

## **Resolving Indeterminacy in Gender Agreement: Comparing Heritage Speakers and L2 Learners of Russian**

**Oksana Laleko**  
**State University of New York at New Paltz**

### **ABSTRACT**

Cross-linguistically, both heritage language (HL) speakers and second language (L2) learners have been shown to experience difficulty in producing and interpreting linguistic structures characterized by indeterminacy, or lack of an invariable and transparent relationship between meaning and form. This article compares two populations of Russian-English bilinguals on their strategies of resolving ambiguity within the system of grammatical gender in Russian, with a particular focus on indeterminacy in gender agreement with animate nouns. As a result of complex interactions among lexical, morpho-phonological, and discourse-level gender categorization cues, the agreement behavior of animate nouns in Russian is not fully uniform. The results of a scaled acceptability ratings study demonstrate that gender agreement in transparent and non-ambiguous contexts is largely unproblematic for both bilingual groups; however, contexts that require *conflict resolution* between different types of cues and those characterized by *underspecification* represent two areas where HL speakers and L2 learners diverge from monolingual Russian-speaking controls. Across all experimental conditions, bilingual speakers demonstrate a higher reliance on morpho-phonological gender categorization cues and assign less weight to lexical and referential factors in gender assignment than monolinguals. The results further show that the two populations of bilinguals are not fully alike with respect to dealing with different types of indeterminacy. In particular, HL speakers exhibit an advantage over L2 learners in conflict resolution; however, both bilingual groups struggle with constructions that give rise to referential ambiguity due to underspecification. These results expand our understanding of the problem of indeterminacy in bilingual acquisition of gender and offer implications for theories of language acquisition and language instruction.

**KEYWORDS:** grammatical gender, underspecification, ambiguity, heritage language, L2 acquisition, Russian

### **1. INTRODUCTION**

Recent years have seen a growing interest among language scientists and educators in systematic scholarly investigations exploring the diverse linguistic profiles of students entering language classrooms. Over the last decade, two particular populations of language students have been at the center of attention in the linguistic and pedagogical scholarship striving to offer a principled account of the extensive variation across the bilingual spectrum: traditional late second language (L2) learners, introduced to the target language for the first time as adults in a formal academic setting, and heritage language (HL) speakers, or early bilinguals with a prior naturalistic exposure to the target language during their childhood years. Given the important differences between these two groups of adult learners with respect to the age, socio-linguistic circumstances, and timing of language exposure, input type, as well as motivation and attitudes towards the target language (Carreira & Kagan, 2011; Kagan & Dillon, 2006; Laleko, 2013; Polinsky & Kagan, 2007), researchers have repeatedly underscored the need for systematic comparative studies examining

the linguistic abilities of these students as a necessary step for developing instructional resources and classroom practices that would help meet these learners' needs more effectively.

Recent experimental studies have offered important insights into the nature of bilingual competence in relation to the above factors. Several specific differences and similarities between early and late bilinguals have been shown to affect these speakers' performance on various linguistic tasks. On the one hand, investigators have documented some linguistic advantages of HL speakers over proficiency-matched L2 learners in several domains of language (including, most prominently, syntax and phonology), suggesting that early linguistic exposure has a facilitative effect on subsequent language re-learning (see Montrul, 2008, 2016). On the other hand, these advantages have been argued to be selective rather than global, with differential results observed for different linguistic phenomena, in different registers and modalities, and in different types of tasks (Bowles, 2011; Montrul et al., 2008). These contrasts notwithstanding, a survey of the existing experimental research involving bilingual speakers points to several common elements in the design of heritage and L2 grammars (cf. overviews in Ortega, 2013; Scontras, Fuchs, & Polinsky, 2015; White, 2003). Assuming that these similarities are not accidental, a more principled understanding of how the grammatical systems of bilingual speakers might converge with and differ from those of monolingually-raised baseline speakers, as well as how they might compare across the bilingual spectrum, may lead to significant theoretical and practical gains. On the theoretical plane, these investigations can provide rich data for informing hypotheses about the nature of language faculty; in a practical sense, they offer useful insights for developing effective teaching strategies in classroom settings.

One particular domain in which HL and L2 speakers have been shown to experience similar difficulties in production and comprehension involves linguistic structures characterized by indeterminacy, or lack of an invariable and transparent relationship between meaning and form, often resulting in interpretive ambiguity or optionality. To illustrate this point with several examples, let us consider the three Russian sentences in (1) below:

- (1) a. Ольга<sub>i</sub> надеется, что она<sub>i/j/∅</sub><sub>i</sub> выиграет конкурс.  
Olga-NOM hope-3.SG.PRES that she/∅ win-3.SG.FUT contest-ACC  
'Olga<sub>i</sub> hopes that she<sub>i/j</sub> will win the contest.'
- b. Вы читали/ прочитали «Войну и мир»?  
you-PL read-IMP/PF war-ACC and peace-ACC  
'Have you read *War and Peace*?'
- c. Где автобус, который везет на буксире  
where bus-NOM/ACC which-NOM/ACC carry-3.SG.PRES on tow-PREP  
грузовик?  
truck-NOM/ACC  
'Where is the bus that is towing the truck?' or 'Where is the truck that is towing the bus?' (example from Dubinina & Polinsky, 2013, p. 19).

The sentence in (1a) is multiply ambiguous: the pronoun *она* ‘she’ may be interpreted as referring to the subject of the sentence or to another individual who is not explicitly mentioned in the sentence; additionally, when referring to the subject, the pronoun may be either omitted or stated overtly, with both options licensed at the level of the grammar. Similarly, the choice between the perfective and imperfective aspectual forms of the verb *читать* ‘read’ in (1b) is not constrained in a categorical fashion by grammatical factors, but depends to a large extent on pragmatic and contextual considerations. In Russian, the imperfective form may optionally be used in reference to completed events, where the perfective aspect may also be attested. Interpretational nuances aside, the grammaticality of both aspectual forms in the same linguistic environment may be construed as another instantiation of linguistic indeterminacy (see Laleko, 2010, 2015 for further discussion). Finally, the syncretism of the nominative and accusative case forms attested with some inanimate masculine nouns in Russian, such as *автобус* ‘bus’ and *грузовик* ‘truck’ in (1c), may give rise to interpretive ambiguity stemming from insufficient differentiation between the subject and the object, resulting in the availability of two different readings of the sentence. The examples in (1a-c) above illustrate just a few of the many areas in which problems have been reported for speakers across the bilingual continuum (Benmamoun, Montrul, & Polinsky, 2013a, 2013b; DeKeyser, 2005; Ivanova-Sullivan, 2014; Laleko, 2010; Laleko & Polinsky, 2013, 2016; Montrul, 2016; O’Grady, Lee, & Lee, 2011; Polinsky, 2011, 2015, 2018; White, 2011). It is likely that at least some of these difficulties may be unified as stemming from a more general problem involving indeterminacy as discussed above. If this is indeed the case, it is necessary to tease apart the specific challenges faced by language acquirers in resolving ambiguity in various areas of the target language and identify issues that prevent learners from reaching target-like levels of competence in these domains.

This article addresses the problem of linguistic indeterminacy by comparing HL speakers and L2 learners on their knowledge of grammatical gender agreement in non-transparent contexts, i.e., contexts in which the noun’s formal properties do not unambiguously determine the choice of agreement marking on the associated words. As we will see further below, grammatical gender in Russian is a hybrid system that lies at the intersection of lexicon, phonology, grammar, and discourse. All of these factors affect the agreement behavior of animate nouns in Russian, and the relationships among them are rather complex, with considerable variation observed both across and within different types of nouns. Examining how these distinct factors interact in bilingual and monolingual grammars will allow us to discuss the issue of indeterminacy in language in relation to the following questions: first, what information do bilingual and monolingual speakers take into consideration when calculating gender agreement in fixed and variable contexts; and second, what specific strategies do these speakers employ in resolving ambiguity in the absence of consistent form-meaning mappings?

