BRILL

Morphological Bottleneck: The Case of Russian Heritage Speakers

Anna Mikhaylova
The University of Queensland
a.mikhaylova@uq.edu.au

Abstract

The Bottleneck Hypothesis (Slabakova, 2008) assumes functional morphology to be a particular challenge in second language (L2) acquisition whereas acquisition of syntax and semantics to be unproblematic. I propose, following Polinsky (2011), that functional morphology can be seen as an acquisitional bottleneck for heritage language (HL) speakers as well. Russian verbal aspect is known to be problematic in bilingual Russian children (Anstatt, 2008; Gupol, 2009), in adult foreign language learners (Slabakova, 2005, Nossalik, 2009) and in Russian heritage speakers of low (Polinsky, 2008) and even near-native fluency (Laleko, 2010).

This comprehension study tested fluent and literate English dominant HL speakers of Russian on their interpretation of lexical and grammatical aspect. The findings suggest that the semantics and syntax of aspect were unproblematic, but aspectual morphology played both a facilitative and a hindering role in the comprehension of aspectual distinctions. In the untimed Semantic Entailments task, where participants chose the most logical continuation of an utterance, the morphological complexity of secondary imperfectives coupled with their semantic complexity, hindered HL interpretations. In contrast, in the Stop-Making-Sense self-paced reading task, in which participants read sentences one word at a time, the idiosyncratic morphology marking lexical aspect hindered HL processing, while the regular mechanism of marking grammatical aspect facilitated it.

Keywords

lexical aspect – grammatical aspect – morphological bottleneck

1   Introduction

Depending on sociolinguistic circumstances, including family composition, time of immigration and linguistic background of their caregivers, heritage language (HL) speakers may differ in the amount and length of exposure to the heritage language. Despite exposure from birth, by adulthood the heritage language may become the weaker language and the dominant language of the society may be the stronger language of this type of early bilingual. Unsurprisingly, the specific circumstances of the language contact situation in which these bilinguals find themselves bear a direct influence on the access/exposure to, fluency in, and role of the two languages in their linguistic repertoires.

  In this paper I argue that, due to limited domains of language input and use, heritage language acquisition shares some characteristics with adult second language (L2) acquisition, and that, therefore, current scholarship on L2 acquisition can offer valuable theoretical and methodological insights into the nature of linguistic knowledge heritage speakers develop (see also Montrul, 2004, 2005, 2008a,b). I then show that Russian verbal aspect presents a good testing ground for the outcomes of the acquisition of Russian aspect in a Russian-English dual language context. Finally I outline the methodology and discuss the results of two experimental comprehension tasks targeting fluent and literate heritage speakers of Russian compared to age-matched monolingual controls.

2   Heritage Language Acquisition on the L1–L2 Acquisition Continuum

Having been exposed to the language naturalistically from birth like monolingual (L1) children, heritage language speakers may be expected to develop native-like linguistic proficiency. However, due to socio-linguistic circumstances, many HL speakers receive neither sufficient exposure to linguistic input that is rich in quality and quantity nor ample opportunity to use their first language (Montrul, 2008; Rothman, 2007). Immigrant families are often under a strong pressure to assimilate. Their interaction patterns and practices both within and outside the family may gradually change, eventually reducing the input and use of the family language to a bare minimum. Since there is little, if any, academic support for the HL during the school years, by adolescence and young

adulthood very few heritage speakers manage to acquire age-appropriate academic literacy skills in the language. As a result, it is often difficult to assess the heritage speakers' overall language proficiency, since they often appear fluent and do well on oral and aural tasks but struggle on tasks that are literacy-based and involve metalinguistic knowledge of the language (e.g., as found by Montrul, 2009, among others).

2.1 *Morphological Variability in Heritage Russian*

If we turn our attention to Russian in contact with English in particular, several empirical studies point to problems with functional morphology, i.e., problems with gender, case and aspect, for Russian HL speakers. Polinsky (1997, 2000) documented the following features of American Russian in non-fluent heritage speakers, who are not literate in Russian. Their lexical knowledge is characterized by the inability to understand shades of meaning and code-switching to English to fill lexical gaps as well as difficulty of lexical retrieval in naming tasks, which is accompanied by slow tempo of speech and excessive pausing. On the level of morphology, these HL Russian speakers appear to have a disintegrated case system (exhibiting a shift from six cases to two in production); loss of verbal and nominal reflexives; loss of the conditional particle *li* 'if/whether' and use of *esli* 'if/under the condition' (likely caused by transfer from English *if*); general increase in the use of analytical forms; and lexicalization of aspect. In clausal syntax, there is deterioration of verbal agreement and frequent occurrence of subject resumptive pronouns. In complex sentences, one can find, among other features, increase of pronominal anaphor; absence of gapping or deletion of the predicate under co-predication or clause linkage. Schmitt (2000, 2001) also documented a restructured case system analyzing the code-switching patterns in HL children. Also, Polinsky (2008a) found that illiterate non-fluent adult heritage speakers operate with a reduced gender system, retaining only masculine and feminine gender and losing the neuter, not only in production, but also in comprehension.

There is somewhat conflicting evidence of the aspectual knowledge of heritage speakers. Illiterate non-fluent speakers seem to have a reduced repertoire of aspectual morphology in production, retaining only one arbitrary morphological form to encode both perfective and imperfective meaning (Polinsky, 2008b). Advanced HL learners in Isurin and Ivanova-Sullivan's (2006) production study made few functional morphology errors: only 2.4% for case and 4.1% for aspectual morphology. And Laleko's (2008, 2010) advanced heritage speakers maintained error-free production, but still had a narrower repertoire for production of the imperfective (avoidance of the imperfective in

some contexts) and a different range of interpretations of the imperfective than monolingual controls.

The persistent non-convergence with the monolingual baseline in adult HL speakers could be explained either by *forgetting/attrition/loss* or *incomplete acquisition of* their first language (Silva-Corvalán, 1994; Polinsky, 1997, 2006, 2011; Montrul, 2002, 2006a, b, 2008). Although the latter terms have often been used interchangeably to describe both the process and outcome of bilingual language acquisition, a clarification for the purposes of the present study is necessary. *Attrition* usually describes an eroded L1 grammar, likely post-puberty, which at some point before the onset of erosion was completely developed and, arguably, stable. In this sense, attrition refers to possible outcomes of late bilingualism. Alternatively, L1 attrition can refer to the loss of a particular language property after that property (rather than the whole linguistic system) had been fully acquired. This type of attrition, along with incomplete acquisition, is a possible outcome of HL acquisition as a type of early bilingualism. However, it is extremely difficult, if not impossible, to differentiate incomplete acquisition from childhood attrition without longitudinal and cross-sectional experimental data (Polinsky, 1997, 2006; Montrul, 2008).[1] So, in this study I will follow Montrul (2008a: 21) and use the term *incomplete acquisition* broadly to refer to "a mature linguistic state, [which is either] the outcome of language acquisition that is not complete OR[2] attrition in childhood."

Thus, HL acquisition, or language acquisition in a dual-language context (Montrul, 2008), may result in a reduced linguistic system in comparison to that of a monolingual adult or of a bilingual adult who is dominant in the target language. What becomes an interesting object of linguistic inquiry is which components of semantic, syntactic and morphological knowledge are fully acquirable under reduced exposure and use and which may be more vulnerable, i.e., which may have not developed fully or may have fossilized in some non-target-like way even in high proficiency learners. In this sense, HL acquisition may be comparable to L2 acquisition and the theoretical and

---

1   Polinsky (2011) is one such study, which tested knowledge of Russian relative clauses in heritage children and adults. The findings suggest attrition, at least with respect to the tested phenomenon, because HL children and L1 children and adults behaved indistinguishably, all outperforming adult heritage speakers. Whether other attested areas of non-convergence are truly a result of childhood attrition or incomplete acquisition is difficult to determine at this point.

2   Capitalization added by me for emphasis.

experimental lens used to study the latter may be useful in analyzing the former.

2.2 *Explanations of Morphosyntactic Variability in L2 Acquisition*

There are well-documented differences in the processes and outcomes of L1 and post-puberty second/foreign language acquisition. While the former in normally developing children is typically *complete* and *successful*,[3] the latter is often variable and incomplete. Variation and the developmental errors observed in monolingual children as they restructure their intermediate grammars to match the target parameters are usually overcome by adulthood. In contrast, adult L2 acquisition, especially at early stages and in low proficiency speakers, shows a great deal of variation and even advanced proficiency/end state speakers often retain indeterminate intuitions and optionality in production. In other words, adult L2 learners often reach the stage of fossilization in their interlanguage development (Selinker, 1972).

In the past three decades, a number of studies of L2 variability and fossilization (Haznedar and Schwartz, 1997; Lardiere, 2005; Prévost and White, 2000) have shown that overt functional morphology, which is a well-attested problem for L2 production, may be dissociated from abstract syntactic knowledge both in intermediate and end-state interlanguage grammars and that linguistic performance is not an accurate reflection of linguistic competence. These studies have found that frequent instances of missing inflectional morphology in spontaneous production are not due to non-target abstract grammatical representations but due to problems in accessing the grammatical representations under the pressure of the oral production task. Under this view, the omission and/or non-target use of functional morphology is seen not as a representational deficit, but rather as a mapping problem, i.e., the (in)ability of the L2 learner to map morpho-phonological form to formal syntactic and semantic features in production.

---

3   While slight variation is present even among adult native speakers of the same language, their linguistic systems are believed to be constrained by the same principles. Benmamoun, Montrul and Polinsky (2011: 6) define the results of L1 acquisition in the following way. For normally developing children exposed to a particular language from birth and having full and uninterrupted access to its input and opportunity to use it, native language acquisition amounts to attaining, by adulthood, "a fully developed system for the production and processing of the phonological, morphological, syntactic and discourse patterns of their languages." If *complete*, native language acquisition results in "capacity to use and process their language in all its richness and complexity."

The Interface Hypothesis proposed by Sorace (2000) predicts that even near-native speakers are expected to have residual optionality in production tasks and/or indeterminacy of judgments in comprehension tasks testing L2 properties that involve integration of syntactic knowledge with pragmatic, semantic, and other types of information (while narrow syntactic knowledge is presumably acquirable). A later version of this hypothesis (Sorace, 2011) builds on some evidence from several studies (e.g., Sorace and Filiaci, 2006; Sorace and Serratrice, 2009; Tsimpli and Dimitrakopolou, 2006) to clarify that external interfaces integrating syntax and other cognitive domains, and specifically discourse, result in greater difficulty for L2 acquisition than the internal interfaces between syntax and the internal linguistic modules (lexicon, morphology, semantics, phonetics/phonology).

