section 5, and we present our conclusions and suggest directions for future research in Section 6.

1.1 Open construal

In reporting the same event, one can say either *A pickpocket stole Frank's money* or *Frank's money got stolen by a pickpocket*. Active vs. Passive voice in English (and many other languages) provides the speaker with the opportunity either to focus on the Agent, putting the pickpocket in Subject position, or to take the perspective of the victim, putting the Patient, Frank's money, in Subject position. Voice is just one of a multitude of grammatical distinctions that facilitate alternative construals of meaning in language. Langacker's (2015: 120) most recent definition of construal states simply: "Construal is our ability to conceive and portray the same situation in alternate ways". This definition emerges from a persistent focus within cognitive linguistics on the relationship between perception and conception, which Verhagen (2007: 50) traces back at least as far as Talmy (1978), who coined the term *ception* (Talmy 1996) to emphasize the indissoluble relationship between the two cognitive mechanisms. Speakers do not merely encode reality through language, but also present their construal of reality (Croft and Cruse 2004: 69; Verhagen 2007: 48), which can be thought of as a way of *viewing* a situation (Langacker 2008: 261).

Construal plays a crucial role in meaning, which "consists of both conceptual content and a particular way of construing that content" (Langacker 2008: 4). Two expressions may refer to the same event, but this does not entail that they have the same meaning, because although they have the same conceptual content, the meanings of the two expressions differ because of differences in construal (Langacker 2008: 95).

Although many discussions of construal have focused on distinctions available in the lexicon (such as *steal* which focuses on the item taken, vs. *rob* which focuses on the victim), it is acknowledged that construal is equally important for grammatical distinctions (see numerous examples in Croft and Cruse 2004: Chapter 3; Langacker 2008: Chapter 3, Langacker 2015: 121). Verbal aspect is

also an example of a grammatical distinction that speakers can use to express alternative construals of events.

There have been several attempts to classify types of construal across various parameters, such as salience, scope, and perspective (cf. Verhagen's 2007 survey focusing primarily on works by Langacker, and Croft and Cruse), without yielding an agreed-upon classification. Langacker (2015: 121) finds the task too unwieldy: "Construal encompasses numerous interrelated factors. While natural groupings can be observed, no one classificatory scheme captures all the relationships or does justice to a single factor." The use of Russian aspect, as explained below, likewise makes reference to a variety of factors in the construal of events, including salience, scope, and perspective.

Croft and Cruse (2004: 75–103) present construal as a dynamic process in which speakers recruit information from the linguistic context, the physical and social context, as well as encyclopedic and stored knowledge about their language. Context is, however, messy territory, and there has been little exploration of the contexts that support alternative construals. A notable exception is, for example, Bresnan's (2007) exploration of the *to*-dative/ditransitive alternation in English between *John gave a book to Sally (to-dative)* and *John gave Sally a book (ditransitive)*, where a multitude of factors (use of pronouns, animacy of the recipient, relative length of object phrases) make one or another variant more or less likely, as in *John whispered Sally the answer* or *The chilly weather gave Sally a cold* (compare with ... *to Sally* in both).

Our study makes it possible to identify authentic contexts that favor Perfective or Imperfective aspect in Russian or even allow both aspects. In relation to our data, a context open to construal is operationalized as one in which speakers give high acceptability ratings to both the Perfective and the Imperfective aspect.

1.2 Redundancy

Redundancy is a current focus of scholarly attention in psycholinguistics.¹ According to Winter and Wedel (2016), redundancy opens the door to variation, spurring evolution in sound systems, as evidenced by their experiment using computational models. Fedzechkina et al. (2017) found that when learning case markings in artificial languages with fixed vs. flexible word order, participants were more likely to acquire case marking when word order was not a reliable

¹ See Chiari (2007) for a definition of linguistic redundancy in terms of information theory and scholarly overview.

cue, in other words, when case was not redundant. Jaeger (2010: 53), on the basis of an experiment on morphosyntactic redundancy in English (use as opposed to omission of optional *that*, *to* and arguments) offers the Uniform Information Density hypothesis, claiming that “speakers prefer to encode their intended message by distributing information uniformly across their utterances at a rate close to, but not exceeding, the channel capacity”.

Redundancy has, however, received considerably less attention in cognitive linguistics. Dahl (2004: 9–13, 187–188, 291–295) discusses redundancy as a means of preventing information loss, and claims that languages have a tendency to develop system-level “smart redundancy” that makes it possible to maximize the advantages of redundant elements without proliferating them. This is achieved through successive cycles of redundancy-increasing and redundancy-decreasing changes that ultimately increase smart redundancy. Dahl finds that languages with “mature features” (those associated with linguistic complexity) make the most use of smart redundancy. Langacker (2008: 188–189) identifies redundancy as a pervasive phenomenon in language and associates it more narrowly with grammatical agreement. According to both Dahl and Langacker, redundancy is neither superfluous nor meaningless. Instead, redundancy provides the hearer with extra clues which can be helpful in decoding an imperfect message, and provides the speaker with the means to emphasize the same information in a variety of ways. However, neither Dahl nor Langacker address the relationship between construal and redundancy.

English definiteness is an example of a construal that is usually redundant in context. As any native speaker of English who has edited texts written by proficient L2 speakers can attest, in most otherwise well-formed sentences it is quite easy for L1 speakers of English to add in missing articles and correct the ones that are misplaced. This is because the construal that English definiteness conveys is usually recoverable from context. If just one eligible candidate for reference is available in a context, as, for example, when we use a word like *only* or a superlative like *toughest* (Langacker 2008: 287), English requires us to use *the*, but the definite article is redundant. It is the very redundancy of articles that likely makes them so hard to master in the first place: Ellis and Wulff (2015: 420) cite numerous studies showing that L2 learners have a hard time mastering grammatical markers that are redundant in their understanding of an utterance.

However, English articles are not always redundant. There are situations where either article can be used depending on what the speaker wants to say. If the speaker says *Bring me the cup*, the speaker is telling the hearer about a particular cup, and it is the hearer’s job to figure out which one. But a speaker can also say *Bring me a cup*, without making any assumptions about which cup is relevant. There are many similarities between English definiteness and

Russian aspect, which is sometimes even termed “temporal definiteness” (Dickey 2000; Dickey and Janda 2015).

Redundancy is operationalized in this study as a context in which a rating of one aspect is highly acceptable while the opposite aspect is rated as unacceptable. Redundancy is thus the situation of fixed (constrained) construal. Note that redundancy and open construal are thus defined with reference to two ends of a continuum. In the most extreme case of redundancy, there is consistent rating of one aspect as highly acceptable and the opposite as unacceptable. In the most extreme case of open construal, both aspects receive identically high ratings. In reality, our data shows that most contexts show a fairly high degree of redundancy, but a portion of contexts allow open construal and many contexts fall somewhere between these two extremes.