The present study attempts to answer both of these questions. Specifically, it focuses on two sources of non-transparency in gender marking: *conflict resolution*, observed in the presence of multiple competing cues within a linguistic form, and *underspecification*, which arises when the linguistic form does not provide sufficiently informative cues for evaluating the occurrence of gender marking on associated words. Understanding how different populations of bilinguals resolve ambiguity in these contexts and in what ways, if any, these strategies differ from those employed by their monolingual peers can inform further linguistic and pedagogical investigations

of the nature of bilingual competence and facilitate the development of empirically grounded learner-oriented teaching resources for language instruction.

### 1.1 Gender Marking with Animate Nouns in Russian

As a language with a grammatical category of gender, Russian displays obligatory gender agreement, according to which the gender value of the noun *controller* is reflected in the syntactic behavior of its agreement *targets*, e.g., adjectives, numerals, possessive pronouns, participles, and verbs in the past tense. The linguistic manifestation of gender agreement with adjectives and verbs is illustrated in (2) below:

- (2) a. На кровати лежала белая подушка.  
on bed-LOC lay-F white-F pillow-F  
'There was a white pillow on the bed.'
- b. На кровати лежал белый матрас.  
on bed-LOC lay-M white-M mattress-M  
'There was a white mattress on the bed.'
- c. На кровати лежало белое одеяло.  
on bed-LOC lay-N white-N blanket-N  
'There was a white blanket on the bed.'

Traditional grammars of Russian distinguish three grammatical genders: feminine, masculine, and neuter, as illustrated respectively in (2a-c). The assignment of nouns to one of these three classes may be determined by a combination of two types of principles, semantic and formal. The *semantic* criteria of gender assignment are tied to the meaning of the noun (e.g., nouns denoting females are feminine); *formal* principles, in contrast, depend on the phonological or morphological form of the noun rather than its meaning (Corbett, 1979, 1991, 2013). The masculine and feminine genders account for the majority of Russian nouns: they represent 87% of the nominal lexicon (Comrie, Stone, & Polinsky, 1996) and span across animate and inanimate classes of nouns. The relatively less frequent neuter gender in Russian is associated primarily with inanimate nouns, whose inherent gender values, such as those illustrated in (1a-c) above, are derived on purely formal grounds and not subject to the additional input of the semantic factors. The role of formal factors in the use and processing of grammatical gender with inanimate nouns has been examined in previous work on heritage and L2 Russian (Polinsky, 2008a; Taraban & Kempe, 1999). The present study shifts the focus of attention to the class of *animate* nouns, which have not been treated in an equally systematic way. In contrast to inanimate nouns, whose grammatical behavior falls within the domain of formal gender categorization principles, animate nouns form the semantic core of the Russian grammatical gender system, a domain in which morpho-phonological factors<sup>1</sup> interact with natural gender and referential properties of nouns. Conflicts resulting from these interactions give rise to a high degree of opacity in gender marking, a point that will be discussed in further detail in the next section.

## 1.2 Two Types of Conflict Resolution

This section examines two distinct types of conflict resolution in gender marking with animate nouns in Russian. In a very general sense, both of these conflicts involve a discord between semantic and formal (morpho-phonological) gender assignment mechanisms. The first case of such misalignment is illustrated by nouns denoting males but carrying a typically feminine ending *-a/-я* (e.g., *nana* ‘dad,’ *дядя* ‘uncle,’ *юноша* ‘youth’). The opacity of such nouns stems from the mismatch between their lexical meaning and morpho-phonological form. As evidenced by the obligatory masculine agreement pattern observed with these types of nouns in Russian, the competition between meaning and form within this nominal subclass is always resolved in favor of meaning.

The second type of cue misalignment examined here is represented by the so-called *hybrid nouns*, i.e., formally masculine nouns that allow for both masculine and feminine agreement patterns when referring to females (e.g., *врач* ‘doctor,’ *директор* ‘director’). Here, too, we observe a conflict between form and meaning (Corbett, 1991), although in this particular case the notion of semantic gender is best understood in terms of reference, rather than denotation (see Dahl, 2000 for additional discussion). When the noun’s formal and referential properties are not aligned, the competition tends to be resolved differently by different speakers and in different situations, giving rise to a high degree of variability and optionality in monolingual grammars. Following a detailed overview of both phenomena in the remainder of this section, Section 2 reviews some existing studies on conflict resolution in monolingual and bilingual acquisition, and the Section 3 expands our understanding of the problem of indeterminacy in gender marking with new experimental data from two distinct populations of bilingual speakers. Some linguistic and pedagogical implications of the obtained findings are discussed in Section 4.

### 1.2.1 Phonologically Transparent versus Opaque Nouns.

Cross-linguistically, phonological factors have been shown to play a significant role in gender categorization (Corbett, 1988, 1991; Tucker, Lambert, & Rigault, 1977). The classic study by Tucker et al. (1977) has demonstrated that native speakers rely heavily on phonological endings in gender assignment, particularly when identifying gender of novel nouns, for which semantic cues are not available. In Russian, a language with a predominantly formal gender assignment system, the majority of nouns follow a predictable morpho-phonological gender categorization pattern, according to which most forms ending in *-a/-я* are feminine and those ending in a hard (i.e., non-palatalized) consonant are masculine. In what follows, I will refer to such predictably distributed nouns as formally *transparent*.

Conversely, nouns whose gender value cannot be established accurately on the basis of their morpho-phonological form will be referred to as *opaque*. Masculine nouns ending in *-a/-я* belong to the opaque class. They display the same formal characteristics as the majority of feminine nouns in Russian, both on the basis of their citation form and declensional behavior. Thus, on purely formal grounds these masculine nouns are indistinguishable from feminine nouns across the paradigm; however, the semantic principle of gender categorization places them within the masculine class based on their meaning. This fact is evidenced by a highly predictable and uniform masculine agreement pattern observed with these nouns, illustrated in (3):

- (3) Молодой / \*молодая      папа    играл /\*играла      на гитаре.  
 young-M/F                      dad-M    played-M/F              on guitar-F  
 ‘A young dad played the guitar.’

While the acceptability judgments of agreement patterns in sentences similar to (3) above are by and large uncontroversial, researchers have shown that resolving phonological conflict in determining gender in opaque nouns comes at a cost even for native speakers. For example, adult L1 speakers of Italian have been shown to exhibit more processing difficulties with nouns that had a phonologically-ambiguous gender ending, compared to nouns that ended in a reliable cue (Bates, Devescovi, Pizzamiglio, D’Amico, & Hernandez, 1995) and made a principled distinction between transparent and opaque gender-related endings in processing experiments (Caffarra, Siyanova-Chanturia, Pesciarelli, Vespignani, & Cacciari, 2015). These findings warrant a closer examination of gender resolution in opaque contexts in bilingual grammars, where processing difficulties may develop into performance gaps in contexts involving integration and ranking of different types of cues.