Another recent explanation of morphological variability, which applies to both production and comprehension and is in line with the basic tenets of the mapping problem view is Slabakova's (2008) Bottleneck Hypothesis. The Bottleneck Hypothesis assumes that mastering functional morphology is the most difficult task in L2 acquisition and that acquisition of syntax and semantics is unproblematic. This means that acquisition of narrow syntactic knowledge precedes acquisition of morphology in L2 production and comprehension of a second language. The hypothesis also implies that, once the command of inflectional morphology is native-like, it is safe to say that L2 learners also have full command of all its semantic content, both that explicitly taught and that extracted from input. Allowing L1 transfer at the early stages of L2 acquisition followed by gradual restructuring towards the settings of the target language along the lines of Full Access/Full Transfer Hypothesis (Schwartz and Sprouse, 1996), the Bottleneck Hypothesis assumes that narrow syntax and calculations of meaning are universal. However, L2 learners have to go through the inflectional morphology as a bottleneck of acquisition because inflectional morphology reflects syntactic and semantic differences between languages and they need to learn these meaning-form mappings. Slabakova claims that the mapping of correct functional morphological forms to the already acquired syntax and semantics is especially difficult when functional meanings are represented differently in the native and target languages, i.e. by a morpheme in one language and by discourse (e.g. word order, information provided by adverbials, or larger context etc.) in the other. According to this model, syntactic and semantic properties encoded morphologically in both languages are easier to learn compared to properties imposed by the discourse or a variety of lexical means in one language and morphologically in another.

Although specifically formulated with L2 acquisition in mind, the two latter hypotheses could be useful in explaining residual optionality and indeterminacy of judgments in advanced proficiency heritage speakers (see Montrul and Polinsky (2011) on the Interface Hypothesis and Polinsky (2011) on the Bottleneck Hypothesis).

3   Russian Aspect

Due to space limitations, this section provides an overview of only the basics about Russian aspect and the relevant cross-linguistics differences with English. For detailed recent accounts of Russian lexical and grammatical aspect in studies focusing on the acquisition of Russian the reader is referred to Laleko (2010), Nossalik (2009), and Mikhaylova (2012) and references therein.

While there exist several analyses of the category of Russian and Slavic aspect, it is well accepted that *aspect* can be broadly defined as the internal temporal structure of events as described by verbs, verbal phrases (VP) and sentences (Comrie, 1976; Smith, 1991). Aspectual information, as lexicalized or expressed by functional morphology and/or through discourse, shows whether an utterance denotes a completed (terminated) or an incomplete (ongoing or habitual) event.

Lexical aspect (also referred to as lexical class/ Aktionsart/ situation aspect/ VP aspect) is a property of predicates (verbs with their internal arguments), and it refers to the type of situation the predicate expresses. According to Vendler's (1957) classification, there are 4 lexical classes of predicates: *states, activities, achievements* and *accomplishments,* which differ in two types of semantic and, according to Slabakova (2001), among others, syntactic characteristics, i.e., *telicity* and *dynamicity* (Table 1).

TABLE 1   *Vendler's (1957) verb classes.*

	non-dynamic	dynamic
[−telic]	STATE *know, hate, want*	ACTIVITY *read* (*letters*), *run laps, bake bread*
[+telic]	ACHIEVEMENT *recognize, die, find*	ACCOMPLISHMENT *read those letters, run a lap, bake a loaf*

Vendler's lexical classes can be grouped based on the semantic features they share. His *states* and *achievements* are *non-dynamic* because they describe instants (Rothstein, 2004) and thus lack the dimension of process. In contrast, *activities* and *accomplishments* are processes that apply to intervals rather than instants and are thus *dynamic*. If predicates are grouped based on the presence/absence of inherent limits after which the event cannot continue, Vendler's *achievements* and *accomplishments,* which have inherent limits, are [*+telic*], and *states* and *activities,* which have no inherent limits*,* are [*–telic*].

Following Slabakova (2001, 2005a, b),[4] I assume that in English and Russian non-dynamic verbs (*states* and *achievements*) telicity is specified in the lexicon (lexicalized), i.e., achievements are marked as [+telic] and states as [–telic]. However, dynamic *activities* and *accomplishments* taking incremental theme are underspecified in the lexicon as [α telic], i.e., the predicate containing the verb gets its telicity value compositionally (in derivation) as a combination of the denotational meaning of the root and the morphological structure of the whole predicate. English relies on the direct object for compositional telicity marking: if a dynamic incremental theme verb is followed by a mass or bare plural noun the predicate is [–telic] (1b), while a predicate containing the same verb followed by an object overtly modified by a determiner, possessive or quantifier receives a [+telic] value (1a).

(1) a. *Nick read the/three/those letters*   ← [+telic]
     b. *Nick read Ø letters*   ← [–telic]

Grammatical aspect (also referred to as Sentential Aspect, viewpoint aspect and IP aspect) reflects different ways of viewing the internal temporal constituency of an event. The *Perfective* can be considered as a framing of the event as a completed whole, as if viewing it from outside (1a, 2a). In contrast, the *Imperfective* can be understood as a framing of the event with no regard to its final boundary, as if from the inside (1b, 2b). This difference in the lens applied to event boundaries is closely related to the semantic feature

---

4 Slabakova's (2001) analysis is largely based on Distributed Morphology a la Halle and Marantz (1993) and, of course, is only one of the possible analyses of Russian Aspect. This analysis is largely comparable to that of Nossalik (2008, 2009), with some important differences. Nossalik acknowledges a telicity parameter as an important difference between Russian and English but offers a different syntactic mechanism and different syntactic structure for achievements.

boundedness. In short*,* the feature *boundedness*, unlike telicity, refers to whether, at the reference time, the event has reached its actual endpoint. The full aspectual interpretation of the clause is achieved as a combination of *telicity* and *boundedness*. For example, two events can be both [+telic], yet different in grammatical aspect (as 2a and 2b). Similarly, they can be both *Perfective*, yet differ in lexical aspect (as 2a and 2c).

(2) a. *Nick read the/three/those letters.*   ← [+telic; +bounded], *Perfective*
     b. *Nick was reading the/three/those*   ← [+telic; –bounded],
        letters.   *Imperfective*
     c. *Nick read letters.*   ← [–telic; +bounded], *Perfective*

Thus, the *Perfective-Imperfective* distinction essentially refers to the [+bounded]/[–bounded] nature of events, i.e. describing whether the event is viewed as completed or not. This distinction has nothing to say about the type of situation denoted by the predicate, i.e., of its lexical class. For example, the sentences in (2) describe three distinct events; however, some pairs of predicates contrast in lexical aspect and others in grammatical aspect. Sentences (2a) and (2b) denote the same type of [+telic] situation, but differ in their boundedness and, therefore, grammatical aspect. In contrast, (2a) and (2c) are both [+bounded], and therefore *Perfective,* but differ in telicity.

Languages may overlap or differ in the ways they mark a particular aspectual distinction. For example, in both Russian and English non-dynamic verbs are specified for telicity in the lexicon. In English, dynamic verbs acquire a telicity value depending on the form/type of the direct object. In contrast, in Russian dynamic verbs, regardless of the form of the object, telicity is marked by verbal morphology: a prefixed verb (3a) is [+telic], and if the same verbal stem is used without a prefix (3b), it is [–telic].

(3) a. *Kolja   pro-čita-l   (eti)   pis'ma*   ← [+telic]
        Kolja   PF-read-PAST   (these) letters
        'Kolja read (these) letters.'

     b. *Kolja   čita-l   (eti)   pis'ma*   ← [–telic]
        Kolja   read-PAST   (these) letters
        'Kolja read (these) letters.'

As far as the mechanism for marking grammatical aspect is concerned, both English and Russian resort to verbal marking for the imperfective, albeit with

important differences.[5] An ongoing event (2b and 4b) in both languages is marked by imperfectivizing operators (*–ing* and *–(y)va-*, respectively), while completed [+bounded] events usually remain unmarked by overt aspectual morphology (2a and 4a).

(4) a. *Kolja   pere-čita-l*   (*eti*)   *pis'ma* ← [+telic; +bounded], *Perfective*
         Kolja   PF-read-PAST   (these) letters
         'Kolja reread these letters.'

     b. *Kolja   Pere-čit-yva-l*   (*eti*)   *pis'ma* ←[+telic; –bounded], *Imperfective*
         Kolja   PF-read-IMPF-PAST (these) letters
         'Kolja was rereading these letters.'

However, in contrast to English *–ing,* which can appear on both [–telic] and [+telic] predicates to encode ongoing events, the Russian secondary imperfective (SI) suffix *–(y)va-* is allowed only on [+telic] verbs. At the same time the SI suffix can encode both a single ongoing event and a series of completed events (i.e., it also can denote a habitual/iterative event) as well as, in some discourse contexts, a general factual and an annulled action meaning. In other words, *–(y)va-* is both more restricted in where it can appear and less restricted in the meanings it can encode.

Since Russian marks both lexical and grammatical aspect on the verb, almost all Russian verbs are traditionally viewed, and taught, as members of morphologically distinct aspectual pairs, each consisting of a perfective and imperfective counterpart. With the exception of some pairs formed via *suppletion*, *prefixation* and *SI suffixation* are the main active mechanisms for the formation of aspectual pairs. The term pair, however, is a bit of a misnomer. For example, while the lexically specified [+telic] achievement verb *dat''give'* participates in one *boundedness* contrast, forming one pair (5a), notice that a

---

5 There are two types of aspectual morphemes that are excluded from discussion since they are not the object of this study. Like prefixes, a semelfactive suffix *-nu-* can create a perfective member of an aspectual pair (*prygat' – prygnut' 'to jump – to jump once'*). However, the status of *nu-* (and semelfactives) and the delimitative *po-* is not straightforward, since in some accounts *po-* is considered a telicizing morpheme while in others a marker of grammatical aspect. There are instances where delimitative prefixes *po-* and *pro-* may be used on atelic verbs as boundedness markers rather than telicity markers in sentences like the following:
      On po-rešal zadaču, not tak ee i ne rešil.
      'He spent a little time solving the problem, but did not solve it.'

derived *accomplishment* verb like *do-pisat'* 'finish writing' forms an aspectual triplet (i.e. participates in two aspectual pairs) as in (5b–c).