Our point in this article is that it is the redundant uses of a distinction that anchor the meanings that are relevant for construal. Redundant uses reinforce the construals associated with the markers of Perfective vs. Imperfective aspect. This continuous strengthening of association facilitates the use of those same markers to invoke their associated construals also in contexts where they are not redundant. Our study highlights the relationship between redundancy and open construal of Russian aspect, and shows that these are not discrete phenomena, but two endpoints of a continuum.

1.3 Russian aspect

In the Past tense, the Russian distinction between Perfective and Imperfective can be compared to Spanish, as in example (1) (see English translation in 1c).

- (1a) (opening lines of *La Sombra del Viento* by Carlos Ruiz Zafón 2001)
Todavía recuerd-o [remember-PRS.1.SG] *aquel amanecer en que mi padre me llev-ó* [bring-PST.PFV.3.SG] *por primera vez a visitar el Cementerio de los Libros Olvidados. Desgrana-b-an* [peel-PST.IPFV.3.PL] *los primeros días del verano de 1945 y caminá-b-amos* [walk-PST.IPFV.1.PL] *por las calles de una Barcelona atrapa-d-a* [capture-PST.PTCP-F.SG] *bajo cielos de ceniza y un sol de vapor que se derrama-b-a* [REFL spill-PST.IPFV.3.SG] *sobre la Rambla de Santa Mónica en una guirnalda de cobre líquido.*
- (1b) (translated by M. Smirnova and V. Temnov 2016)
Ja kak seičas pomnj-u [remember.IPFV-PRS.1.SG] *to ranee utro, kogda otec v pervye pove-l* [lead.PFV-PST.M.SG] *menja na Kladbišče Zabytyx Knig. Stoja-t-i* [stand.IPFV-PST-PL] *pervye dni leta 1945 goda. My š-l-i* [walk.

IPFV-PST-PL] *po ulicam Barselony, nakry-t-oj* [cover.PFV-PST.PTCP-GEN.F.SG]
pepel'nym nebom, i mutnoe solnce židkoj med'ju rasteka-l-o-s' [**spill**.
IPFV-PST-N.SG-REFL] *po bul'varu Santa-Monica.*

(1c) (translated by Lucia Graves 2004)

'I still remember the day my father **took** me to the Cemetery of Forgotten Books for the first time. It **was** the early summer of 1945, and we **walked** through the streets of a Barcelona trapped beneath ashen skies as dawn **poured** over Rambla de Santa Monica in a wreath of liquid copper.'

Four past tense verb forms are boldfaced in example (1a–b), and the aspects correspond (as is the case for most Spanish-Russian translation equivalents). The first form refers to a singular completed action: *llev-ó* and *pove-l* 'took' are Perfective in both Spanish and Russian. The remaining past tense forms describe ongoing backgrounded situations and are Imperfective in both languages: *des-grana-b-an*, *stoja-l-i* 'was'; *caminā-b-amos*, *š-l-i* 'walked'; *se derrama-b-a*, *rasteka-l-o-s'* 'poured'. Notice, however, that the aspect is glossed as part of the inflection for the Spanish forms, whereas aspect is part of the lexical gloss for the Russian forms. Notice also the other two inflected verb forms, the present tense *recuerd-o*, *pomnj-u* 'remember' and the participle *atrapa-d-a*, *nakry-t-oj* 'trapped': these Russian forms express aspect too, but the Spanish forms do not. This is because in Russian, all forms of the verb obligatorily express either Perfective or Imperfective aspect.²

One could say that Russian Perfective verbs describe situations as complete events, while Imperfective verbs describe situations as ongoing or repeated processes, but this is a gross oversimplification. A vast scholarly literature (cf. references in Dickey 2000; Zaliznjak and Šmelev 2000; Timberlake 2004; Janda 2007b; Janda et al. 2013) is devoted to Russian aspect, which is not fully mastered even at age six by native speakers (Stoll 2001; Gagarina 2004), and is routinely listed as the single greatest obstacle facing second language learners of Russian (cf. Offord 2005; Andrews et al. 2001; Cubberly 2002; Martelle 2011).

Russian verbal conjugation has only two tenses, one that is Past and one that is not. The latter tense is often referred to as the "Non-Past", and in the Non-

² Russian has several hundred "bi-aspectual" verbs that express both Perfective and Imperfective aspect (scholars disagree on exact numbers, cf. numerous citations in Janda 2007a). However, most scholars agree that in context, bi-aspectual verbs are not ambiguous: they always express either Perfective or Imperfective aspect. In other words, these verbs are syncretic aspectual pairs for which aspect is disambiguated in context, just as number is disambiguated for English *sheep* in context.

Past, Imperfective verbs usually express Present tense, while Perfective verbs usually express Future tense. In addition, there is a periphrastic Future used with Imperfective verbs. This distribution is represented in Table 1, illustrated with forms from the verb pairs *napisat* ‘write [Perfective]’ / *pisat* ‘write [Imperfective]’ and *vyigrat* ‘win [Perfective]’ / *vyigryvat* ‘win [Imperfective]’. In the first verb pair (‘write’) the difference in aspect is marked with the prefix *na-* on the Perfective verb forms, while in the second verb pair (‘win’), the difference in aspect is marked with the suffix *-yva* on the Imperfective verb forms. These two verb pairs represent two of the most common ways in which aspect is marked morphologically in Russian.³

Table 1: Aspectual contrasts considered in this study; shading highlights the fact that no contrast is available in Present tense.

	Perfective	Imperfective
Past	<i>napisat</i> ‘he wrote’ <i>vyigrat</i> ‘he won’	<i>pisat</i> ‘he wrote’ <i>vyigryvat</i> ‘he won’
Present	[No aspectual contrast available]	<i>pišet</i> ‘s/he writes’ <i>vyigryvaet</i> ‘s/he wins’ (Non-Past)
Future	<i>napišet</i> ‘s/he will write’ <i>vyigraet</i> ‘s/he will win’ (Non-Past)	<i>budet pisat</i> ‘s/he will write’ <i>budet vyigryvat</i> ‘s/he will win’ (periphrastic Future)
Infinitive	<i>napisat</i> ‘write’ <i>vyigrat</i> ‘win’	<i>pisat</i> ‘write’ <i>vyigryvat</i> ‘win’
Imperative	<i>napišite</i> ‘write!’ <i>vyigrajte</i> ‘win!’	<i>pišite</i> ‘write!’ <i>vyigryvajte</i> ‘win!’