### 1.2.2 Formal versus Referential Agreement with Hybrid Nouns

The obligatory occurrence of masculine agreement with masculine nouns ending in *-a/-я* demonstrates that when lexical rules of gender assignment in Russian conflict with formal rules, the lexical rules take precedence (Corbett, 1991, 2013; Corbett & Fraser, 2000). However, the conflict between meaning and form is not always settled in an unequivocal way. Such unresolved competition is evident in the mixed syntactic behavior of hybrid nouns, i.e., formally masculine nouns that denote occupations held by men and women and correspondingly take agreement in more than one gender.

Hybrid nouns have received considerable attention in recent linguistic literature as a phenomenon representing a clash between semantic and formal features in gender resolution (Comrie et al., 1996; Corbett, 1991, 2013; Dahl, 2000; Rappaport, 2014). For these nouns, the conflict between the competing rules is not entirely settled once and for all, producing different patterns of agreement in different contexts. When denoting a male, the hybrid nouns consistently take masculine agreements. However, when denoting a female, these nouns display a pattern of variable agreement. This dual behavior is illustrated in example (4) below, where both masculine and feminine agreements are possible when the intended referent of the noun *врач* ‘doctor’ is a female:

- (4) Опытный/опытная    врач                      выписал/выписала    рецепт.  
 experienced-M/F          doctor                      wrote-M/F                      prescription-M  
 ‘An experienced (female) doctor has issued a prescription.’

The two competing strategies employed in the choice of an agreement pattern with hybrid nouns referring to females reflect a fundamental contrast between linguistic properties labeled by various researchers as “syntactic” and “semantic” (Corbett, 1991), “lexical” and “referential” (Dahl, 2000), “formal” and “referential” (Rappaport, 2014), or “fixed” and “variable” (Alexiadou, 2004). Regardless of the specific terms used, the crucial contrast captured in all these accounts is one between form-internal (or inward-looking) and form-external (outward-looking or context-

dependent) properties of the noun. On formal grounds, hybrid nouns belong to declension I, which includes masculine nouns; thus, the formal (syntactic) principles of agreement require the use of masculine agreement marking, regardless of the sex of the noun's referent. However, when the referent is known to be a female, this contextual information may optionally override the contribution of formal factors, resulting in the use of feminine agreement.

Crucially, referential assignment rules do not always outrank formal (morpho-phonological) factors in the event of a mismatch between these cues. Instead, the conflict between formal and referential criteria is resolved differently for different target types: with attributive modifiers, formal principles typically outweigh referential rules, whereas in predicate agreement the referential principles seem to take precedence. Generally, the masculine agreement pattern in attributive modifiers is reported to be more common than the feminine pattern; however, the opposite tendency is observed with predicates, which are more likely than attributive modifiers to exhibit feminine agreement (Corbett, 1991, pp. 178, 183-4; Martynyuk, 1990, p. 108). This asymmetry has been formalized as the Agreement Hierarchy, an ordered classification of agreement targets that predicts a relatively higher likelihood of referential agreement further to the right along the following implicational scale: attributive < predicate < relative pronoun < personal pronoun (Corbett, 1979, 1991). The occurrence of referential agreement in the left periphery of the hierarchy implies the occurrence of referential agreement further to the right of the hierarchy. For example, as illustrated in (5), the choice of feminine agreement morphology on the adjective modifying the noun *врач* 'doctor' calls for feminine agreement on the predicate of the clause:

- (5) Опытная врач \*выписал/выписала рецепт.  
experienced-F doctor wrote- M/F prescription-M

'An experienced (female) doctor has issued a prescription.'

Surveys carried out with adult native speakers of Russian have shown that the preferences for the use of masculine or feminine agreement with hybrid nouns are linked to a number of linguistic, stylistic, sociolinguistic, and pragmatic factors (Corbett, 1991; Doleschal & Schmid, 2001; Martynyuk, 1990). Extensive variability in the baseline makes the problem of mixed agreement an interesting phenomenon in the context of bilingual language acquisition and raises a number of questions for research: in contexts characterized by optionality, do heritage and L2 speakers exhibit similar or different strategies of conflict resolution, and to what extent are these strategies resemble those observed for the monolingual controls? In particular, do gender agreement patterns with hybrid nouns follow predominantly formal (syntactic) rules, or are they governed primarily by semantic (referential) principles? Specific hypotheses pertaining to these general considerations are formulated in Section 3.1 below.

### 1.3 The Problem of Underspecification

So far we have considered instances of non-transparent gender assignment in Russian in which a specified grammatical gender value of a noun stands in a competition with a contradicting internal or external cue. The first type of conflict we considered involved lexically masculine nouns ending in *-а/-я*, representing a clash between two form-internal gender categorization factors: lexical meaning and morpho-phonological form. The second type of conflict involved generically

masculine nouns characterized by mixed patterns of agreement; in this case, the opacity was due to a context-induced mismatch between the noun's grammatical gender value and its referential properties.

Common gender nouns represent yet another area of ambiguity in the Russian grammatical gender system; similarly to the previously discussed categories of non-transparent nouns, this nominal subclass also exhibits a lack of invariable correspondence between meaning and form. Forms that represent this group include nouns denoting personal qualities or otherwise characterize people of both genders, e.g. *сладстена* 'sweet-tooth', *соня* 'sleepy-head', *сирота* 'orphan', *коллега* 'colleague'. Unlike the previous two nominal groups characterized by indeterminacy in gender marking, the lack of transparency with these nouns stems from insufficiency of form-internal cues in establishing a gender value, rather than from a conflict among them. Common gender nouns, also known as double gender nouns, form a nominal class that lacks grammatical gender altogether (Dahl, 2000); in other words, they are underspecified for gender. The gender interpretation of such nouns is not straightforwardly predictable either from their morpho-phonological form or lexical meaning. Instead, it is determined situationally via identification with the noun's referent in context. As evidenced by the term itself, double gender nouns are compatible with both masculine and feminine agreement patterns. This fact is illustrated in example (6) below:

- (6) Пожилой/пожилая судья      обратился/обратилась      к адвокату.  
 elderly-M/F                      judge      addressed-M/F                      to lawyer-M  
 'The elderly judge addressed the lawyer.'

At first glance, the agreement behavior of common gender nouns appears to be similar to that of hybrid nouns: as examples (4) and (6) illustrate, both masculine and feminine agreement patterns are attested with both types of nouns. However, the specific contexts in which the two agreement patterns occur differ considerably for the two nominal classes, a point that attests to their different status within the Russian gender system. Hybrid nouns are formally masculine nouns that exhibit variable behavior only when linked with a female referent; and even then, speakers exhibit striking variability and optionality in their use of feminine agreement forms, which are subject to numerous linguistic and extra-linguistic restrictions. On the contrary, agreement with common gender nouns follows a much more consistent pattern, one that adheres more strictly to the referential principle of gender assignment. In the absence of an inherent gender specification, their gender value is determined situationally in context: feminine agreement is used when the common gender noun refers to a female, and masculine agreement occurs when a male referent is intended. In terms of their morpho-phonological form, common gender nouns belong to declension II, which hosts predominantly feminine forms, along with a small group of opaque masculine nouns ending in *-а/-я*, as discussed above. Nevertheless, common gender nouns have a unique status compared to other nominal classes within this declensional type. They do not carry a fixed gender value, and as a result of their form-internal underspecification, the occurrence of masculine or feminine agreement with these nouns is determined externally, i.e., on the basis of their referent in discourse.