(5) a. *dat'*   –   *da-va-t'*
        give   *give*-IMPF
        'to give – to be giving'

     b. *pisat'*   –   *do-pisat'*
        write   PF-write
        'to write – to finish writing'

     c. *do-pisat'* –   *do-pis-yva-t'*
        PF-write   PF-write-IMPF
        'to finish writing – to be finishing writing'

Which verbs can form aspectual triplets depends on the constraints imposed by the lexical aspect of these verbs: only dynamic activity-accomplishment verbs are capable of forming triplets precisely because they do not carry a fixed telicity value without the information supplied by other components of the predicate. The [αtelic] verbal root *-pis-* can surface in a (primary imperfective) [–telic;-bounded] activity *pisat'* and in a [+telic; +bounded] perfective accomplishment *do-pisat'*. These two predicates differ in both telicity and boundedness. Since *do-pisat'* can undergo secondary imperfectivization and become [–bounded] with the help of the SI suffix, another aspectual contrast is possible. These predicates differ in boundedness only. In contrast to the roots of dynamic verbs, the root of the non-dynamic verb *dat'* is stored in the lexicon as [+telic], and, therefore, can only participate in one aspectual pair (with a secondary imperfective counterpart, which has the same telicity value).[6]

---

6   While morphologically derived pairs like *prodat' – prodavat'* 'sell', based on this same root seem to be formally similar to pairs like *dopisat' – dopisyvat'* 'finish writing', the historic derivation of the *achievement dat'* into *prodat'* did not change the telicity value of the verb. In addition the prefix changed the lexical meaning of the verb so much that [+telic; +bounded] dat' and [+telic; +bounded] prodat' cannot be considered an aspectual opposition. However see Paducheva's (2008) discussion, among others, of the fact that many of the derivatives of the activities like *pisat'-napisat'/dopisat'/perepisat'*/etc can be considered to be in [–telc; –bounded/+telic; +bounded] aspectual opposition since prefixation in this case changes the lexical class of the original verb.

3.1 *Predictions for Potentially Incomplete Acquisition*

To sum up the relevant facts in the previous section, the feature of lexical aspect, *telicity,* encodes the presence/absence in a predicate of an inherent limit of the event. The feature of grammatical aspect, *boundedness,* indicates that the event described by the whole sentence has reached its actual limit. In English verbs with incremental theme that are not specified for telicity in the lexicon, telicity is marked by an overt marker modifying the object and boundedness (for ongoing meanings) is marked by verbal suffixes. In Russian, both aspectual features are overtly marked on the verb, but by different morphemes: telicity by prefixes and boundedness by SI suffixes. Thus, based on these facts alone, there is the potential for cross-linguistic transfer by HL speakers in calculating the telicity value of the predicate, i.e. paying attention to the form of the object instead of the telicizing prefix.

If we turn to the two hypotheses making predictions for the outcomes of potentially incomplete acquisition, the cross-linguistic differences between Russian and English aspect make a good testing ground for both the Interface Hypothesis (Sorace, 2011) and the Bottleneck Hypothesis (Slabakova, 2008) in high proficiency learners. The former would predict that lexical aspect, which involves only internal interfaces (syntax-morphology, syntax-semantics and morphology-semantics) should be easier to learn than grammatical aspect, which involves a syntax-discourse interface. And the Russian Imperfective would be predicted to elicit more indeterminate judgments than the Perfective precisely because it involves the knowledge of discourse conditions under which the imperfective form is mapped to an ongoing or habitual interpretation and especially to a completed event interpretation.

However, the Bottleneck Hypothesis would not necessarily discard a potential difficulty in the internal interfaces, specifically syntax-morphology and syntax-semantics. Outlining the Bottleneck Hypothesis, Slabakova (2008: 111) provides four reasons why acquisition of L2 functional morphology may be difficult for an L2 learner, all of which apply to learning the differences between Russian and English mechanisms of marking verbal aspect, and especially to differences in lexical aspect (telicity) marking.

First, a functional meaning may be represented on two different lexical categories in the L1 vs the L2. In activity/accomplishment verbs telicity is encoded by verbal prefixes in Russian and as an overt modifier on the direct object in English. In other words, one needs to attend to the determiner/quantifier modifying a noun in English and to the verb in Russian. Second, the L1 and L2 may encode a functional meaning in different types of functional morphology. Again, in order to calculate the telicity value of activity/accomplishment verbs,

one needs to pay attention to a bound verbal morpheme in Russian and a free determiner/quantifier morpheme in English.

Third, the language may have special discourse conditions under which certain morphological realizations are associated with a different functional meaning than when those discourse conditions do not apply. Only adverbial modification and/or discourse context determine whether Russian imperfectives are describing an ongoing or habitual action or whether they indicate the less likely general factual or reversed action meanings. That is, completed events in Russian in some meanings can be described using perfective forms (default) and also imperfective forms (the general factual imperfective). In addition, the iterative/habitual past meaning in English is expressed by the simple past tense, while in Russian, it is expressed by the SI marker or a zero morpheme. The ongoing past meaning is expressed by *–ing* in English, which is dedicated to that meaning, while in Russian *-yva* shares the ongoing and habitual meanings.

Finally, certain phonological and morphological environments may cause a functional form with a constant meaning to have varied expressions. Telicity in Russian can be expressed by a range of polysemantic prefixes, some of which may impart additional lexical meanings to the derived verb. The Secondary Imperfective suffix (*–y)va* is quite productive; however, some verb stems may require *-a/-ya* alteration of the root vowel, stress shift, or even suppletion. With all the above in mind, morphological mechanisms in both lexical and grammatical aspect may present a bottleneck in the acquisition of Russian by English-dominant speakers.

3.2   *Acquisition of Russian Aspect*

Russian aspect has been shown to be difficult in a range of populations: monolingual and bilingual children, adult L2 learners and adult HL speakers. In recent years, the acquisition of Russian aspect has been studied in various acquisition scenarios: among monolingual children (Kazanina and Phillips, 2007; Stoll, 2005; Anstatt, 2008, among others), adult L2 learners (Slabakova, 2005a,b; Nossalik, 2008, 2009; Martelle, 2011), and HL speakers (Polinsky, 2008b; Laleko, 2008, 2010). Many of these studies point to asymmetries in the acquisition of Russian aspectual phenomena and challenges presented by its rich aspectual morphology.

The full range of aspectual meanings and forms may not be fully acquired before age seven, in both monolingual and bilingual contexts. For example, Russian L1 children (ages 2;6–6;9) correctly matched perfective verbs with completed actions and never with incomplete actions, but some were non-convergent with L1 adults in the interpretation of imperfective sentences

denoting an incomplete action (Kazanina and Phillips, 2007). In the child HL context, acquisition of Russian aspect may be incomplete or even followed by attrition due to early shift to another language. Russian-Hebrew bilingual children (ages 4–8) acquired the inventory but not the full range of function of inflectional and derivational morphology (Gupol, 2009). Russian-German bilingual children (ages 4–10) made few aspectual errors, mostly using perfective in imperfective contexts; errors increased at age seven (Anstatt, 2008). In child acquisition data, the morphological imperfective (i.e., [–bounded] in our terms) presented a greater difficulty for child acquirers. However, since neither of these studies targeted acquisition of particular morphological mechanisms of aspect marking, it is not clear how the acquisition of aspectual semantics correlates with aspectual morphology.

There is also evidence that adult HL speakers might have a restructured aspectual system. Non-fluent English-dominant Russian HL speakers fail to use aspectual morphology to signal aspectual contrasts and produce both morphological imperfective and perfective interchangeably, regardless of intended interpretation (Polinsky, 2008b). Highly fluent English-dominant Russian HL speakers, even when production is error-free, use and interpret aspect differently from the L1 baseline, differing mostly in the production rate and interpretation of morphological imperfectives at the syntax-discourse interface (Laleko, 2010). Again, these studies did not test whether/how the acquisition of telicity and boundedness correlate with morphological mechanisms of aspect marking.

The few studies of adult foreign language acquisition of Russian aspect (L2 acquirers) have shown that morphology is the primary problem for L2 learners. Intermediate and advanced L2 learners know the syntax and semantics of aspect marking but have trouble mapping it to correct morphological form (Slabakova, 2005b; Nossalik, 2009).

4   Method

Most studies of the acquisition of Russian aspect to date have used different methodologies to test knowledge of telicity and boundedness, so it is difficult to tell if (potentially incomplete) acquirers have trouble with telicity and boundedness to the same degree. The only study that has looked into the comprehension of both lexical and grammatical Russian aspect (Nossalik, 2009) used different methods of tapping into the knowledge of the two semantic features and focused only on the L2 acquisition context.

While for some scholars inconsistent *use* of inflectional morphology signals incomplete acquisition or loss of a grammatical category, exclusive reliance

on production data leaves unaddressed the participants' ability to *interpret* aspectual information and judge the grammaticality of sentences containing grammatical incongruences. Several studies devoted specifically to the acquisition of aspect suggest that monolingual children in early stages of language acquisition and even highly proficient heritage speakers may have error-free production, but still behave differently from adult monolinguals in comprehension. In contrast, production errors may coexist with native-like ability to interpret aspectual contrasts.

This study uses the same methodology to compare comprehension of both telicity and boundedness contrasts. This is the first study to date to investigate the role of morphological mechanisms of aspect marking in the comprehension of telicity and boundedness contrasts in adult English-dominant heritage speakers of Russian. More specifically, the Semantic Entailments Task taps into semantic knowledge and tests the ability of heritage speakers to assign the most salient entailments to sentences contrasting in one aspectual morpheme. The Stop-Making-Sense Task tests their ability to parse and detect sentences containing an aspectual incongruence when the semantic interpretation is aided by a disambiguating adverbial but high working memory load may inhibit the ability to correctly interpret the sentence.

In both experimental tasks, all the items were based on vocabulary from *Golosa* (Robin, 2003), Volumes 1–2, a popular textbook for college level beginner and low-intermediate level courses. Since I was looking for effects of both types of aspectual morphological markers on the interpretation of predicates with the same type of verb stems, I selected dynamic verbs which allowed both prefixation and secondary imperfective (SI) suffixation. All the target items with verbs undergoing SI-suffixation were controlled for phonological transparency.