From the perspective of cognitive linguistics, Janda (2004) has described the meaning construals associated with Russian Perfective and Imperfective in terms of a complex version of a TIME IS SPACE metaphor, namely PERFECTIVE IS A DISCRETE SOLID OBJECT vs. IMPERFECTIVE IS A FLUID SUBSTANCE. The contrast of two types of physical matter, discrete solid objects vs. fluid substances, provides a rich source domain with a multitude of properties that align with the meaning

³ There are approximately twenty (depending upon how one counts allomorphs) affixes that mark aspect in Russian, in addition to suppletion. A fuller description of Russian aspectual morphology can be found in Townsend (1975).

construals of the two aspects. For example, discrete solid objects are unique individuals with edges, are rigid, can have various shapes (including very thin/punctual), are perceptually salient (foreground), but cannot flow and cannot be easily penetrated (appear as Gestalts). Fluid substances lack inherent shape and boundaries, but can flow and spread and fill containers and be easily penetrated (described from the inside), are perceptually diffuse (background), and can be mixed together. Isomorphism between matter and aspect accounts for many facts about the use of Russian aspect, for example that Perfective is used to describe bounded events seen as wholes, that can be of varying duration (even punctual), that are necessarily sequenced (and therefore mostly incompatible with Present tense), used to describe prominent plot-line events and to express successful completion and issue instructions and warnings. Imperfective on the other hand is used to express unbounded situations that require at least some duration (never punctual), can express situations that are simultaneous with each other and with the Present tense, can be used in gnomic expression of eternal facts, can describe gradual processes and repeated actions, can describe how an action unfolds, and can be used to describe background situations (settings), trying to do something, categorical negation, frustration, and polite Imperatives in certain social situations. In other words, Russian can construe a situation either as the temporal correlate of a discrete solid object or as the temporal correlate of a fluid substance. Janda (2004) compares this model of Russian aspect to traditional models, such as those based on semantic features.

Russian speakers choose between these two alternative construals of situations as Perfective vs. Imperfective every time they use a verb. This choice involves various types of construal, including focusing, scope, and profiling (cf. Langacker 2008: Chapter 3). In terms of focusing, the Perfective gives a foregrounding construal as opposed to the Imperfective, which serves to background events. In terms of scope, the Perfective includes an entire bounded event, as opposed to the Imperfective which has more limited scope, excluding the endpoints of the bounded event. In this sense, Russian Imperfective aspect is in some ways similar to (but by no means equivalent to) the English progressive. To a limited extent, Russian Perfective corresponds to Langacker's summary scanning as opposed to the Imperfective as sequential scanning, but this correspondence fails to reflect certain language-specific details. In terms of profiling, the Perfective profiles the completion of an event, whereas the Imperfective does not profile the completion.

In many contexts, the choice of Perfective vs. Imperfective aspect is largely or entirely redundant in Russian. Descriptive grammars of Russian list dozens of adverbials and other syntactic "cues" that indicate strong preference for one aspect. For example, *za tri minuty* 'in three minutes' is a cue for Perfective verb forms (*Ja s"ela banany za tri minuty* 'I ate the bananas in three minutes' where *s"ela* 'ate'

is a Perfective verb form), while *vsegda* ‘always’ is a cue for Imperfective verb forms (*Ja vsegda ela banany* ‘I always ate bananas’ where *ela* ‘ate’ is an Imperfective verb form). Some examples of typical cues are presented in Table 2 (a subset of a compilation taken from the sources listed in the Reference grammars and textbooks section of the References).

Table 2: Some examples of “cues” for Perfective and Imperfective aspect in Russian.

	Adverbials as Cues	Verbs as Cues
Preference for Perfective verb forms	<i>nakonec</i> ‘finally’, <i>vnezapno</i> ‘suddenly’, <i>srazu</i> ‘immediately’, <i>čit’ ne</i> ‘nearly’, <i>vdrug</i> ‘suddenly’, <i>uže</i> ‘already’, <i>neožidanno</i> ‘unexpectedly’, <i>sovsem</i> ‘completely’, <i>za tri minuty</i> ‘in three minutes’ ...	<i>zabyt’</i> ‘forget’, <i>ostat’sja</i> ‘remain’, <i>rešit’</i> ‘decide’, <i>udat’sja</i> ‘succeed’, <i>uspet’</i> ‘succeed’, <i>spešit’</i> ‘hurry’ ...
Preference for Imperfective verb forms	<i>vsegda</i> ‘always’, <i>často</i> ‘often’, <i>inogda</i> ‘sometimes’, <i>poka</i> ‘while’, <i>postojanno</i> ‘continually’, <i>obyčno</i> ‘usually’, <i>dolgo</i> ‘for a long time’, <i>každyj den’</i> ‘every day’, <i>vse vremja</i> ‘all the time’, <i>tri časa</i> ‘for three hours’ ... categorical negation: <i>ne nado</i> ‘should not’, <i>ne stoit</i> ‘not worth’, <i>ne razrešaetsja</i> ‘not allowed’ ...	Verbs of motion: <i>pojti</i> ‘go’, etc. Other verbs: <i>učit’sja</i> ‘learn’, <i>umet’</i> ‘know how’, <i>ljubit’</i> ‘love’ ...

The cues sampled in Table 2 are known cues for the use of aspect in Russian. Psycholinguists (Dittmar et al. 2008; Goldberg 2006: 105–126; MacWhinney et al. 1984; Perek and Goldberg 2017) make measurements of cue validity in terms of both the cue reliability (when the cue is present, in what percentage of cases the given category is used) and cue availability (in what percentage of cases the cue is present). Cue validity is the product of cue reliability and cue availability.

Reynolds (2016) tested the behavior of the known cues for Russian aspect against corpus data. While he found that they indeed predict aspect with fairly good cue reliability (around 96%), even when taken in aggregate, these cues are relatively rare in actual language use, appearing in association with only about 2% of verbs in corpus language samples (cue availability). This means that descriptive grammars fail to represent 98% of the relationship of context to aspect. And in terms of cue validity, since the product of 96% and 2% is only about 2%, the known cues for aspect have very low cue validity.

While variable construal of aspect is acknowledged as a significant phenomenon (cf. Langacker 2008: 147–160), there has not been previous empirical investigation of relevant factors. Previous experimentation on aspect with Russian native speakers has been more limited or different in scope. Gorbova (2010) reports on data from forty-five Russian native speakers who are college students studying Romance languages. Participants were shown text fragments (1–3 sentences) translated from Spanish works of literature and asked to mark one of three forms (Imperfective Past, Perfective Past, and Imperfective Non-Past) as most felicitous in the given context (or to rate two or all three options if more than one was possible). For about half of the test items, native speakers were largely in agreement that only one form was possible, and over half of these were contexts with no cues (called “catalyzers” by Gorbova). In the remaining test items, there was lack of agreement among speakers, who often found two or even all three items acceptable. A survey of thirty-six linguists (not all native speakers) in 1997 (Anketa 1997) asked whether seven pairs of Russian verbs constituted aspectual pairs (where two verbs differ only in aspect), and received very divergent answers (see discussion in Gorbova 2011). Batiukova et al. (2012) report on a semantic decision task, in which participants were shown a verb prime and then a target verb, and had to decide whether the target verb “refers to an event/situation with a clear outcome”. They found that resultative verbs were recognized more quickly, especially if they had prefixes marking the aspect. Vinnitskaya and Wexler (2001) conducted three experiments with children: a narrative task, a comprehension task, and an elicitation task, finding that children use more Imperfective verb forms than adults. In a series of experiments, Stoll (2001) finds that children’s use of aspect is more conservative than that of adults and that they achieve better mastery of resultative uses for Perfective than for atelic uses.