## 2. PREVIOUS RESEARCH ON CONFLICT RESOLUTION IN THE ACQUISITION OF GENDER

### 2.1 Conflict Resolution in Early Monolingual Acquisition of Gender

Research on early L1 acquisition of gender has shown that children do not simply rely on rote learning in allocating nouns to genders. Instead, they are sensitive to a variety of cues available in their native language in acquiring the target system of gender, which is typically in place by the age of three. Cross-linguistically, the pattern of acquisition has been shown to correlate with the transparency of overt gender-related cues available in the target language. When faced with competing cues, children appear to be more sensitive to morpho-phonological and syntactic cues (i.e., “intra-linguistic” formal cues) and relatively less sensitive to semantic and referential cues, such as the natural sex of the external referent (Clark, 1986; Henzl, 1975; Koehn, 1994; Kupisch, Müller, & Cantone, 2002; Levy, 1988; Mills, 1986; Pérez-Pereira, 1991). Several studies have underscored the reliance of early L1 learners on phonological strategies of gender resolution, followed by a gradually increasing awareness of semantic and syntactic cues in their continued linguistic development (Berman, 1986; Karmiloff-Smith, 1979; Müller, 1994; Rodina, 2008; Rodina & Westergaard, 2012). For example, in Karmiloff-Smith’s (1979) study of gender-predictive cues in the acquisition of grammatical gender by 341 monolingual French-speaking children aged 3-12, several experiments pointed to the prevalence of morpho-phonological cues across all age groups. Younger children consistently preferred phonological cues to syntactic and semantic cues. In older children, the weight of syntactic and semantic cues gradually increased, although phonology continued to trump semantics in situations where phonological and semantic cues were in conflict (pp. 167-68). Taken together, these results show that the L1 acquisition of grammatical gender is a gradual and complex process that involves mastery of several distinct mechanisms, and that children’s sensitivity to these multiple factors in gender categorization changes with age.

In the literature on the L1 acquisition of gender in Russian, it has been argued that children acquire gender by approximately the age of three, as evidenced by an overall target-like mastery of masculine and feminine agreement with adjectives and predicates observed at this age (Gvozdev, 1961; Maratsos, 1988). However, recent experimental work has also demonstrated considerable individual variation among children and argued for the need to differentiate between the acquisition of formal rules, which appear to be acquired early and apparently exhibit no frequency effects, and semantic rules, which develop more gradually and are more dependent on the frequency of exposure (Rodina, 2008).

Several researchers have suggested that in the course of acquiring the Russian gender system, children initially rely to a great extent on noun endings. During the early stages of acquisition this strategy results in a binary gender system based on formal morpho-phonological principles: nouns ending in *-a/-я* are treated as feminine, nouns ending in a hard consonant are treated as masculine (Gvozdev, 1961; Popova, 1973; Ceytlin, 2005). In these early stages, the majority of developmental errors reflecting an overextension of formal criteria are documented for phonologically non-transparent forms. Based on available linguistic descriptions, such overextensions are particularly frequent for forms ending in *-a/-я*. For example, in Gvozdev’s (1961) longitudinal study of his son’s language acquisition, phonologically opaque masculines like *nana* ‘dad’ occur with feminine agreement until about the age of three.<sup>2</sup> In Rodina’s (2008) cross-sectional study, mostly target-like agreement with these types of nouns was already attested at the age of two, with the exception of some low-frequency nouns like *юноша* ‘youth,’ which were

mastered approximately by the age of 3.6. Similar observations concerning the use of formally opaque masculine nouns are reported in Ceytlin (2005, 2009), who also presents evidence pointing to an overall more frequent occurrence of feminine nouns in early L1 production.

While the conflict between morpho-phonological and lexical cues seems to be resolved relatively early in developing L1 grammars, feminine agreement with hybrid nouns, forms that allow for varying patterns of agreement in adult grammars, appears much later in monolingual acquisition of Russian. These types of targets are still assigned gender by formal criteria at the age of four, and although the use of semantic agreement gradually increases for five- and six-year-olds, the semantic strategy of gender assignment with hybrids referring to females is still not applied in adult-like way by children in the late pre-school years (Rodina, 2008; Rodina & Westergaard, 2012). The researchers interpret these findings as evidence that children master semantic agreement with different subclasses of nouns individually (Rodina & Westergaard, 2012, p. 1099). However, an alternative explanation is also possible if we assume that the notion of *semantic agreement* in fact subsumes two separate agreement mechanisms, associated with distinct acquisitional timelines. The contrast between *nana*-type nouns and *врач*-type nouns in early L1 acquisition would then follow from an asymmetry in the employment of intra-linguistic (lexical) and extra-linguistic (referential) rules in conflict resolution, as discussed above. While the former mechanism engages the interface between the lexicon and grammar, the latter task requires computation at the grammar-discourse interface, mastery of which may demand more time. When formal and lexical cues point in different directions, early acquirers of Russian are quick to establish the relevant ranking between them; however, the weight of the referential criteria in conflict resolution increases slowly and gradually with age as the developing gender systems mature.

## 2.2 Conflict Resolution in Bilingual Acquisition of Gender

Studies of early bilingual language acquisition have demonstrated that the mastery of grammatical gender in bilingual children is by and large similar to that of monolingual language acquirers, with some possible quantitative differences between the two groups. Specifically, it has been shown that the acquisition of gender in phonologically transparent contexts proceeds with more ease for both bilingual and monolingual children, although bilingual children in early stages of language acquisition experience more difficulty than their monolingual peers with morpho-phonologically complex or opaque forms (Kupisch et al., 2002; Rodina & Westergaard, 2013). However, despite some temporary delays reported for bilinguals, likely related to their relatively decreased exposure to input in each language, the developmental patterns overall appear to be rather similar for monolingual and multilingual children (Dieser, 2007; Müller, 2000; Schwartz et al., 2014). With respect to Russian in particular, Dieser's (2007) longitudinal investigation of bilingual and trilingual acquisition of gender showed that the disappearance of overgeneralization errors with opaque masculine forms ending in *-a/-я* overall falls within the maturational timeline reported for monolinguals (i.e., between the ages of two and three).

In contrast to these findings, research on adult L2 acquisition of grammatical gender has documented extensive variability and differential rates of success in mature learners, even those at relatively high levels of proficiency, with respect to gender assignment and gender agreement (Delisle, 1985; Granfeldt, 2000; Grüter, Lew-Williams, & Fernald, 2012; Finneman, 1992; Franceschina, 2005; Harley, 1979; Montrul, Foote, & Perpiñan, 2008; Taraban & Roark, 1996).

When faced with multiple competing cues, L2 learners have been reported to employ various strategies for conflict resolution, suggesting that both semantic and formal factors may in principle serve as gender categorization cues in L2. Yet the exact relationship between these gender assignment mechanisms is not entirely clear. On the one hand, some studies have documented a clear preference for semantic cues (such as the biological sex of the referent) over formal cues (Delisle, 1985; Andersen, 1984; Carroll, 2005) in the acquisition of grammatical gender by adult L2 learners. On the other hand, researchers have presented evidence for the dominance of formal factors, such as the phonological shape of the noun, in the L2 learning of gender categorization (Bordag, Opitz, & Pechmann, 2006). The contribution of noun endings as cues in gender processing in L1 and L2 speakers of Russian has been tested by Taraban and Kempe (1999) in an experiment targeting opaque and transparent nouns. The results showed that L2 learners (but not L1 speakers) demonstrated significantly reduced results with opaque nouns (Taraban & Kempe, 1999), suggesting that formal transparency is a predictive cue in the L2 acquisition of grammatical gender in adulthood. Keeping in mind the previously discussed dynamic nature of gender acquisition in early L1 learners, whose reliance on different gender-predictive cues was shown to depend on age (Karmiloff-Smith, 1979), it remains to be seen if the observed disparity between the relative weight of formal versus semantic factors reported in various studies on L2 acquisition of gender reflects similar developmental factors, such as the participants' onset of exposure to the L2 and their achieved level of proficiency in the target language.