4.1　*Participants*

The baseline group for the study (L1) consisted of 30 monolingual native speakers of Russian, tested in Russia. To control for possible meta-linguistic awareness, all monolingual native speakers were college students without

TABLE 2　*Age of the participants at the time of study.*

Group	N	Mean (range)	SD
L1	30	21 (16–40)	5.47
HL	22	21 (19–28)	1.94

TABLE 3   *Accuracy on the proficiency measure (% correct choices).*

Group	N	Mean (range)	SD
L1	30	96.4 (80–100)	4.9
HL	22	96 (91.2–99)	4.0

professional meta-linguistic knowledge of Russian or English, i.e., none majoring in Foreign Languages, Russian or Philology/Linguistics. The test group (HL) consisted of 22 English dominant fluent and literate heritage speakers of Russian. At the time of testing, the participants in the test group were either enrolled in or had recently graduated from college courses of Russian in US higher education institutions. Table 3 reports age means and ranges for the controls and the test group.

The independent Proficiency Measure is a replication of Slabakova's (2005b) cloze test, which consisted of a continuous text (a story about seasons) with 30 blank spaces substituting single words and was completed on-line. Participants were asked to fill in the blanks choosing the only correct option of the three options provided in the drop-down menu. The gaps targeted knowledge of a range of grammatical and lexical categories, including case and number agreement, and tense. Following Slabakova's methodology, those HL learners whose cloze test scores were below the range of the scores of the control group of monolingual native speakers were excluded from the analysis. Table 4 shows that the average cloze-test score[7] of HL learners was almost identical to that of L1 controls (no statistical difference).

In addition, the participants were asked to rank their own abilities in English and Russian reading, writing, listening and speaking skills on a scale of 0 to 5. Based on the consistently higher self-rating in English than in Russian, it is safe to say that the HL speakers in this study are dominant in English. Practically all heritage speakers of Russian ranked all of their English skills at the maximum while their average combined self-rating of Russian was 15.5 out of 20.

---

7   As pointed out by anonymous reviewers, the scores on this highly explicit grammatical test do not provide an adequate assessment of the learners' overall proficiency, and especially their ability to use language in real world tasks. While the latter is beyond the scope of this study, the use of the cloze test ensured that the learners possessed enough literacy-related skills to be compared to native speakers, who all were college students in Russia. This measure was used in conjunction with self-ratings, which Swender *et al.* (2014) have found to be reliable with advanced-proficiency HL learners when compared against Oral Proficiency Interview ratings.

4.2   *Tested Conditions*

The two experiments in this study test the same three main conditions and the same set of predicates inside each condition (Table 4 gives an overview of each condition). In each condition half of the sentences are perfective and half imperfective, contrasting only in one aspectual morpheme.

Condition 1 manipulates *telicity* contrasts in dynamic predicates, which are lexically underspecified as [α telic] and which mark both telicity and boundedness via presence or absence of aspectual morphology. The condition includes sentences with [−telic;-bounded] activities (1A), which carry no overt aspectual markers, and [+telic; +bounded][8] accomplishments (1B), which carry a telicizing prefix (either used in a purely telicizing sense or also supplying additional lexical meaning to the verb), but no si suffix.

To test for transfer of the processing strategy involved in the calculation of telicity information in English while processing Russian sentences, the predicates in Condition 1 of the sms task were manipulated in the following way. Both grammatical and ungrammatical sentences were further split based on whether there was competition between the morphological marking of the verb and that of the object (so, half of the sentences in each of the condition were grammatical and the other half ungrammatical.) A prefixed verb followed by a mass or plural noun and an unprefixed verb followed by an overtly modified/ quantized object would constitute the competition condition because there is a competition between a familiar English strategy to pay attention to the morphological marking on the direct object and the Russian strategy to pay attention to the morphology on the verb and disregard the form of the object. In contrast, a prefixed verb followed by an overtly modified object and an unprefixed verb followed by a bare noun would constitute a matching condition because both the verb and the object would have an overt marker used for the calculation of the telicity value. Intuitively, the ungrammatical sentences in the competition condition should be most difficult and the grammatical sentences in the matching condition should be the easiest to process.

Conditions 2 and 3 manipulated *boundedness* contrasts in dynamic predicates including lexically underspecified roots and a telicty morpheme (Condition 2) and in non-dynamic lexically telic predicates (Condition 3). That is, Conditions 2 and 3 tested sensitivity to the same semantic feature, but in different types of predicates. Like Condition 1, Condition 2 included verbs lexically underspecified for telicity, in which both aspectual features are encoded

---

8   While contrasts between 1A and 1B necessarily involve contrasts in both telicity and boundedness values, the morphological difference is only in the presence/absence of the telicity morpheme. More importantly, while all three conditions involve contrasts in boundedness, this is the only condition with a contrast in telicity.

TABLE 4   *Morphological contrasts in the study conditions.*

	Condition/ Contrast	Imperfective	Perfective
1	TELICITY* morpheme (dynamic predicates)	1A. Ø+V+Ø** [–telic; –bounded]	1B. PREFIX +V+Ø [+telic; +bounded]
		pisal 'was writing'/'would write'/ 'wrote'	*DOpisal* 'wrote'/'finished writing'
2	BOUNDEDNESS morpheme (dynamic predicates)	2D. PREFIX +V+SI [+telic; –unbounded]	***2C=1B. PREFIX+V+Ø [+telic; +bounded]
		DOčitYVAl 'was finishing reading'/'would finish reading'/ 'finished reading'	*DOčital* 'finished reading'
3	BOUNDEDNESS morpheme (non-dynamic predicates	3F. V+SI [+telic; –bounded]	3E. V+Ø [+telic; +bounded]
		zakazYVAl 'was ordering'/ 'would order'/ 'ordered'	*zakazal* 'ordered'

*   Note that the contrast in this condition is based on presence/absence of a telicity marker. However, the two forms also differ in boundedness, since it is impossible to find aspectual pairs that would only contrast in telicity.

**   The terms V, PREFIX and SI are used here not to provide its full morphological decomposition, but only as a reference to the presence/absence of overt aspectual morphology on the verb. While *pisal* actually has two affixes (thematic vowel -a- and Past Tense suffix – l), neither of them are aspectual morphemes that affect the aspectual status of the predicate (or fill an aspectual projection) as telicizing prefixes and SI suffixes do; hence the predicate is labeled V.

*** Since we are dealing with aspectual triplets, 1B and 2C are essentially the same condition.

with presence/absence of aspectual morphology: i.e., prefixed [+telic; +bounded] accomplishments (2C) and prefixed [+telic; –bounded] accomplishments also marked by an SI suffix (2D). Types 2C and 2D are structurally the same,[9]

9   See Slabakova (2001, 2005a, b), Nossalik (2008, 2009) and Mikhaylova (2012) for analyses suggesting that these morphological differences also reflect different syntactic structures.

but predicates in 2D carry more overt morphology. Essentially, 2C is the same type of predicate as 1B from the previous condition, since dynamic verbs are capable of forming aspectual triplets differing in both telicity and boundedness. The task was designed in such a way that 1B and 2C contained the same verbal roots, but these roots were used in different predicates and different sentences.

Finally, Condition 3 manipulated *boundedness* contrasts in lexically telic non-dynamic achievements, which encode the predicate's boundedness via the presence/absence of a SI suffix. The rationale for adding Condition 3 to the task is that it provides a set of aspectual pairs that are created by means of SI suffixation, like those in Condition 2, but which are lexicalized as [+telic] in the lexicon and, arguably, are both morphologically simpler than prefixed-suffixed accomplishment predicates.

In addition, unlike dynamic predicates in 2C-D, non-dynamic predicates should not require telicity parameter resetting because achievements are specified for telicity in the lexicon in both English and Russian. The predicates without overt aspectual morphology are [+telic; +bounded] predicates (3E), and predicates carrying an SI suffix are [+telic; –bounded] (3F). As has been discussed, non-dynamic predicates used in this condition are morphologically simpler than those in Conditions 1 and 2.

To summarize, Conditions 1 and 2 include morphologically complex predicates with lexically underspecified dynamic verbs; i.e., in these predicates both telicity and boundedness need to be calculated for successful interpretation of the sentence. Condition 3, by contrast, includes predicates with non-dynamic verbs lexically specified as [+telic]; so, the processing such a predicate only requires calculation of the boundedness value of the predicate. Condition 2, therefore, should be the most difficult for acquisition.

4.3   *Experiment 1: The Semantic Entailments Task*
The Semantic Entailments Task contained 30 target items (10 items per condition, 5 items per predicate type) and 30 fillers. The task was distributed and administered electronically via SurveyGizmo survey platform in one attempt, with no backtracking allowed. The participants were presented with sentences, each containing a Subject, Verb, and a Direct Object (no disambiguating context) and followed by two continuations/entailments (6a-b) and were asked to

---

Namely, Slabakova and Mikhaylova consider achievements to be simple VPs (hence lexicalized telicity value) while activities and accomplishments being vPs with both telicity and boundedness morphemes (overt and null) matching a separate projection.

decide whether one or both entailments were most logical. The participants' ability to interpret aspectual information in the main sentence determined their choice in this task.

(6) a. Vladimir   **pro-čital**   detektiv...
        Vladimir   PF-read   detective.story
        'Vasya read the detective story...'

     a) ... i emu ne ponravilsja konec.   ← correct choice
     'and he didn't like the ending'
     b) ... i on hotel uznat' konec.
     '... and he wanted to find out the ending'
     c) Oba varianta vozmožny
     'Both variants are possible'

(6) b. Vladimir   **čital**   detektiv...
        Vladimir   read   detective.story
        'Vasya read/was reading the detective story...'

     a) ... i emu ne ponravilsja konec.   ← incorrect choice
     'and he didn't like the ending'
     b) ... i on hotel uznat' konec.   ← more salient choice
     '... and he wanted to find out the ending'   ← also correct choice
     c) Oba varianta vozmožny
     'Both variants are possible'

While not very demanding of working memory (the participants could see all the sentences at the same time and were not restricted in time to complete the task), this task is quite complex from the point of view of semantics. Without contextual clues, the participants were forced to rely only on verbal morphology for their interpretation of the predicate and draw from the available repertoire of interpretations for that form. Note that while (6a) has an unambiguously correct choice (a), in (6b) there is one unambiguously incorrect choice and both (b) and (c) are possible. However, (b) is a more salient interpretation. Since morphologically imperfective predicates in some contexts can have a completed interpretation in addition to the more salient incomplete habitual or on-going interpretations, sentences like (6b) tested the salience of interpretations rather than accuracy/correctness of choice in the more traditional sense.