To sum up, when a known cue for Russian aspect is present, cue reliability is high, and therefore aspect itself is largely redundant. However, the extremely low cue availability leads one to suspect that the known cues are actually quite marginal in the decision to use Perfective vs. Imperfective verb forms. In what proportion of contexts is the choice of aspect redundant and therefore fixed, and in what proportion is it open to construal? This question has never before been addressed empirically and it must be addressed before we set out to search for the unknown cues. Ours is the only study of the reactions of a large number of adult native speakers of Russian to complete contexts of authentic texts originally written in Russian.

2 Stimuli and data collection

We tested the reactions of native speakers of Russian to Perfective vs. Imperfective aspect using full-sized authentic contexts. An offline survey experiment was undertaken in order to ensure that all of the contextual factors available to all participants responding to the same test item would be the same.

2.1 Stimuli

Six extensive, complete, and unedited texts served as stimuli for our study, listed in References. Stimuli were carefully chosen in order to meet a series of criteria: authenticity, balance across registers/genres, length, density of test items, appropriateness and permission for use.

Authenticity: Only contemporary authentic texts were chosen. All six texts were created by and for native speakers (none were elicited for this study). We did not abridge or edit the texts.

Balance: Half of the texts represent written genres, and half represent spoken genres. The speech of the war veteran (Suškov 2004) contained some dialectal features relating to reflexive morphology, but none relevant to aspect.

Length: The goal was to provide the fullest context possible in an experimental setting so that no information would be absent due to lack of context. A pilot study showed that the longest text that could be accommodated without overtaxing participants was about 1500–1600 words. At this length, most participants in the pilot study were able to complete the task in less than twenty minutes. The texts also needed to be approximately the same length. The length of the texts varied from 1116 to 1617 words, with an average of 1415.5 words per text.

Density of test items: Texts were selected to maximize the number of verb pairs that participants would be exposed to.

Appropriateness and permission: Stimuli were chosen to avoid taboo language and subjects, as well as politically sensitive or potentially unpleasant topics. We hold the rights to use all of the texts included in the study.

Test items in the stimuli targeted the four grammatical categories where an aspectual contrast is available, namely Past, Future, Infinitive, and Imperative forms. Several types of verb forms were not rendered as test items on the grounds that they precluded aspectual contrast. These include: forms of the verb *byť* ‘be’, which is always Imperfective in Russian; gerunds and participles, which tend to be highly specific to one aspect or the other; bi-aspectual verbs which express both Perfective and Imperfective aspect without any morphological distinction,

such as *realizovat* ‘realize, implement’; and other verbs not paired for aspect, such as *-sja* passives like *prednaznačat’sja* ‘be intended for’ and the verb *stat* when used as a phasal verb meaning ‘begin’.

Example (2) demonstrates how original verb forms were rendered as pairs of test items in the opening lines of the ‘Beetle’ text (Fineeva 2015):

(2a) Original text:

Prav-o *vybor-a* *žiznennogo put-i* --
 right-NOM.SG choice-GEN.SG life-GEN.SG path-GEN.SG
bol’s-oj *podarok* *sud’b-y.* *U Vasilij-a* *èt-ogo*
 big-NOM.SG gift-NOM.SG fate-GEN.SG at Vasilij-GEN.SG that-GEN.SG
prav-a *ne* ***by-l-o.*** *On* *bezropotno*
 right-GEN.SG not **be-IPFV-PST-N.SG** he-NOM.SG uncomplainingly
prinja-l *vybor,* *kotor-yj* *za*
accept-PFV-PST.M.SG choice-ACC.SG which-ACC.M.SG for
nego ***sdela-l-a*** *sud’b-a,* *i* *èt-o*
 he-ACC.SG **make-PFV-PST-F.SG** fate-NOM.SG and that-N.SG
by-l *velik-ij* *šag.*
Be-IPFV-PST.M.SG big-NOM.M.SG step-NOM.SG

‘The right to choose one’s path in life is a great gift of fate. Vasilij **didn’t have** that right. He uncomplainingly **accepted** the choice that fate **made** for him, and that **was** a major step.’

(2b) Text with test item pairs:

Pravo vybora žiznennogo puti -- bol’sjoj podarok sud’by. U Vasilija ètogo prava ne bylo. On bezropotno [prinjal / prinimal] vybor, kotoryj za nego [sdelala / delala] sud’ba, i èto byl velikij šag.

The example contains four overt verb forms boldfaced in (2a): *bylo* ‘was’ (a Past form of Imperfective *byt* ‘be’), *prinjal* ‘accepted’ (a Past form of Perfective *prinjat* ‘accept’), *sdelala* ‘made’ (a Past form of Perfective *sdelat* ‘make’), and *byl* ‘was’ (another Past form of Imperfective *byt* ‘be’). In (2b) the two forms of *byt* ‘be’ were left as is since there is no aspectual contrast available, and the other two verb forms are presented as test item pairs (boldfaced), including the corresponding Imperfective forms *prinimal* ‘accepted’ (a Past form of Imperfective *prinimat* ‘accept’) and *delala* ‘made’ (a Past form of Imperfective *delat* ‘make’). Ratings were collected from participants of both the Perfective and the Imperfective verb forms for every pair, without providing any indication of what the original aspect was.

2.2 Procedure

The study was conducted as an online survey using Qualtrics software.⁴ Each participant completed a “CAPTCHA” task to prove that they were human (not a robot) and was randomly assigned to one of the six texts that served as stimuli. Participants were instructed to rate the acceptability of verb forms as “Excellent”, “Acceptable”, or “Impossible”, and it was possible to give both verbs the same rating. They were told that they must complete the entire task in order to receive a code for a prize lottery, and warned that their code would be eliminated from the lottery if there was evidence that the survey was filled in at random or if they filled out more than one survey. Participants were also told that their participation was voluntary and they could quit the task at any time, and that by participating they were giving their consent. Prior to reading the text and evaluating the verbs, participants were asked to state their age (to confirm that they were 16 or older), their native language (to confirm that they were native speakers of Russian), and their gender identity. No IP addresses or other identifying information was collected.