Relatively less is known about grammatical gender in heritage languages. Existing work on heritage Russian has shown that the three-gender system of baseline Russian undergoes significant reanalysis, and that the overall principles of gender assignment operating in the heritage grammar are quite different from those in the baseline system (Polinsky, 2008a). These general differences emerge in speakers at both ends of the proficiency spectrum, as measured by the participants' speech rate and lexical access, despite some variation in the complexity of the gender systems of low-proficiency and high-proficiency speakers (Polinsky, 2008a). In low-proficiency speakers, only the masculine and feminine genders are preserved: nouns that end in a consonant are invariably masculine, and those that end in a vowel are feminine. Speakers at relatively higher levels of proficiency appear to retain the overall three-way distinction; however, due to the loss of case morphology and collapse of declensional paradigms, the distribution of nouns among the three genders is still carried out on the basis of nominal endings (Polinsky, 2008a). These results demonstrate the prevalence of formal (specifically, phonological) factors in gender categorization in heritage Russian. Since existing research on gender in heritage Russian has focused primarily on inanimate nouns, the status of semantic and referential factors in gender assignment has not been explicitly addressed. This problem is examined in the present study.

### **3. CONFLICT RESOLUTION AND REFERENTIAL AMBIGUITY IN HERITAGE AND L2 RUSSIAN**

The studies surveyed in Section 2 above provide a convincing body of evidence for the observation that both monolingual and bilingual language acquirers experience temporary or lasting difficulty with some aspects of the grammatical gender system represented in their target language. Overwhelmingly, researchers have pointed to lack of formal transparency and inconsistent form-meaning mapping as contexts where monolingual and bilingual acquirers exhibit difficulties in production or comprehension of gender. However, depending on the age and context of acquisition, among other factors, different populations of language learners have been shown to employ distinct strategies and reach varying outcomes in overcoming these problems. It is likely

that at least some of this variation may be related to the differential salience of lexical, morpho-phonological, and referential principles in gender categorization for different types of speakers. To probe into the nature of these differences, the present study examines the knowledge of non-transparent gender agreement in two populations of English-dominant bilinguals: heritage speakers and L2 learners of Russian.

In order to obtain a more comprehensive understanding of strategies employed by the bilingual and monolingual speakers in dealing with linguistic indeterminacy, the study analyzes two specific manifestations of non-transparency within the Russian gender system: (i) conflict between different types of cues in gender categorization, and (ii) ambiguity arising from underspecification. With respect to (i), two distinct types of conflict resolution are examined, both involving, in a general sense, a form-meaning mismatch. The first type of such mismatch, resolved at the lexicon-grammar interface, is represented by morpho-phonologically opaque nouns whose lexical gender value is not predictable from their morpho-phonological form (e.g., *мужчина* ‘man’). Misalignment of the second type, mediated at the grammar-discourse interface, results in varying (i.e., syntactic or referential) patterns of agreement observed with hybrid nouns (e.g., *доктор* ‘doctor’). With respect to (ii), the study examines the agreement behavior of referentially ambiguous common gender nouns, whose interpretation is underspecified in the grammar but is calculated situationally based on the sex of their discourse referent (e.g., *коллега* ‘colleague’). The specific hypotheses and predictions of the study are discussed in Section 3.2 below.

### **3.1 Participants and Methodology**

Sixty-five speakers of Russian participated in the study, including 29 heritage speakers of Russian residing in the U.S. (mean age = 19.4), 20 adult second language learners of Russian residing in the U.S. (mean age = 18.9), and 16 adult monolinguals residing in Russia (mean age = 23.6). Prior to completing the test, all participants filled out a detailed sociolinguistic questionnaire administered in their dominant language. Based on this survey, a characteristic distinction emerged between HL and L2 speakers of Russian based on the timing and context of their exposure to the target language. In particular, all HL speakers began acquiring Russian at home, through naturalistic interaction with parents and other family members, but reported switching to English shortly after entering pre-school. This scenario is typical of early subtractive bilinguals, i.e., speakers whose L1 exposure is interrupted by a switch to another, more dominant, language, eventually leading to reduced use of and diminished proficiency in the societally non-dominant L1 in adulthood. Consistent with this characterization, all participants in the heritage language group indicated English to be their current main and most frequently used language of communication, although the survey also pointed to a continued use of Russian in limited domains (i.e., with family and friends). In contrast, all participants in the L2 group were introduced to Russian in an academic setting as adults, i.e., through high school and/or college-level Russian classes (mean length of classroom exposure = 3.4 years) and reported using Russian primarily with teachers, classmates, and friends, but not with family members. In addition to the demographic details, the participants were also asked to provide self-ratings of their Russian language skills in the four modalities of language use on a 1-10 scale (1 = “cannot understand/speak/read/write in Russian at all;” 10 = “can understand/speak/read/write in Russian like a native speaker”). These ratings further highlight the previously observed contrast between the two bilingual populations stemming from the different circumstances of their exposure to Russian. As expected in the context of early naturalistic acquisition, the self-ratings provided by HL speakers place greater emphasis on their

aural and oral skills (the highest scores in this bilingual group involve speaking Russian and understanding spoken Russian). Conversely, L2 learners assess themselves higher in the two domains associated primarily with formal academic exposure (reading and writing in Russian) and are relatively less confident in their oral communication skills. Table 1 below summarizes the relevant demographic details for the two groups of bilingual participants.

**Table 1.**

*Demographic Summary for the Bilingual Participants, Mean (Range)*

<b>Participants</b>	<b>HL (N = 29)</b>	<b>L2 (N = 20)</b>
Age of arrival to the U.S.	<b>2.1</b> (0-7)	<b>0</b>
Age of switch to English	<b>4.6</b> (0-7)	<b>0</b>
Average daily use of Russian (%)	<b>26.3</b> (5-45)	<b>10.7</b> (1-20)
Understanding spoken Russian (1-10 scale)	<b>8.3</b> (5-10)	<b>5.2</b> (3-7)
Speaking Russian (1-10 scale)	<b>7.1</b> (4-10)	<b>4.6</b> (2-7)
Reading in Russian (1-10 scale)	<b>6.5</b> (4-10)	<b>6.1</b> (3-9)
Writing in Russian (1-10 scale)	<b>6.1</b> (4-10)	<b>5.7</b> (2-9)

In the main experiment, acceptability ratings were elicited on a 5-point Likert scale (1 = “completely unacceptable”; 5 = “completely acceptable”) for 72 sentences involving gender-matched (or gender-concordant) and gender-mismatched (or gender-discordant) agreement combinations involving animate nouns in Russian. Nouns in each experimental condition occurred separately with two types of agreement targets, adjectives and past tense verbs. Only one agreement combination was presented per sentence; thus, sentences targeting noun-adjective agreement patterns ( $n = 36$ ) contained verbs in the present tense (where no gender agreement is observed in Russian), and sentences designed to elicit noun-verb agreement preferences ( $n = 36$ ) were presented without attributive modifiers. The experiment was untimed, and all stimuli were presented in a randomized manner visually on a computer screen (as shown in Table 1, all study participants were able to read in Russian, an area where the mean self-assessment scores obtained from the two bilingual groups were within a close range of each other). In addition to the main experimental stimuli, the study included 96 filler sentences targeting unrelated grammatical phenomena; speakers who performed at chance on the fillers were not included in the main study.