4.4   *Experiment 2: The Stop-Making-Sense Task*

The Stop-Making-Sense Task was completed on the researcher's computer using Linger experimental software. The task consisted of 42 target items (3 conditions, 14 items per condition) and 66 filler items. The order of the sentences was automatically randomized for each participant. The participants were asked to keep pressing computer key "J" to reveal a masked sentence word by word, until they thought there was an error due to which the sentence stopped making sense, in which case they were asked to press "F" (7). If they thought the item contained no error (i.e. if the sentences continued to make sense), they tapped "J" until they were taken to the next item. Each sentence started with a disambiguating adverbial that either matched or conflicted with the aspectual form of the predicate, i.e, it was the verbal morphology that suggested whether the sentence made sense.

(7)   Ves' den'   Marina   (*na-)pisala   eto pis'mo.
       All day   Marina   (*PF-)write   this letter
       'All day Marina was writing this letter.'

       Screen shot #1 →   Ves' ---- ------ ------ --- -----.
       Screen shot #2→   ---- den' ------ ------ --- -----.
       Screen shot #3, etc →   ---- ---- Marina ------ --- ------.etc

This task required the participants to interpret the aspectual value of the predicates while taxing their working memory. The participants could only see one word of the sentence at a time. So, in order to make a correct aspectual interpretation, they needed to remember the disambiguating adverbial that appeared earlier in the sentence. Unlike the Semantic Entailments task, in which the participants saw the whole sentence and all possible continuations, this task manipulated the effects of high processing costs and also located where in the sentence the breakdown occurred. The task also aimed at determining the possibility of transfer from English: in the telicity condition (Condition 1), it tested whether the participant was paying attention to the morphology on the verb (Russian strategy) or on the object (English strategy).

5   Results

A bird's-eye view of the results of this study for both the controls and the heritage speakers suggests that the Semantic Entailments (SE) task, which lacked disambiguating clues for the interpretation of the aspectual form, was more
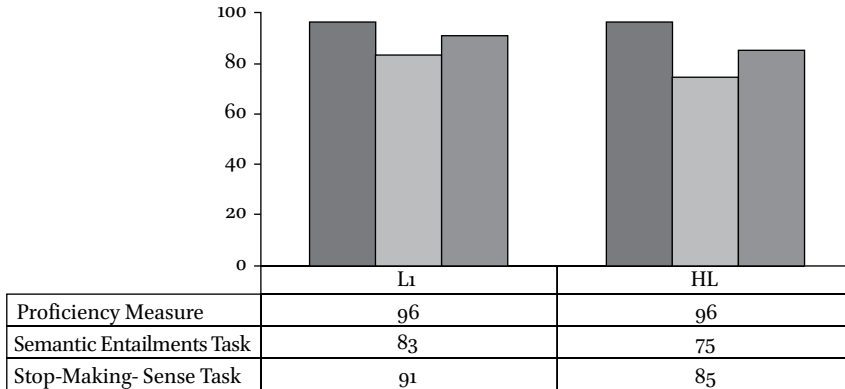
	L1	HL
Proficiency Measure	96	96
Semantic Entailments Task	83	75
Stop-Making- Sense Task	91	85

FIGURE 1   *Proficiency measure and two test tasks (% total correct judgments).*

difficult than the Stop-Making-Sense (SMS) task, which provided a disambiguating adverbial yet also taxed the participants' working memory (Figure 1). Both group achieved higher accuracy scores on the proficiency measure than in either task

Despite being indistinguishable from the controls in their results of the cloze-test, which was used as an independent proficiency measure, the heritage speakers' scores were significantly lower than those of the controls on both tasks (t(50)=2.407; p=0.02 for the SE task and t(50)=2.423; p<0.02 for the SMS task). In what follows I sum up the results of each task before discussing their implications.

5.1   *Results of the Semantic Entailments (SE) Task*

5.1.1   SE Task: Salience of Interpretations

Since indeterminacy of judgments is a potential feature of advanced level L2 and, possibly, HL speakers, it is worth comparing the heritage speakers and the control group in salience of their interpretations. Recall that the morphologically imperfective form can be used to describe ongoing, habitual and even single completed events, yet the latter is not a salient interpretation and is possible only in a narrow range of contexts. The task results show that the monolingual controls overall robustly prefer the salient interpretations to the non-salient one or to accepting both as possible. In contrast, the heritage speakers are overall more likely to show indeterminate judgments (i.e., choosing both interpretations rather than one).

More specifically, the more straightforward morphological 'perfectives' ([+telic; +bounded]) receive robust salient (completed) interpretations. The vast majority of the control group (89%) and HL group (75%) chose the salient

completed interpretation for the morphological 'perfectives'. Also, not surprisingly, the morphological imperfectives, which include both [–telic; –bounded] and [+telic; –bounded] predicates and may allow a completed interpretation in some discourse contexts, yield more optionality than the perfectives in both groups. The main difference between the two groups is in the salience of interpretations of the morphological imperfective. The majority of L1 controls chose the salient incomplete interpretation (74% of L1 participants)[10] and far fewer accepted "both possible" (14%) or a complete interpretation (12%). At the same time, only a bit more than half of the heritage speakers (58%) opted for the salient interpretation and a third (33%) opted for the "both variants" as a logical interpretation.

Since salience alone is not as informative as the patterns of sensitivity to various facets of aspectual meaning and marking, the following sections offer a detailed look at convergence and non-convergence of sensitivity patterns between monolingual controls and the test group on specific semantic features and morpho-syntactic structure.

5.1.2   SE Task: Results by Condition

Since the salience results have shown that even the monolingual controls showed some optionality in their judgments, although to a lesser degree than the test group, the results of these tasks were recoded for further analysis in the following way. For imperfective/[–bounded] sentences, I assigned a full one point to salient incomplete interpretations, half a point to "both possible," and zero points to non-salient complete interpretations. For perfective/[+bounded] sentences, I assigned a full one point to salient complete interpretations, half a point to "both possible," and zero points to incorrect incomplete interpretations. So, when reading the rest of the results for this task as well as the discussion thereof, it is necessary to keep in mind that accuracy scores reflect recoding based on saliency of interpretations of the L1 group and include both salient interpretations and those with optionality.

After the coding, a series of Paired-Samples T-Tests revealed that for the control group there is no statistical difference in their average scores on the three conditions (Figure 2). In contrast, the HL group scored significantly lower on the more morphologically complex Condition 2 than on Condition 3 ($t(21)=2.2$; $p=0.039$). Although not to the same degree, structural and morphological complexity may play a role in the salience of boundedness contrasts. The scores of the HL group scores also were numerically lower on Condition 2 than on Condition 1, but the difference was not statistically significant. The

---

10   In fact, only three out of fifteen [–bounded] items received more than 20% «both possible» interpretations from the control group.

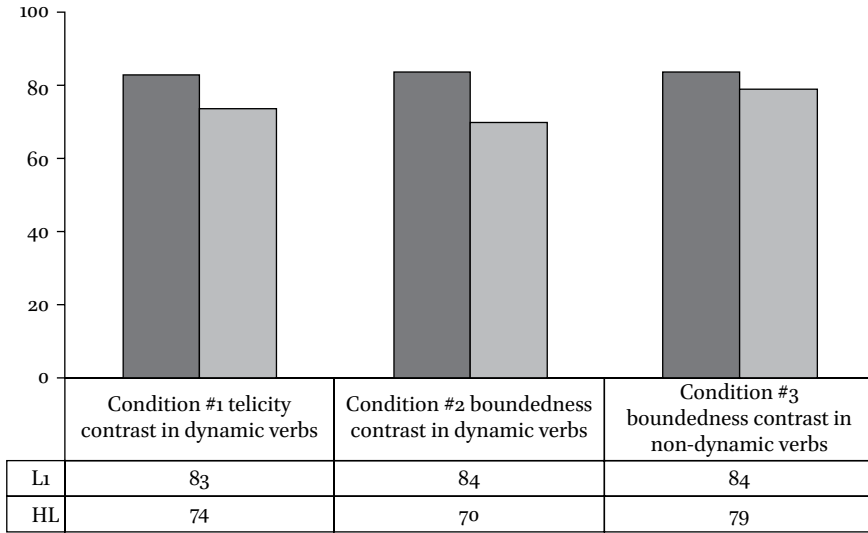|	Condition #1 telicity contrast in dynamic verbs	Condition #2 boundedness contrast in dynamic verbs	Condition #3 boundedness contrast in non-dynamic verbs
L1	83	84	84
HL	74	70	79

FIGURE 2 *SE Task: % correct judgments by condition (after coding).*

judgments of the heritage speakers were statistically different from those of the controls on Condition 2 ($t(50)=2.593$; $p<0.01$).

5.1.3 SE Task: Predicate Pairs within Conditions

Additional insights into the differences between the way controls and HL speakers interpret aspectual information can be gained if these results are analyzed based on contrasts within each condition and based on grammatical aspect, i.e. the traditional morphologically 'perfective-imperfective' pairs.

Figure 3 shows that the two groups clearly differ from each other in the patterns of salience of predicates in the telicity condition (Condition 1). Numerically, the L1 controls have more salient interpretations on the [+telic; +bounded] accomplishments (1B) than on the [–telic; –bounded] activities (1A) while there is no numerical difference between the two types of predicates for the HL group. Interestingly, only the controls treat predicates 1A and 1B statistically differently ($t(29)=3.384$; $p=0.002$).