Figure 1 shows the instructions in blue and the survey text following the horizontal line. The test pairs are in square brackets and highlighted in light blue, with the Perfective verb form followed by a slash and then the corresponding Imperfective verb form. When the participant moves the cursor over a verb in a test pair, the three evaluations pop up as illustrated in Figure 1. Here the participant

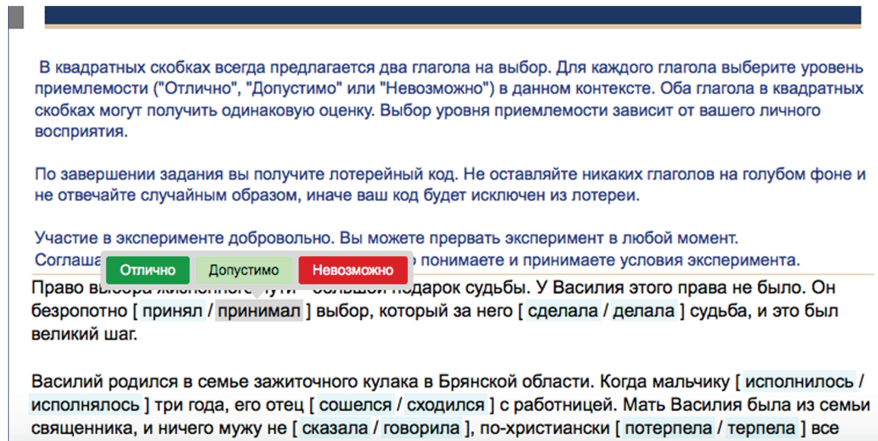


Figure 1: Screenshot illustrating what the task looked like.

⁴ <https://www.qualtrics.com/research-core/>

has moved the cursor over the Imperfective Past tense form *prinimal* ‘accepted’ (see example [2] above) and the three options are given with iconic coloring: “Excellent” in dark green, “Acceptable” in light green, and “Impossible” in red. The participant needs only to click on one of the options and then move on. The participant is asked to rate both the Perfective and the Imperfective verb forms in each test pair.

There was no time limit, participants were allowed to go back to items as many times as they wanted, and they were prompted to go back and finish any items that they had skipped. Participants were recruited via emails sent to various listservs and individuals in Russia. In the course of one week (13. –20.09.2016), 501 participants successfully completed the task.

3 Statistical analysis

The purpose of this analysis is to determine how strongly the context predicts ratings (measured as match to original aspect), and to measure this variable against other possible variables. The input for our analysis is the data from our study, collected in 111,364 lines, each of which recorded values for the variables detailed in Table 3.⁵

“Rating” is the dependent (response) variable, which consists of ordered categories. “Excellent” was the rating chosen most often, in 57,116 of responses, while “Acceptable” was the rating chosen least often, in only 17,395 of responses. The remaining variables in Table 3 are independent (predictor) variables.

“Matches Original” tells us whether the form being rated is of the same aspect as in the original text or not. See Table 4 below.

“Logarithm of Relative Frequency” is the natural logarithm of the relative frequency of the form being rated vs. the frequency of the corresponding form of the opposite aspect. This measure is called a “logit”. It is customary to logarithmically transform corpus frequency data in order to correct for the extreme skewing of corpus word frequencies, known as “Zipf’s Law” (1949). Logits are logarithmically transformed odds ratios. They have the admirable property of transforming odds ratios (which normally range from zero to 1 on one side, and

⁵ All of our data, as well as the R code for the statistical analysis, are available at this URL: <http://dx.doi.org/10.18710/BFFMPH> (Tromsø Repository of Language and Linguistics). This post also gives further details about interactions. Gender (80,326 responses from female participants, 30,044 from male participants, and 994 from other participants) was not found to be significant and is not included in the model.

Table 3: Variables, their levels, and the distribution of responses across levels.

Variable	Levels	Distribution of Responses
Rating	“Excellent”	57,116
	“Acceptable”	17,395
	“Impossible”	36,853
Matches Original	False = non-original aspect	55,682
	True = original aspect	55,682
Logarithm of Relative Frequency (of rated form vs. form of opposite aspect)	Minimum	-9.735
	1st Quartile	-1.161
	Median	0
	Mean	0
	3rd Quartile	1.161
Text	Maximum	9.735
	NS = Krutixin 2016	13,944
	BZh = Fineeva 2015	24,900
	ID = Suškov 2004	20,740
	Ist = Anonymous 2016	15,840
Aspect	MGLU = Cienki and Iriskhanova 2014	21,684
	VU = Markov 2016	14,256
	i = Imperfective	55,682
	p = Perfective	55,682
	Subparadigm	Pst = Past
Fut = Future		9438
Imp = Imperative		3442
Inf = Infinitive		26,723
Cue Match	None = no cue	93,246
	False = cue associated with non-original aspect	1732
	True = cue associated with original aspect	16,386
Age	Minimum	16
	1st Quartile	20
	Median	25
	Mean	29.46
	3rd Quartile	36
	Maximum	78
Participant ID	Each of the 501 participants was assigned a unique ID number (particID)	

from 1 to infinity on the other) into a symmetrical distribution. For example, an odds ratio of 1000/1 (relative frequency where one item appears 1000 times and the other only once) = 1000 yields a logit of 6.9, and the reverse relative

Table 4: Interpretation of combinations of values for “Matches Original” and “Aspect”.

	Matches Original = False	Matches Original = True
Aspect = i	The participant is rating a form that is Imperfective, but the original text had a Perfective form	The participant is rating a form that is Imperfective, and the original text also had an Imperfective form
Aspect = p	The participant is rating a form that is Perfective, but the original text had an Imperfective form	The participant is rating a form that is Perfective, and the original text also had a Perfective form

frequency of $1/1000 = 0.001$ yields a logit of -6.9 . When the frequencies of two items are the same, the odds ratio is 1, and the logit is 0. The purpose of this measure is to determine whether the relative frequency of the two aspectual forms has any influence on the ratings.

“Text” shows the number of responses for each of the six text stimuli in the study.

“Aspect” indicates the aspect of the form that is rated by the participant, which is either Perfective (p) or Imperfective (i). Table 4 shows what all the combinations of the variables “Matches Original” and “Aspect” mean.

“Subparadigm” records the number of responses for each subparadigm.

“Cue Match” tells us whether there was a cue word present, and, if so, whether the cue is usually associated with the same aspect as in the original text (“True”), with the opposite aspect (“False”), or there was no cue (“None”, the most common value).

“Age” is the age of the participants, which ranged from 16 to 78.

We analyzed the ratings with the *mgcv* package, using the *gam* function and setting the family directive to *ocat*($R = 3$), where R specifies the number of ordered categories. The response variable needs to be coded with integers 1 ... R .

A main-effects model with by-participant random intercepts representing the variables given in Table 3 is summarized in Table 5.

The central concept underlying this implementation of ordinal regression is the following. We assume there is a latent random variable U that reflects subjects’ intuitions about acceptability. U can assume any value on the real axis. To discretize U into 3 rating categories, the real axis is divided into three bins. For this, we need cut-off points specifying the boundaries between the bins. The first cut-off point is set at -1 . For ratings on a three-point scale, a second cut-off point is required that is greater than -1 . For the present main-effects model, this cut-off point is estimated at 0.33.