The experimental stimuli included sentences with gender-concordant and gender-discordant agreement combinations involving animate nouns of the following six types: (1) transparent masculine nouns, (2) opaque masculine nouns ending in *-a/-я*, (3) transparent lexically feminine nouns, (4) transparent morphologically derived feminine nouns, (5) hybrid nouns, (6) common gender nouns. The target noun phrases (NPs) in all experimental sentences were presented in the nominative case.<sup>3</sup>

### 3.2 Hypotheses and Predictions

Based on the considerations discussed in Section 2, the following differences between HL and L2 speakers of Russian were expected to emerge in the experiment. With respect to conflict resolution, assuming that the mismatch between lexical and formal cues in masculine nouns ending in *-a/-я* is overcome relatively early in L1 acquisition of Russian but presents a lingering problem for late L2 learners, we may expect HL speakers (early bilinguals) to outperform L2 learners (late bilinguals) in conditions targeting formally opaque nouns. At the same time, since delays or problems in the processing of non-transparently-marked nouns have been reported for both bilingual populations, we may also observe a contrast between the heritage and baseline speakers in at least some experimental conditions targeting this type of form-meaning mismatch. Specifically, if HL speakers and L2 learners are guided to a greater extent by morpho-phonological gender assignment cues than by those retrieved from the lexicon,<sup>4</sup> sentences involving incongruous agreement combinations with opaque masculine nouns may be rated relatively higher in both bilingual groups.

The second type of indeterminacy stemming from cue competition in the marking of gender in Russian involves hybrid nouns referring to females; thus, we may predict some differences in the ratings of bilingual and monolingual speakers in contexts involving feminine agreement with these nouns. The use of feminine agreement with hybrid nouns referring to females in Russian is to a large extent stylistically governed: the masculine pattern is typically observed in formal and written styles, while the feminine pattern is more common in spoken and colloquial registers. This division may find its reflection in differential rates in the acceptance of feminine agreement in the two populations of bilinguals. As stated previously, HL speakers are early naturalistic bilinguals whose primary linguistic exposure to Russian takes place in a home environment. As a result, adult HL speakers typically exhibit more familiarity with informal and colloquial styles of their family language, but struggle with its more formal and written aspects (Montrul, 2016; Polinsky & Kagan, 2007; Polinsky, 2015). In contrast, formally instructed adult L2 learners generally perform better on written tests and in formal contexts, but may experience difficulty with informal registers associated with everyday language use outside the classroom setting.

At the same time, there are reasons to expect that both populations of bilinguals may under-accept feminine agreement with hybrid nouns, compared to native speakers, because this pattern represents an optional linguistic phenomenon in Russian. It occurs in a limited set of contexts and is subject to multiple restrictions. A stricter adherence to the more systematically represented masculine agreement pattern, which covers both referential contexts, would be the safer (i.e., more straightforward) strategy for speakers providing judgments in their non-dominant language.

Finally, the following predictions can be formulated with respect to our last set of conditions, involving feminine and masculine agreements with common gender nouns. Previous work on heritage Russian has documented persistent problems in advanced HL speakers with constructions characterized by underspecification, i.e., in contexts where the choice between two grammatically equivalent linguistic options can be resolved only at the level of discourse (Laleko, 2010, 2015). Discourse-level computation has been linked with comprehension and production problems in heritage and L2 speakers alike (Domínguez, 2013; Laleko & Polinsky, 2013, 2016; Montrul, 2004; Rothman, 2009; Serratrice, Sorace, & Paoli, 2004; Sorace, 2011). Taken together, these findings

predict difficulty for both bilingual groups in contexts where the target-like use of gender agreement requires referent-tracking in discourse.

At the same time, agreement with common gender nouns has been shown to be mastered relatively early in child L1 acquisition of Russian. Children between 2;6 and 4;0 years of age appear to be able to assign two genders to the same noun, correlated to the sex of the discourse referent (Rodina, 2008). Assuming, in the case of early bilinguals, that some aspects of heritage language competence are shaped by these speakers' early language experience, these findings may suggest a more target-like performance of HL speakers, compared to L2 learners, with respect to these nouns. These predictions are summarized in (7) below.

### 7. SUMMARY OF PREDICTIONS

1. Target-like ratings of agreement patterns with formally transparent nouns in both bilingual groups.
2. Greater reliance on formal cues with non-transparent nouns in both groups of bilinguals compared to monolinguals; namely:
  - 2a. Over-acceptance of feminine agreement with formally opaque nouns by bilinguals;
  - 2b. Under-acceptance of feminine agreement with hybrid nouns by bilinguals;
  - 2c. Under-acceptance of masculine agreement with common gender nouns by bilinguals.
3. Advantage of HL speakers over L2 learners.

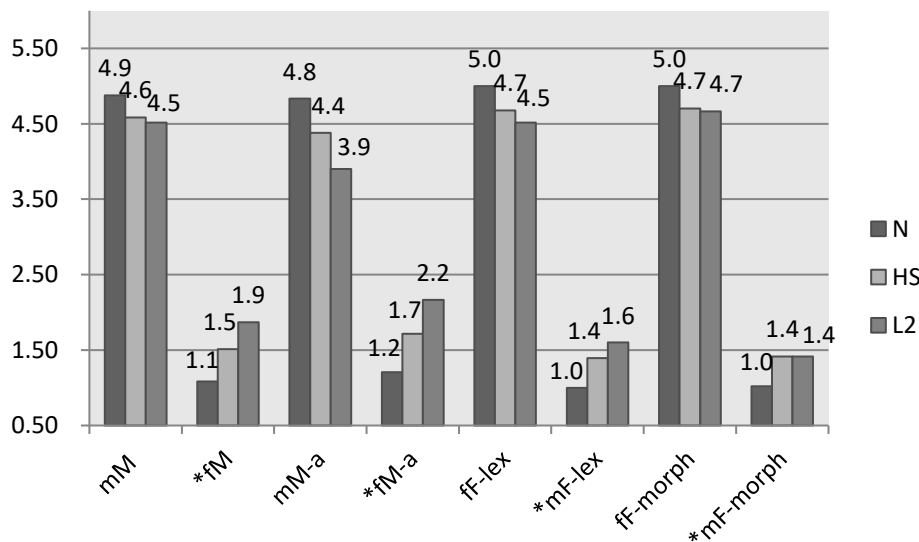
### 3.3 Results

Statistical analyses were carried out using Bonferroni-corrected Welch's unequal variances t-tests in R. Figures 1 and 2 summarize the results for gender-concordant and gender-discordant adjective-noun (Figure 1) and noun-verb (Figure 2) combinations with formally transparent and opaque nouns. First, I present the results for transparent nouns, i.e. nouns whose grammatical gender value is predictable from their morpho-phonological form. Three groups of transparent nouns were included in the experiment: lexically feminine forms (e.g., *невеста* 'bride'), morphologically derived feminine forms (e.g., *гимнастка* '(female) gymnast'), and lexically masculine forms (e.g., *мальчик* 'boy'). Speakers in all participant groups exhibited highly significant ( $p < 0.01$ ) contrasts between congruous and incongruous sentences in all conditions characterized by formal transparency. This finding suggests that all speakers in the study demonstrate target-like knowledge of gender agreement in non-ambiguous contexts, i.e., in the absence of conflicts among different types of cues. Thus we can assume that the syntactic mechanism of gender agreement is in place in both heritage and L2 grammars, and that any difficulties that may be detected in non-transparent agreement contexts cannot be reduced to global problems with grammatical gender stemming from the absence of such category in English, the bilingual speakers' dominant language.