When it comes to the boundedness contrasts in Conditions 2 and 3, both groups score higher on the [+telic; +bounded] members (2C and 3E) of the pairs of predicates than on their [+telic; –bounded] counterparts (2D and 3F, respectively). However, in Condition 2, the difference between the dynamic predicates 2C and 2D is statistically significant in the scores of the L1 control group ($t(29)=2.994$; $p=0.006$) but not in the scores of the HL group. In the non-dynamic predicates 3E and 3F in Condition 3, on the contrary, the difference is
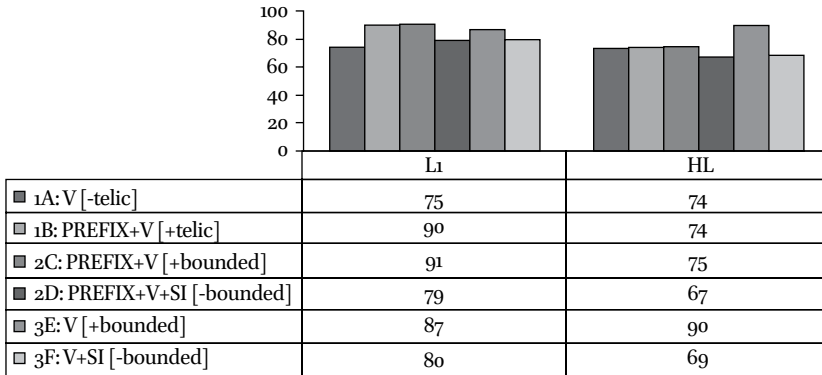
	L1	HL
◼ 1A: V [-telic]	75	74
◻ 1B: PREFIX+V [+telic]	90	74
◼ 2C: PREFIX+V [+bounded]	91	75
◼ 2D: PREFIX+V+SI [-bounded]	79	67
◼ 3E: V [+bounded]	87	90
◻ 3F: V+SI [-bounded]	80	69

FIGURE 3   *SE Task: Accuracy scores.*

statistically significant for the HL group ($t(21)=5.219$; $p<0.0001$) but not for the control group.

5.1.4   SE Task: Morphological 'Perfectives' vs 'Imperfectives'

Figures 4 and 5 show that the monolingual controls allowed overall more optionality in interpretation of the imperfectives than of the perfectives, especially with the [−telic;-bounded] activities (1A). Nevertheless, after a series of Paired-Sample T-tests, statistically the controls were equally sensitive to all types of perfective predicates and all types of imperfective predicates, regardless of dynamicity or morphological complexity of individual predicates.

The results of the HL group, however, did not converge with those of the controls. The HL Speakers are significantly more accurate on the non-dynamic perfective achievements 3E which are stored in the lexicon as [+telic] than the prefixed dynamic accomplishments 1B and 2C ($t(10)=3.348$; $p<0.007$ and $t(10)=3.32$; $p<0.008$ respectively) while there was no statistically significant difference between their judgments on 1B and 2C. Also, according to a series of Independent-Sample T-Tests, the scores of the HL group on 1B and 2C,[11] are significantly lower than those of the controls ($t(50)=3.311$; $p<0.004$) for 1B and ($t(50)=2.378$; $p<0.02$ for 2C).

For the Imperfective predicates, the HL group's scores on the most morphologically complex prefixed-suffixed SI accomplishments (2D) were statistically lower than those on bare activities or SI suffixed achievements ($t(10)=4.474$;

---

11   Note that all participants treat these two sets of prefixed dynamic predicates the same way (there is no difference between 1B and 2C in the scores of either group).
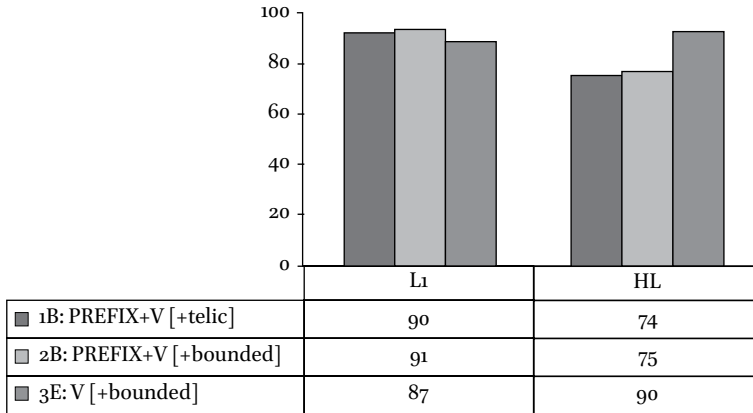
	L1	HL
■ 1B: PREFIX+V [+telic]	90	74
□ 2B: PREFIX+V [+bounded]	91	75
■ 3E: V [+bounded]	87	90

FIGURE 4   SE *Task: The morphological perfective ([+bounded]).*

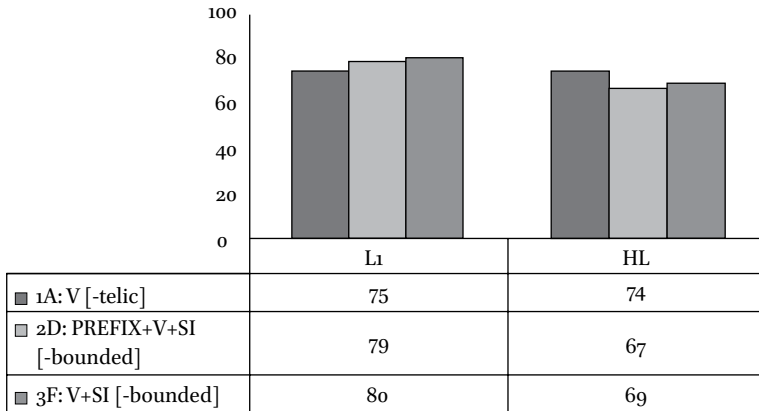|	L1	HL
■ 1A: V [-telic]	75	74
□ 2D: PREFIX+V+SI [-bounded]	79	67
■ 3F: V+SI [-bounded]	80	69

FIGURE 5   SE *Task: The morphological imperfective ([−bounded]).*

p=0.001 and $t(10)$=3.501; p=0.006 respectively), while there was no statistically significant difference between the other two predicates. The scores of the HL group on the non-dynamic SI predicate 3F were lower than those of the controls ($t(50)$=2.08; p<0.04).

5.2   *Results of the Stop-Making-Sense (SMS) Task*
In the Stop-Making-Sense task, participants received one point for tapping through a correct sentence and zero points for tapping through a sentence, which contained an error. Similarly, they received one point for stopping a

sentence with an error, even if they tapped "F" after the last word in the sentence (evidenced by a period), and they received zero points for tapping "J" all the way through an erroneous sentence.

There is a possibility that in a task that involves accepting/rejecting an item, a bias towards either accepting or rejecting sentences could become a potential confounding factor. In this task, 50% of the items were plausible and the other 50% implausible, and a 50%/50% acceptance/rejection rate, regardless of the accuracy of judgment, would indicate that the participants were not biased one way or the other. Neither the control group nor the HL group showed bias either way (both groups had 51% acceptance rate on target items and 50% acceptance on the whole task including fillers).

5.2.1 SMS Task: Results by Condition

Monolingual controls were equally sensitive to aspectual contrasts based on telicity and boundedness. According to a battery of Paired Samples T-Tests, their scores are statistically similar in all three conditions (means for each condition are presented in Figure 6). In contrast, in this testing modality telicity contrasts (Condition 1) pose a greater difficulty to heritage speakers than boundedness contrasts (Conditions 2–3) as illustrated by mean scores in Fig. 6 and confirmed by a series of paired samples T-Tests. More specifically, the HL group was significantly less accurate on pairs of predicates with lexically underspecified activity-accomplishment verbs differing in telicity (Condition 1) than on those contrasting in boundedness (Condition 2): $t(21)=2.222$; $p=0.037$). In addition, the HL group had statistically weaker judgments of telicity in lexically underspecified activity-accomplishment verbs in Condition 1 than
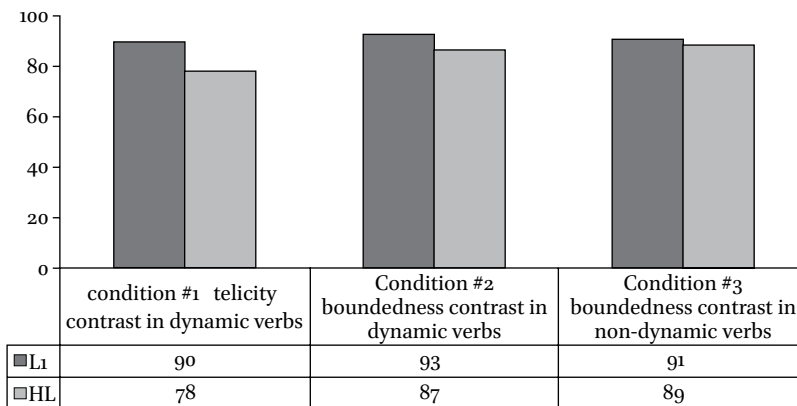

	condition #1 telicity contrast in dynamic verbs	Condition #2 boundedness contrast in dynamic verbs	Condition #3 boundedness contrast in non-dynamic verbs
▪L1	90	93	91
▫HL	78	87	89

FIGURE 6   *SMS Task: % correct judgments by condition.*

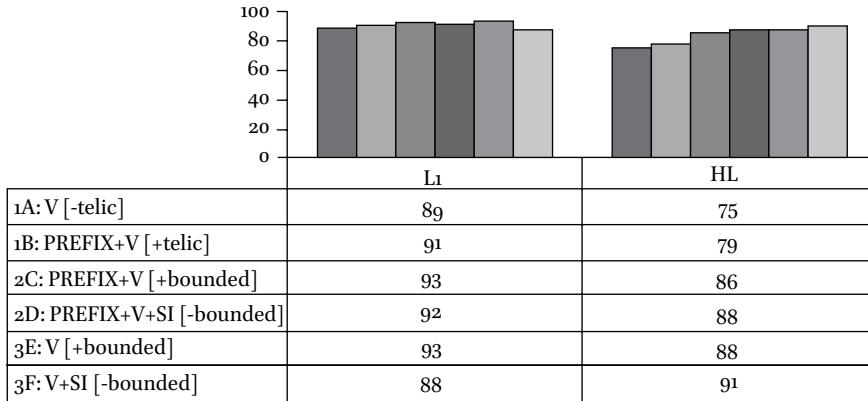|	L1	HL
1A: V [-telic]	89	75
1B: PREFIX+V [+telic]	91	79
2C: PREFIX+V [+bounded]	93	86
2D: PREFIX+V+SI [-bounded]	92	88
3E: V [+bounded]	93	88
3F: V+SI [-bounded]	88	91

FIGURE 7   *SMS Task: Accuracy scores.*

of boundedness in lexically telic achievements in Condition 3 ($t(21)=-2.642$; $p=0.015$), with no difference between the two boundedness conditions.