Table 5: Main-effects model fitted to acceptability ratings.

A. parametric coefficients	Estimate	Std. Error	t-value	p-value
(Intercept)	0.2117	0.1038	2.0389	0.0415
Matches Original True	-3.5301	0.0173	-203.7780	<0.0001
Text ID	-0.0268	0.0741	-0.3610	0.7181
Text Ist	0.0427	0.0726	0.5882	0.5564
Text MGLU	-0.1003	0.0757	-1.3255	0.1850
Text NS	-0.3640	0.0758	-4.8019	<0.0001
Text VU	-0.5461	0.0782	-6.9880	<0.0001
Aspect p	0.0569	0.0162	3.5077	0.0005
Subparadigm Imp	0.2391	0.0517	4.6251	<0.0001
Subparadigm Inf	0.4524	0.0346	13.0595	<0.0001
Subparadigm Pst	0.4058	0.0324	12.5083	<0.0001
Age	0.0041	0.0018	2.2678	0.0233
Logarithm of Relative Frequency	-0.2235	0.0044	-51.0735	<0.0001
Cue Match None	0.0042	0.0608	0.0696	0.9445
Cue Match True	0.2320	0.0623	3.7234	0.0002
B. smooth terms	edf	Ref.df	F-value	p-value
s(particID)	435.2204	494.0000	7.3574	<0.0001

U	Rating
$(-\infty, -1)$	1
$(-1, 0.33)$	2
$(0.33, +\infty)$	3

Thus, the mapping of intervals on the real axis to ratings is as follows: The ordinal gam models the latent variable U as a function of the predictors, i.e. the linear predictor η_i is the following:

$$\eta_i = U_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots$$

Given the predicted value of U_i (which is taken to follow a logistic distribution), we inspect which interval on the real axis it falls into, and this in turn determines which rating is predicted (see also Baayen and Divjak 2017 for further discussion).

Table 5 shows that the effect of the variable Matches Original is larger than any other, even when corrections are made for differences in units and numbers of levels. In other words, even when we take into account the fact that there is some tendency to choose a form that is more frequent, and that there are differences associated with various factors relating to the form and context of

the token and with the participants, there is a very strong tendency to prefer the original form over the alternative.

As a next step, we considered a model that included two interactions. The first interaction is that of age by frequency ratio, the idea being that experience with language accumulates over the lifetime in such a way that speakers become more proficient as they age, and hence may not need to rely as much on relative frequency of use and more on the “hidden factors” that drive aspect selection (Ramscar et al. 2017). We also considered the interaction of Matches Original by Text, as it is known that the use of aspect can vary substantially between, e.g. scientific texts and fiction. Older speakers appear to rely less on the relative frequency of aspect use, possibly because they are more sensitive to the stylistic/discourse factors that determine aspect use, compared to younger speakers (further details about interactions can be found in the link in Footnote 5).

Word identity is not included as a random effect. The reason for this is that the frequency distribution of verbs is Zipfian, with many verb forms appearing only once and a small number of verbs being used intensively. Including item as a random effect forces the model to find a set of by-item adjustments that follow a normal distribution. Given the Zipfian nature of word probabilities, this is impossible. A model including by-word random intercepts would be misspecified. To see this, consider the large proportion of forms (typically around 50% of the word types) that occur once only. For each of these forms, the model would include not only an intercept adjustment, but also several other item-bound predictors such as Logarithm of Relative Frequency, Matches Original, Aspect, and Subparadigm. Thus, such a model would be overspecified.

In this context, it is worth noting that the logistic GAM is not a Gaussian model, and that there is no error term that should be independently and identically distributed (iid) for p-values in the model summary to be trustworthy. Thus, whereas in a standard linear mixed model for, e.g. reaction times, it would be desirable to include word as random-effect factor to avoid structured errors and violation of the iid model assumption, this issue does not arise in the context of the present ordinal regression model. Furthermore, as this model (for details, see Wood et al. 2016) is not a proportional odds model, assumptions about proportional odds need not be made.

In sum, the statistical analysis brings into relief the importance of the variable Matches Original in determining the rating of a verb form, even when other factors are taken into account. The remainder of our analysis focuses on the rating of original aspect vs. non-original aspect, and how this manifests as an indicator of redundancy vs. open construal in our data.

4 Redundancy vs. open construal

Our data consists of pairs of ratings for original aspectual verb forms as opposed to non-original aspectual verb forms. The ratings of each verb form can be sorted into two groups: a **high** rating group where the majority of participants chose “Excellent” or “Acceptable” ratings vs. a **low** rating group where “Impossible” is the predominant choice. A high rating of the original aspect combined with a low rating of the opposite aspect indicates that aspect is redundant in context, whereas high rating of both aspects indicates that aspect is open to construal. Table 6 shows the distribution of possible combinations between high and low ratings for original and non-original paired aspectual forms.

Table 6: Distribution of paired ratings and what they mean for redundancy vs. open construal.

Rating of original aspectual form	Rating of non-original aspectual form	Percentage of paired aspectual forms in context	Choice of aspect in context
high rating	low rating	81%	REDUNDANT
high rating	high rating	17%	OPEN TO CONSTRUAL
low rating	high rating	2%	REDUNDANT
low rating	low rating	(No data)	NA

Most of the data (81%) is represented in the first line of Table 6, where the original aspect receives a high rating, while the corresponding item of the opposite aspect receives a low rating. Here aspect is largely redundant, since native speakers can reliably recover it based only on context. The construal of the event as Perfective or Imperfective is certainly present, but the overt marking of aspect on the verb is unnecessary since aspect can be recovered from context. Examples (3) and (4) from our study illustrate situations in which the Perfective and Imperfective aspect are redundant. Table 7 shows the numbers of ratings that these test items received in our study. Ratings for the original aspect are in shaded boxes.

- (3) *V* *vosem'* *let* *mal'čik* [*original* *sbeža-l* /
 in eight_{.ACC} year_{.GEN.PL} boy_{.NOM.SG} run_{.PFV-PST.M.SG}
non-original *sbega-l*] *iz* *dom-a*.
 run_{.IPFV-PST.M.SG} from home_{.GEN.SG}
 ‘At the age of eight the boy **ran away** from home.’ (Fineeva 2015)

Table 7: Ratings of examples (3) and (4) where aspect is redundant; shading indicates original aspect.