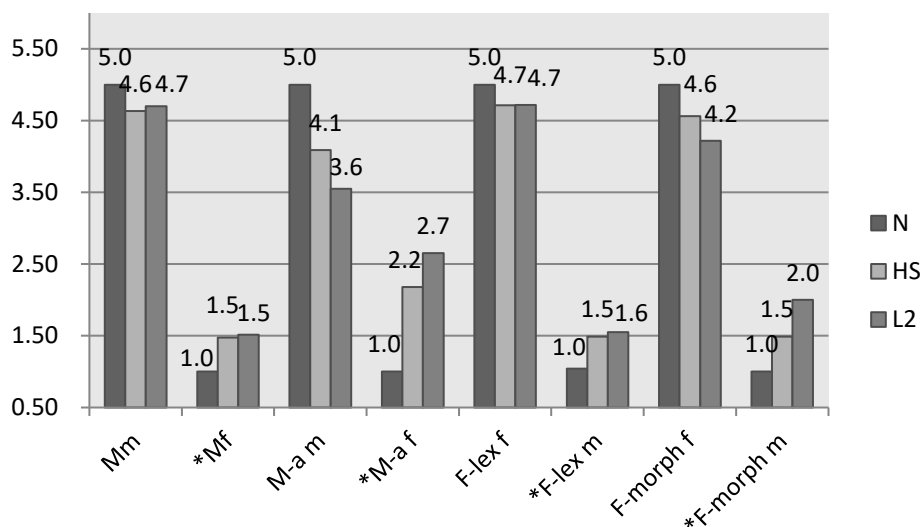
Keeping these results in mind, we can now examine the data on gender agreement in non-transparent contexts. First, we consider the distribution of opaque masculine forms ending in *-а/-я*. Recall that these nouns represent a conflict between the noun's lexical meaning and its morpho-phonological form. Ratings obtained from the monolingual speakers of Russian in the control group confirm that this conflict is in fact resolved unambiguously in baseline Russian in favor of

meaning. Both types of masculine agreement targets (adjectives and verbs) were rated as highly acceptable with transparent and opaque masculine nouns, with no statistical difference emerging in these conditions ( $p > 0.05$ ); in other words, the acceptability of masculine agreement marking with opaque masculine nouns did not decrease for monolinguals despite their formal similarity to nouns of the feminine class. Now, we turn to the results obtained in the two bilingual groups. In the adjective agreement condition, the difference between transparent and opaque forms turned out to be significant for L2 learners ( $p = 0.01$ ), where higher ratings were obtained for masculine adjectives occurring with transparent masculine nouns, and relatively lower ratings occurred for these modifiers with formally opaque masculine nouns. No such differences in the adjective agreement condition were detected in the data from HL speakers ( $p > 0.05$ ). However, the two bilingual groups converged in conditions targeting verb agreement. Here, the difference between transparent and opaque masculine nouns proved to be significant in both groups. In the congruous condition, masculine verbs were rated significantly lower (i.e., were less acceptable) when occurring with opaque masculine nouns, compared to those presented with transparent masculine nouns ( $p < 0.01$ ). Conversely, in the incongruous condition, verbs carrying feminine agreement marking received higher ratings in the presence of opaque masculine nouns, compared to transparent masculine nouns ( $p < 0.01$ ). Additional across-group comparisons confirmed that HL speakers patterned with baseline controls on conditions involving adjective agreement ( $p > 0.05$ ), but were indistinguishable from L2 learners on conditions involving verb agreement ( $p > 0.05$ ).

**Figure 1.** Acceptability Ratings for Adjective Agreement with Formally Transparent and Opaque Nouns<sup>5</sup>





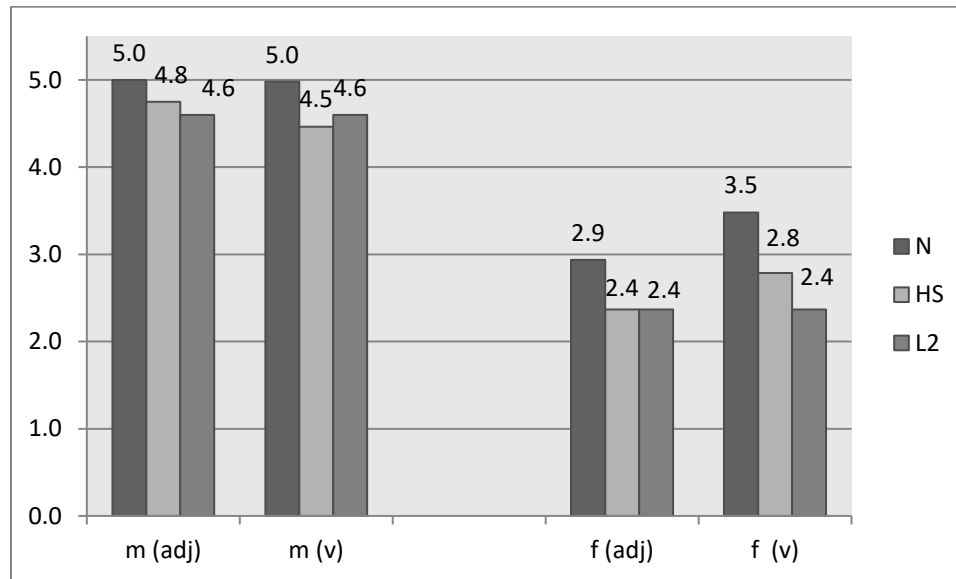
**Figure 2.** Acceptability Ratings for Verb Agreement with Formally Transparent and Opaque Nouns

Next, I present the results for sentences illustrating the use of referential (feminine) and syntactic (masculine) agreement with hybrid nouns (e.g., *водитель* ‘driver’). Recall that both agreement patterns are possible with these formally masculine nouns in Russian, although the feminine pattern is considerably more restricted in its distribution than the masculine pattern. The mean ratings for the two patterns of agreement with hybrid nouns are presented in Figure 3 below. Overall, as expected, speakers in all participant groups exhibited a statistically significant preference toward masculine agreement over feminine agreement ( $p < 0.01$ ) with hybrid nouns. Thus, all participants displayed a clear preference for formal agreement over referential agreement in the context of an acceptability judgment task. This finding provides experimental evidence in support of previous accounts that report the prevalence of the syntactic agreement pattern with hybrid nouns in Russian (Corbett, 1991; Martynyuk, 1990). At the same time, it demonstrates that the conflict between syntactic and referential agreement within this nominal class is not resolved in a categorical way, as evidenced by the absence of clear ungrammaticality in the baseline ratings of the feminine agreement pattern.

In order to provide a more detailed analysis of the ratings provided by the monolingual and bilingual participants for the referential agreement pattern with hybrid nouns, additional across-group comparisons were performed for conditions illustrating feminine agreement on adjectives and verbs. The acceptability of feminine agreement on adjectives with hybrid nouns in Russian is generally low, but verbs typically display feminine marking more freely. Consistent with this observation, no statistically significant differences among the three participant groups emerged in the adjective condition, where gender agreement was shown to be determined primarily by formal factors in all the three groups ( $p < 0.01$ ). However, a different pattern emerged in the verb condition, where the feminine agreement in Russian is most likely to occur. Here, baseline speakers exhibited the highest ratings for referential agreement among the three participant groups and demonstrated significantly higher ratings than the bilinguals ( $p < 0.01$ ) for the feminine

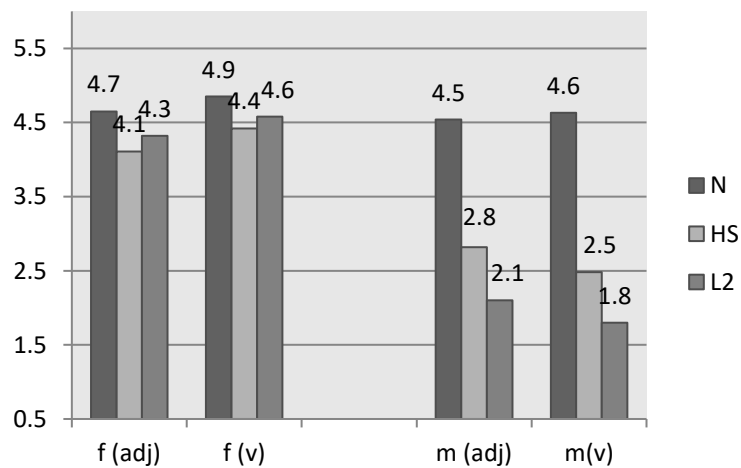
pattern. Conversely, HL and L2 speakers were alike ( $p > 0.05$ ) in providing significantly lower ratings for referential agreement.