The controls showed no statistically significant difference between judgments of the members of each pair within each condition (between 1A and 1B, 2C and 2D, and 3E and 3F respectively. Like the control group, there was no significant difference between the HL group's accuracy on members of the predicate pairs in each condition (between 1A and 1B, 2C and 2D, and 3E and 3F respectively). See Figure 7 for the means on each predicate.

5.2.2   SMS Task: Morphological 'Perfectives' vs 'Imperfectives'
There was no difference between the accuracy of the control group on judgments of perfective predicates (between 1B and 2C; 1B and 3E; or 2C and 3E) or of imperfective predicates (between 1A and 2D; 1A and 3F; or 2D and 3F).[12] Unsurprisingly both types of aspectual contrasts and the associated morphological mechanisms are stable in adult monolingual grammars. Similarly to the control group, the battery of tests did not reveal a difference in the way the HL group speakers judged perfectives (Figure 8).

However, in contrast to the controls, the HL group was significantly less accurate on primary imperfectives ([–telic] activities) in 1A than on the two types of [+telic] secondary imperfectives (Figure 9), while there was no significant difference between their mean judgments on the two types of SI predicates (3D and 3F). More specifically, their scores on activities (1A) were significantly lower than their scores on SI-suffixed achievements (3F): $t(21)=2.642$; $p=0.015$.

---

12   The difference in raw scores on primary imperfectives (1A) and SI achievements (3F) is
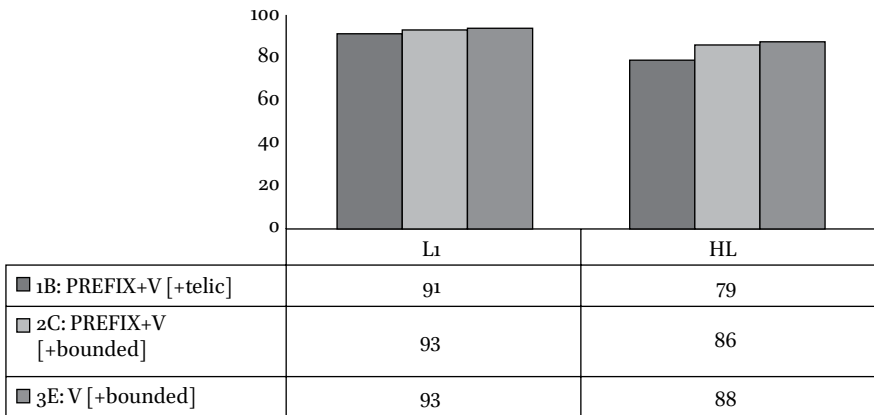   not significant.

	L1	HL
■ 1B: PREFIX+V [+telic]	91	79
□ 2C: PREFIX+V [+bounded]	93	86
■ 3E: V [+bounded]	93	88

FIGURE 8   *SMS Task: The morphological perfective* ([+*bounded*]).

	L1	HL
■ 1A: V [-telic]	89	75
□ 2D: PREFIX+V+SI [-bounded]	92	88
■ 3F: V+SI [-bounded]	88	91
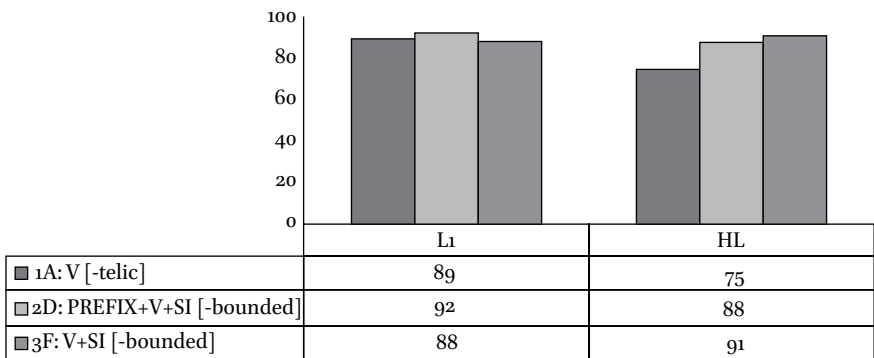
FIGURE 9   *SMS Task: The morphological imperfective* ([−*bounded*]).

Activities also presented a greater challenge than the prefixed and SI-suffixed accomplishments (2D): $t(21)=2.300$; $p=0.032$).

Based on the results of this task alone, unlike telicity contrasts, boundedness contrasts instantiated by SI morphology seem rather stable in the HL grammar regardless of predicate type, as are judgments of the Perfective in contrast to the judgments of the Imperfective. In this task, the regular SI suffixation mechanism seems to aid heritage speakers in on-line processing, even in the morphologically complex SI accomplishments; however, the irregular prefixation mechanism may be more challenging to parse on-line.

5.2.3   SMS Task: Potential of Transfer from English

The predicates in Condition 1 were manipulated for the morphological marking of the verb and that of the object (those that would involve competition between a familiar English strategy to pay attention to the morphological

marking on the direct object and the Russian strategy to pay attention to the morphology on the verb and disregard the form of the object.

While the control group treated all the transfer conditions statistically the same, the HL group showed a significant difference in treatment of the two types of sentences that contained an error. They were significantly more accurate on error items that contained competition between the morphological marking on the verb and object (M=94; SD=13.9) than on those with matching morphological marking (M=77.6; SD=29), t(21)=2.305; p=0.03). At the same time the HL speakers were significantly less accurate than the controls only on the grammatical competition condition (t(50)=2.047; p<0.05).

6   Discussion

Before discussing the implications of the findings above for the heritage speakers, it is worth summarizing the results of both tasks for the monolingual baseline. Although the scores of the control group on the Semantic Entailments Task were not at ceiling (83% average), an important finding was that the controls were equally sensitive to boundedness and telicity contrasts, i.e., there was no statistically significant difference between their scores on the three conditions. Notably, in Slabakova's (2005b) and Laleko's (2010) studies, monolingual controls also performed at around 85% accuracy in aspectual entailments, especially of the imperfective. The scores of the control group in this task were higher on perfective sentences, which have more straightforward interpretations, than on the imperfective sentences. This suggests that an interpretation task that involves retrieval and ranking of multiple meanings associated with one form is complex, even when acquisition is complete.

In contrast, despite the heavy processing load, the scores of the control group on the Stop-Making Sense Task were considerably higher (on average 91% target judgments). As, in the previous task, native speakers were equally sensitive to boundedness and telicity contrasts. However, unlike the previous task, there was no statistically significant difference between the scores of the controls on perfective sentences and imperfective sentences, or in fact, between any types of predicates in either condition. This suggests that the presence of a disambiguating adverbial helped them in comprehension and processing of relevant aspectual information.

If we turn our attention to heritage speakers, the results of the two experiments show that they do not display equally salient aspectual interpretations. In both experimental tasks, their average task scores and scores on each condition were significantly lower than those of the controls. It also becomes

apparent that some aspectual contrasts pose a greater difficulty than others and that a linguistic task at hand may affect how salient their specific aspectual knowledge is.

In the Semantic Entailments Task, the HL group performed equally on perfective and imperfective predicates within the telicity condition (they were quite accurate on the morphologically unmarked imperfective activities). However, like the controls, they scored higher on perfective members of the two boundedness conditions than on the SI members of the same conditions. The HL group scored highest on the lexically specified [+telic] non-dynamic perfective achievements. They scored lowest on the imperfective prefixed-SI-suffixed dynamic accomplishments. This suggests that grammatical aspect (the semantic feature *boundedness*) and specifically the imperfective and the associated morphological mechanism of SI suffixation presents a greater difficulty for interpretation without disambiguating contextual clues. Recall also that in this task heritage speakers were much more likely to choose the indeterminate "both possible" interpretation than the monolingual controls. These findings of residual indeterminacy of judgments in high-proficiency heritage speakers support both the Interface Hypothesis and the Bottleneck Hypothesis.

Although like the monolingual controls, heritage speakers scored higher on the Stop-Making-Sense task than on the Semantic Entailments task, their improvement is significant only in the boundedness conditions. The results of this task also suggest that primary imperfectives rather than secondary imperfectives or perfectives are the vulnerability point under high working memory load.

At the same time, the group's lower performance on primary imperfectives seems to be related to their difficulty with the telicity contrast and with the potential for transfer in that condition. Recall that HL speakers were surprisingly better on the ungrammatical sentences that were designed to involve competition between the English and Russian processing strategies for the calculation of telicity instead of showing lower accuracy on this presumably most difficult condition (the latter would be evidence of transfer from English). This heightened accuracy on the most difficult subset of telicity items in the SMS task and lack of overall improvement on the telicity condition between the two tasks may be seen as evidence that lexical aspect also presents a significant challenge to heritage speakers and that processing of these items involves more cognitive resources. For example, Sekerina and Trueswell (2011) found that even with at ceiling accuracy, advanced proficiency HL speakers showed a "wait-and-see" processing strategy, waiting for all available information in processing noun-adjective agreement instead of making decisions as soon as the first relevant clue was available. The expectation of a problematic parse may

have drawn the HL speakers' intentional resources to the mismatch between the object and the verb.

Importantly, similarly to the controls, in the SMS task, heritage speakers showed no statistically significant difference between their scores on the perfective versus imperfective members of each condition, regardless of the asymmetry between accuracy on the telicity and boundedness conditions. This suggests that the HL participants know both morphological mechanisms, (prefixation for telicity marking and SI-suffixation for boundedness marking), however, the regular SI morpheme is easier for parsing under a heavy working memory load while the idiosyncratic telicity morphemes are more difficult to parse and process effectively. Together with the results from the Semantic Entailments Task, these findings suggest that HL speakers, even at advanced proficiency levels, have a difficult time resolving ambiguity under pressure. These findings support the predictions of the Bottleneck Hypothesis that functional morphology may be a tight spot in the acquisition of Russian aspect, even for advanced speakers.

These findings have implications for both further research and pedagogy. It is clear that even high proficiency fluent HL learners do not converge with native speakers in aspectual knowledge and can benefit from instruction. In order to improve aspectual knowledge, HL learners may benefit from explicit instruction on the morphological mechanisms and the semantic interaction of telicity and boundedness.