	Impossible	Acceptable	Excellent
(3) Perfective (original aspect)	0	0	83
(3) Imperfective (non-original aspect)	69	12	2
(4) Perfective (non-original aspect)	80	3	0
(4) Imperfective (original aspect)	0	0	83

- (4) *Bogomol'n-aja ženščin-a nikogda ne*
 pious^{-NOM.F.SG} woman^{-NOM.SG} never not
 [*non-original* *obruža-l-a* / *original* *ruga-l-a* ego
 yell^{-PFV-PST-F.SG} / yell^{-IPFV-PST-F.SG} he^{-ACC}
 'The pious woman never **yelled** at him' (Fineeva 2015)

Example (3) describes a unique punctual event that happened at a specific moment in time, which makes Perfective aspect strongly preferred. The categorical negation (literally 'never not') in (4) gives a strong reason to prefer the Imperfective for a situation that is designed to cover all times without limits (rather than specifying a unique event).

Most of the rest of the data (17%) appears in the second line of Table 6, where both the original aspect and the non-original aspect receive high ratings. These items illustrate open construal, since native speakers cannot guess the aspect from context. Examples (5) and (6) illustrate contexts where construal is relatively open, as evidenced in the rating data in Table 8.

Table 8: Ratings of examples (5) and (6) where aspect is open to construal; shading indicates original aspect.

	Impossible	Acceptable	Excellent
(5) Perfective (original aspect)	10	41	32
(5) Imperfective (non-original aspect)	2	25	56
(6) Perfective (non-original aspect)	9	31	43
(6) Imperfective (original aspect)	4	25	54

- (5) *On ume-l nezametno [original vytašči-t' /*
he.NOM know.how.IPFV-PST.M.SG unnoticed pluck.PFV-INF
non-original vytaskiva-t'] den'gi iz karman-a zevak-i.
pluck.Imperf-INF money.ACC from pocket-GEN.SG idler-GEN.SG
 'He knew how **to pluck** the money out of the pocket of an idle onlooker without being noticed.' (Fineeva 2015)
- (6) *Vyži-vš-uju iz um-a*
outlive.PFV-PST.ACTIVE.PTCP-ACC.F.SG from mind-GEN.SG
starux-u nikto vser'ez ne [non-original prinja-l /
old.woman-ACC.SG no.one-NOM seriously not accept-PFV-PST.M.SG
original prinima-l].
Accept-IPFV-PST.M.SG
 'No one **took** the senile old woman seriously.' (Fineeva 2015)

The use of aspect in example (5) depends on whether the speaker wishes to emphasize how successful the pickpocket was at snatching money (Perfective) or how continuously he stole money (Imperfective). In example (6) the Perfective construal emphasizes a single event (in this case, ignoring the woman when she accused her son-in-law of stealing from her), whereas the Imperfective emphasizes more a general disregard for the claims of a senile old woman.

For the remainder of the data (2%), most native speakers simply disagree with the authors of the texts. Aspect is largely redundant here as well, even though the authors of the original texts chose the aspect that was less popular among the participants. Examples (7) and (8) illustrate test items of this type, and their ratings are summarized in Table 9.

- (7) *[original Poš-l-i / non-original š-l-i] my [original poš-l-i /*
go.PFV-PST.PL go.IPFV-PST.PL we go.PFV-PST.PL
non-original š-l-i], ja už tak v
go.IPFV-PST.PL I.NOM already thus in
princip-e ponja-l-a, što estestvenno do konc-a
principle-LOC.SG understand.PFV-PST-F.SG that naturally to end-GEN.SG
my peškom ne dojd-ëm.
we.NOM on.foot not go.all.the.way.PFV-FUT.1.PL
 'We **set off, walked a little**, I already knew of course that we wouldn't make it all the way on foot.' (Anonymous 2016)

Table 9: Ratings of examples (7) and (8) where participants disagree with authors⁶; shading indicates original aspect.

	Impossible	Acceptable	Excellent
(7) Perfective (original aspect)	91	6	2
(7) Imperfective (non-original aspect)	1	1	97
(8) Perfective (non-original aspect)	0	8	70
(8) Imperfective (original aspect)	20	39	19

- (8) *Snačala ja zapolni-l anket-u,*
 first I.NOM fill.out.PFV-PST.M.SG form-ACC.SG
prišē-l tuda, xote-l uže
 come.PFV-PST.M.SG there want.IPFV-PST.M.SG already
 [*non-original* *sda-t'* / *original* *sdava-t'*], no *mne skaza-l-i,*
 submit.PFV-INF submit.IPFV-INF but I.DAT tell.PFV-PST-PL
čto tam čto-to, čego-to ne
 that there something.NOM something.GEN not
xvata-et, čto, nu, kak vseгда.
 suffice.IPFV-PRS.3.SG which well as always
 'First I filled out the form, walked up and wanted to just **submit** it, but I was told that this and that was missing, which, you know, is how it always is.' (Cienki and Iriskhanova 2014)

There are no test items for which native speakers found neither form (original, non-original) to be suitable in the given context, and thus no data in the last line of Table 6.

Table 6 tells an important story about redundancy and open construal. The meanings available for construal have to come from somewhere, so it is reasonable that they are anchored in uses where the construal, though of course present, is redundant. In a usage-based model, this means that the construal associated with, say, the Perfective aspect, is entrenched through repeated exposure to examples where the construal is unmistakable due to the presence of other cues in the context that align with that construal. This entrenchment makes the construal of Perfective robust enough to be capable

⁶ The numbers for example (7) in Table 9 refer only to the sentence-initial choice of verb forms, not to the repeated form after the pronoun.

of expressing Perfective meaning even when there are no other cues to Perfective available in the context. However, these two characterizations, one of a situation where aspectual markers are redundant, and the other of open construal of aspect so that the speaker can choose what to emphasize, are extreme idealizations. In reality, there is a continuum of distribution of ratings in this data. Nearly all examples involve some balance between redundancy and open construal, with most examples reflecting a heavier portion of redundancy than open construal. Redundancy is the norm, and probably sets the standard for what the usually redundant aspectual markers can express in contexts that allow open construal. While it remains to be proven, it is conceivable that this kind of relationship between redundancy and open construal is common among languages of the world.

5 Agreement/disagreement across speakers

There is mounting evidence that, instead of converging on a single grammar, native speakers can disagree on what is grammatical in their language and differ widely in their attainment of their native language. The present study contributes to this evidence, and further shows that differences in acceptability ratings are much more pronounced when speakers are presented with unattested language (items that do not match authentic original texts) than with attested language.

Dąbrowska (Dąbrowska 2008, Dąbrowska 2012, Dąbrowska 2013, Dąbrowska 2015; Street and Dąbrowska 2010) has shown, through a series of experiments on native speakers of Polish and English, that native speakers exhibit differences in their grammars. Native speakers can have different strategies for understanding the same grammatical phenomena (for example abstract schematic rules vs. low-level rules vs. memorization of exemplars), yet still produce the same forms, and thus be said to “speak the same language”. Native speakers can also differ in how well they master the grammatical categories of their native language. These differences span various kinds of grammatical phenomena, including morphology and syntax. Dąbrowska (2015: 661–662) attributes such individual differences to both cognitive and environmental factors. In other words, differences can result from differences in inherent ability and also from differences in the language that people are exposed to: the precise input of course varies from person to person, and there are overall differences in the quantity and quality of language exposure that are tied to socio-economic status. Verhagen and Mos (2016) report that both inter-speaker and intra-speaker

(measured at an interval of 2–3 weeks) variation in the rating of the familiarity of multiword units can be high, yet when the responses of 86 individuals are averaged, the result is stable.

Variation in our data is influenced by whether the item being rated appeared in the original text or not. When native speakers rated the item that originally appeared in the text (the aspect matching that in the authentic text), they tended to agree that the item was “Excellent”. We see this, for example, in the ratings in Table 7 for examples (3) and (4). In example (3), the original aspect was Perfective, and all 83 participants rated the Perfective form as “Excellent”. In example (4), the original aspect was Imperfective, and all 83 participants rated the Imperfective form as “Excellent”. However, when native speakers rated the non-original aspect (the aspect opposite to the one in the authentic text), they often chose a wide range of ratings, as we see in the ratings of non-matching items in Tables 7 and 8. Example (9) and Table 10 show an extreme example of lack of agreement among participants for the non-original verb form.

Table 10: Ratings of example (9); shading indicates original aspect.

	Impossible	Acceptable	Excellent
(9) Perfective (non-original aspect)	24	25	23
(9) Imperfective (original aspect)	2	13	57

- (9) *Fag-ov* [*non-original* *podverg-l-i* / *original* *podverga-l-i*]
 phage-ACC.PL subject.to.PFV-PST-PL subject.to.IPFV-PST-PL
polnogenomn-omu sekvknirovani-ju
 full.gene-DAT.N.SG sequencing-DAT.SG
 ‘The phages **were subjected to** full-gene sequencing’ (Markov 2016)

While speakers mostly agreed that the original aspect in example (9), the Imperfective, was “Excellent” or “Acceptable”, the rating of the non-original aspect, the Perfective, is completely split across the three options.

One way of measuring the degree of agreement/disagreement across participants is to look at the standard deviation in the rating of each item, since a larger standard deviation will indicate greater diversity of responses. Figure 2 visualizes the distributions of standard deviations for the responses to the original tokens vs. the non-original tokens of the opposite aspect, showing that responses to the originals were different from those to the non-originals

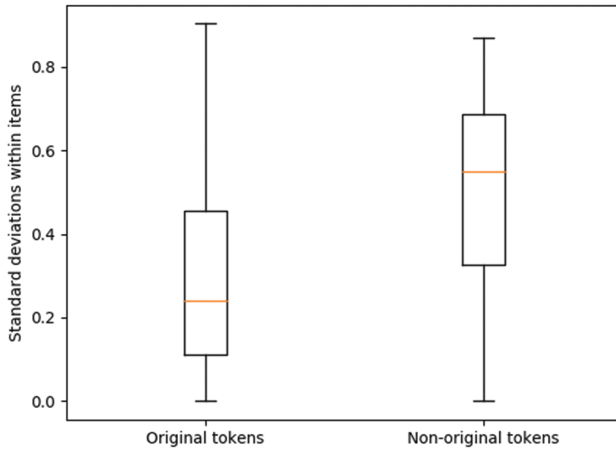


Figure 2: Distributions in standard deviations of ratings for original vs. non-original items.

also on this measure. The mean standard deviation for original items was 0.286, whereas the mean standard deviation for the non-original items was 0.497, and a paired t-test shows that this difference is significant (test-statistic = -17.630 , $p=2.9e-57$).

We find that native speakers can differ in their ratings of Perfective and Imperfective verb forms in Russian. This finding is in line with other experimental evidence showing individual variation in the grammars of native speakers. In addition, we find that native speakers are more consistent in giving positive ratings for the original tokens, whereas they are less consistent in their ratings of the non-original tokens. This may indicate that native speakers are more reliable in reacting to authentic language than in reacting to language that has been manipulated (in this case, by suggesting an aspectual form that does not match the original text). This result may also have implications for how much linguists can rely on the intuitions of native speakers in reaction to constructed “examples” as opposed to authentic ones.

6 Conclusions

Aspect is one of the most pervasive and characteristic grammatical categories in Russian, requiring its speakers constantly to choose between Perfective and Imperfective. Our survey of the rating of Perfective and Imperfective verb pairs in full, authentic contexts shows that this choice is

anything but simple and invariable. We find that in 81% of examples, native speakers can fairly reliably retrieve the original aspect, and that they can do this regardless of whether there is an identifiable “cue” word for aspect in the context. Now that a sample of contexts where aspect is largely redundant has been identified, it is possible to engage in a search for other cues in these contexts beyond the known cues, which have extremely low cue availability. In 17% of contexts, native speakers accept both aspects. The discovery of these distributions and the norming of concrete examples along the scale from categorical grammaticality difference (correct/incorrect) to free variation is a valuable contribution to our knowledge about the behavior of aspect in Russian. These findings can serve as the basis for further research using methods of experimentation and machine learning to ferret out the as-yet unidentified contextual cues to aspect. If such cues can be uncovered, this could have far-reaching implications for both natural language processing and language pedagogy.

The data from our study reveal in a concrete way the relationship between redundancy and open construal, which has not previously been studied empirically. The distribution of ratings described in Section 4 is compatible with the interpretation of redundancy and open construal as co-existing in a continuum. The meanings associated with the two alternative construals offered by Russian aspect are always available, but their salience and independence from context vary. At one end of the continuum, the meanings of Perfective vs. Imperfective are strongly anchored by context, highly redundant, and the choice of aspect is tightly constrained. This end of the continuum is also its center of gravity, the place where most uses are observed and most entrenchment is expected. At the other end of the continuum, construal breaks free from context and operates independently, without the support of redundancy. In these uses, the speaker can deploy aspect to manipulate nuances of meaning, with the option of representing the “same” content in two slightly different ways, emphasizing either the discreteness of the situation as Perfective or its fluidity as Imperfective. Between these two extremes there are varying degrees of redundancy and freedom of construal. It is likely that construal actually needs the redundant uses to empower it to operate on its own when redundancy is reduced. Our data are restricted only to the relationship between redundancy and open construal for Russian aspect; it remains to be seen whether this relationship can be confirmed for other grammatical distinctions and other languages.

Our data also confirm that there are differences among native speakers, revealing a consistent bias toward less variation in response to an attested (naturally occurring) example than to a non-attested (manipulated and possibly

unnatural) example. This suggests that native speakers may be more reliable in reacting to authentic language stimuli than in reacting to language stimuli constructed for experimental purposes (even when such language is merely a slight modification of authentic language). This may mean that linguistic experiments involving constructed stimuli could be subject to a certain bias, but this is a topic for future research.

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