Further analysis, which is beyond the scope of this paper, will involve a closer look into the processing mechanisms involved in the interpretation of Russian aspect and specifically where in the ungrammatical sentences the breakdown occurs and whether the HL speakers' reading time changes depending on the aspectual information they are processing. It would be also informative to look into potential effects of the age of onset of bilingualism, i.e. whether those HL speakers who were exposed to English at an early age would be outperformed by those who shifted to English after age 7, (age by which they could have completely acquired both forms and functions of Russian aspect (Kazanina and Phillips, 2007, among others). Finally, it would be beneficial to look at effects of instruction on the comprehension and production of aspectual contrasts.

Acknowledgments

two anonymous reviewers for helpful suggestions on how to make this manuscript clearer to a general audience.

References

Anstatt, Tanja. 2008. Aspektfehler im Russischen Mono- und Bilingualer Kinder. In Sebastien Kempgen (ed.) *Deutche Beiträge zum 14. Internationalen Slavistenkongress*, 13–25. Ohrid.

Carreira, Maria. 2004. Seeking explanatory adequacy: a dual approach to understanding the term 'heritage language learner'. *Heritage Language Journal* 2(1): 1–25.

Comrie, Bernard. 1976. *Aspect*. Cambridge, UK: Cambridge University Press.

Cook, Vivian. (ed.) 2003. *Effects of the Second Language on the First.* Clevedo, Buffalo, Toronto, Sydney: Multilingual Matters.

Geisherik, Anna. 2005. *Aspects of teaching literacy to heritage learners of Russian*. Ph.D. Dissertation, State University of New York, Stony Brook.

Gupol, Olga. 2009. *The acquisition of Russian verbal morphosyntax in Russian-Hebrew bilingual children.* Ph.D. Dissertation, Bar-Ilan University.

Hawkins, Roger and Cecilia Chan. 1997. The partial availability of Universal Grammar in second language acquisition: The "failed functional features hypothesis." *Second Language Research* 13: 187–226.

Hawkins, Roger and Hajime Hattori. 2006. Interpretation of English multiple wh-questions by Japanese speakers: a missing uninterpretable feature account. *Second Language Research* 22: 269–301.

Haznedar, Belma and Bonnie Schwartz. 1997. Are there optional infinitives in child L2 acquisition? In Elizabeth Hughes, Mary Hughes and Annabel Greenhill (eds.), *Proceedings of the Boston University Conference on Language Development*, 257–268. Somerville, MA: Cascadilla Press.

Isurin, Ludmila and Tanya Ivanova-Sullivan. 2008. Lost in between: The Case of Russian Heritage Speakers. *Heritage Language Journal* 6(1): 72–104.

Kagan, Olga. 2005. In support of proficiency-based definition of heritage language learners: the case of Russian. *International Journal of Bilingual Education and Bilingualism* 8: 213–221.

Kagan, Olga and Kathleen Dillon. 2006. Russian Heritage Learners: so what happens now? *Slavic and East European Journal* 50(1): 83–96.

Kazanina, Nina, and Colin Phillips. 2007. A developmental perspective on the Imperfective Paradox. *Cognition* 1005(1): 65–102.

Laleko, Oksana. 2008. Compositional telicity and Heritage Russian aspect. In M. Grosvald and D. Soares (eds.). *Proceedings of the Thirty-Eighth Western Conference on Linguistics* (*WECOL*) 19: 150–160.

Laleko, Oksana. 2010. *The syntax-pragmatics interface in language loss: Covert restructuring of aspect in Heritage Russian*. Ph.D. Dissertation, University of Minnesota.

Lardiere, Donna. 2005. On morphological competence. In *Proceedings of the 7th Generative Approaches to* Second Language Acquisition Conference (GASLA 2004), Laurent Dekydtspotter, Rex A. Sprouse, and Audrey Liljestrand (eds.), 178–192. Somerville, MA: Cascadilla Proceedings Project.

Lenneberg, Eric. 1967. Biological *Foundations of Language*. New York: Wiley.

Martelle, Wendy. 2011. *Testing the Aspect Hypothesis in L2 Russian.* Ph.D. Dissertation, University of Pittsburgh.

Mikhaylova, Anna. 2012. (*In*)*complete acquisition of aspect in second language and heritage Russian*. Ph.D. Dissertation, University of South Carolina.

Montrul, Silvina. 2006a. Incomplete acquisition as a feature of L2 and bilingual grammars. In Roumyana Slabakova, Silvina Montrul and Philippe Prévost (eds.), *Inquiries in language development: Studies in Honor of Lydia White*, 335–359. Amsterdam: John Benjamins.

Montrul, Silvina. 2006b. On the bilingual competence of Spanish heritage speakers: Syntax, lexical-semantics and processing. *International Journal of Bilingualism* 10(1): 37–69.

Montrul, Silvina. 2007. Interpreting mood distinctions in Spanish as a heritage language. In Kim Potowski and Richard Cameron (eds.), *Spanish contact. Policy, social and linguistic inquiries*, 23–40. Amsterdam: John Benjamins.

Montrul, Silvina. 2008. *Incomplete acquisition in bilingualism: Re-examining the age factor*. Amsterdam: John Benjamins.

Montrul, Silvina. 2009. Knowledge of tense-aspect and mood in Spanish heritage speakers. *International Journal of bilingualism* 13(2): 239–269.

Montrul, Silvina and Maria Polinsky. 2011. Why not heritage speakers. *Linguistic Approaches to Bilingualism* 1(1): 58–62.

Nossalik, Larissa. 2008. L2 Acquisition of Russian Outer Aspect. In Roumyana Slabakova, Jason Rothman, Paula Kempchinsky and Elena Gavruseva (eds.), *Proceedings of the 9th Generative Approaches to Second Language Acquisition Conference (GASLA 2007)*, 165–180. Somerville, MA: Cascadilla Proceedings Project.

Nossalik, Larissa. 2009. *L2 Acquisition of Russian Aspect.* Ph.D. Dissertation, McGill University.

Polinsky, Maria. 1997. American Russian: Language loss meets language acquisition. In Wayles Browne, Ewa Dornisch, Natasha Kondrashova and Draga Zec (eds.), *Proceedings of the Annual Workshop on Formal Approaches to Slavic Linguistics* 4: 370–406. Ann Arbor, Michigan: Slavic Publications.

Polinsky, Maria. 2000a. A composite linguistic profile of a speaker of Russian in the US. In Olga Kagan and Benjamin Rifkin (eds.), *The learning and teaching of Slavic languages and cultures: Toward the 21st century*, 437–466. Bloomington, IN: Slavica.

Polinsky, Maria. 2006. Incomplete acquisition: American Russian. *Journal of Slavic Linguistics* 14: 191–262.

Polinsky, Maria. 2008a. Russian gender under incomplete acquisition. *Heritage Language Journal* 7(2): 40–71.

Polinsky, Maria. 2008b. Without aspect. In Greville Corbett and Michael Noonan (eds.) *Case and Grammatical Relations*, 263–282. Oxford: Oxford University Press.

Polinsky, Maria. 2011. Reanalysis in adult heritage language: New evidence in support of attrition. *Studies in Second Language Acquisition* 45: 305–328.

Prévost, Philippe and Lydia White. 2000. Missing surface inflection or impairment in second language acquisition? Evidence from tense and agreement. *Second Language Research*, 16: 103–133.

Robin, Richard M. 2003. [*Golosa*]*: A basic course in Russian* (3ʳᵈ ed.). Upper Saddle River, N.J.: Prentice Hall.

Rothman, Jason. 2007. Heritage speaker competence differences, language change, and input type: inflected infinitives in Heritage Brazilian Portuguese. *International Journal of Bilingualism* 11(4): 359–389.

Schwartz, Bonnie and Rex Sprouse. 1996. L2 cognitive states and the Full Transfer/Full Access model. *Second Language Research* 12: 40–72.

Selinker, Larry. 1972. Interlanguage. *International Review of Applied Linguistics* 10: 209–231.

Silva-Corvalán, Carmen. 1994. *Language contact and change: Spanish in Los Angeles*. Oxford: Oxford University Press.

Slabakova, Roumyana. 2001. *Telicity in the second language*. Amsterdam: John Benjamins.

Slabakova, Roumyana. 2005a. Perfective Prefixes: What they are, what flavors they come in, and how they are acquired? In Steven Franks, Frank Gladney and Mila Tasseva-Kurktchieva (eds.), *Proceedings of Formal Approaches to Slavic Linguistics 13*: *The South Carolina Meeting*, 324–341. Ann Arbor, MI: Michigan Slavic Publications.

Slabakova, Roumyana. 2005b. What is so difficult about telicity marking in L2 Russian? *Bilingualism: Language and Cognition* 8(1): 63–77.

Slabakova, Roumyana. 2008. *Meaning in the Second Language*, *Studies in Language Acquisition Series*, Berlin: Mouton de Gruyter.

Smith, Carol. 1991. *The parameter of aspect*. Dordrecht: Kluwer.

Sorace, Anotnella. 2003. Near-nativeness. In Cartherine Doughty and Michael Long (eds.), *The handbook of second language acquisition*, 130–151. Oxford: Blackwell.

Sorace, Anotnella. 2011. Pinning down the concept of interface in bilingualism. *Linguistic Approaches to Bilingualism* 1(1): 1–33.

Sorace, Anotnella and Frederica Filiaci. 2006. Anaphora resolution in near-native speakers of Italian. *Second Language Research* 22: 339–368.

Sorace, Anotnella and Ludovica Serratrice. 2009. Internal and external interfaces in bilingual language development: Beyond structural overlap. *International Journal of Bilingualism* 13: 195–210.

Stoll, Sabine. 2005. Beginning and end in the acquisition of the perfective aspect in Russian. *Journal of Child Language* 32: 805–825.

Tsimpli, Ianthi M. and Maria Dimitrakopoulou. 2006. Differentiating interfaces: L2 performance in syntaxsemantics and syntax-discourse phenomena. In David Bamman, Tatiana Magnitskaia and Colleen Zaller (eds.), *Proceedings of the 30th Annual Boston University Conference on Language Development*, 653–664. Somerville, MA: Cascadilla Press.

Vendler, Zeno. 1957. Verbs and times. *Philosophical Review* 56: 143–160.