**Figure 3.** Acceptability Ratings for Adjective and Verb Agreement with Hybrid Nouns



Having addressed two distinct types of conflict resolution in gender agreement, I turn to the results pertaining to the distribution of feminine and masculine agreement patterns with common gender nouns, characterized by the highest degree of underspecification in the Russian grammatical gender system. The results for masculine and feminine adjective and verb agreement patterns with common gender nouns are presented in Figure 4.

**Figure 4.** Acceptability Ratings for Agreement with Common Gender Nouns



Ratings obtained from the baseline speakers of Russian offer strong empirical support to the observation that common gender nouns occupy a unique place in the Russian grammatical gender system. Statistical comparisons between feminine and masculine agreement conditions showed no significant differences in either adjective or verb agreement contexts ( $p > 0.05$ ) in the monolingual group. In contrast, both HL speakers and L2 learners displayed a clear statistical preference ( $p < 0.01$ ) for feminine over masculine agreement patterns with these nouns, with both types of agreement targets (adjectives and verbs). These findings suggest that speakers in both bilingual groups are guided by morpho-phonological, rather than referential, criteria in assigning gender to otherwise genderless common gender nouns. The observed under-acceptance of the masculine agreement pattern points to a different status of the underspecified common gender forms in the bilingual and monolingual grammars. In particular, these forms remain open-valued in baseline Russian but acquire a feminine specification in the heritage and L2 gender systems.

Further across-group comparisons demonstrated that the three groups of speakers were not the same in conditions involving masculine agreement with common gender nouns ( $p < 0.01$ ). While HL speakers differed both from L1 and L2 speakers (and L1 and L2 groups differed from each other as well), the mean ratings obtained from the HL speakers were quantitatively closer to those in the L2 group (Figure 4). This pattern of results was attested in both adjective and verb agreement contexts, a finding that attests to a systematic nature of the observed changes in the use of referential agreement by bilingual speakers.

The consistently low ratings for the use of masculine agreement with common gender nouns in the two bilingual populations raise the question of whether these speakers reanalyze common gender nouns as invariably feminine. If so, the ratings for masculine agreement with common gender nouns ending in *-a/-я* (e.g., *коллега* ‘colleague’) could converge with those obtained for masculine agreement with invariably feminine nouns ending in *-a/-я* (e.g., *девушка* ‘young lady’) for speakers who assign nouns to genders strictly on the basis of formal criteria. To address this question, statistical comparisons were performed between these two sets of conditions in each participant group. As expected, statistically significant contrasts between the gender-specific and gender-ambiguous nouns emerged in the baseline group ( $p < 0.01$ ), suggesting that native speakers of Russian make a principled distinction between fixed and variable gender assignment. A similar target-like contrast was further obtained for HL speakers ( $p < 0.01$ ). However, L2 learners did not display a significant difference between these conditions ( $p > 0.05$ ) and treated lexically feminine nouns on par with common gender forms. These results show that L2 learners do not distinguish between lexical and referential principles of gender assignment in Russian; instead, they reanalyze common gender nouns as invariably feminine on the basis of their morpho-phonological form. In contrast, while HL speakers experience greater difficulty in contexts targeting referential agreement, they nevertheless retain the fundamental distinction between lexical and referential principles in gender assignment.

### 3.4 Discussion

The analysis of ratings obtained in sentences with formally transparent and opaque nouns points to a distinction between the monolingual and bilingual strategies for resolving a conflict between *lexical* and *formal* factors in gender assignment. While the judgments provided by native monolingual speakers of Russian were altogether unaffected by the inclusion of opaque forms, both heritage and L2 speakers exhibited diminished accuracy with non-transparent nouns. This

difference suggests that morpho-phonological factors play a relatively more prominent role in bilingual gender processing than they do for monolinguals. Despite the fact that both HL speakers and L2 learners showed a similar difficulty with opaque nouns, a significant contrast also emerged between the two bilingual groups. The L2 learners diverged in their acceptability ratings from the monolingual controls across the experiment, i.e., in both adjective and verb agreement conditions. These results are in line with earlier findings for Russian reported in Taraban and Kempe (1999), who demonstrated that L1 processing of gender in Russian is not complicated by lack of phonological transparency, while advanced L2 learners of Russian exhibit difficulty in processing sentences with ambiguously marked nouns. In contrast to the L2 group, the HL speakers' ratings were split between the adjective and verb agreement conditions, suggesting a relatively less pervasive influence of formal factors in this group. When processing agreement locally within the noun phrase, HL speakers patterned with the baseline controls; however, when faced with the problem of linking the controller with its target at a distance to evaluate subject-verb agreement, their acceptability judgments decreased and became similar to those of L2 learners. The amplified difficulty of carrying out long-distance operations and maintaining longer dependencies has been documented for a number of phenomena in heritage languages (Benmamoun et al., 2013a; Montrul & Polinsky, 2011; O'Grady, 2011; Polinsky, 2018). The results reported here corroborate these findings in yet another domain of heritage language architecture.

Another case of gender cue misalignment examined in the study involved a competition between *formal* and *referential* factors in the categorization of hybrid nouns. In verb agreement conditions, where the likelihood of referential agreement in Russian is particularly high (Martynyuk, 1990), across-group analyses revealed a significant contrast between the monolingual and bilingual speakers in their acceptability of feminine agreement. As predicted, speakers in both bilingual groups provided statistically lower ratings for the use of feminine agreement than baseline controls. The observed under-use of referential agreement by HL and L2 speakers in contexts where it is represented robustly in the monolingual group attests to the pervasiveness of the previously discussed pattern of results. Namely, in resolving a conflict between meaning and form, the bilinguals appear to be more likely than the monolinguals to rely on form. If on the right track, this observation also accounts for the statistically uniform treatment of feminine agreement by the monolingual and bilingual speakers in the adjective condition (Figure 3), where the weight of formal criteria has been argued to be relatively greater in determining agreement (Corbett, 1991). Assuming that bilinguals are guided first and foremost by formal factors as a general strategy in gender agreement, we may correctly predict greater accuracy in contexts where formal factors determine gender agreement in the baseline (i.e., adjective agreement) and, conversely, relatively lower accuracy in contexts where referential factors prevail (i.e., verb agreement).

Keeping in mind the existing surveys of contemporary colloquial Russian, which document a continued increase in the overall use of feminine agreement with hybrid nouns over time (Corbett, 1991; Comrie et al., 1996; Rothstein, 1973), it is notable that the mean scores obtained from the baseline Russian speakers for conditions illustrating feminine agreement with hybrid nouns were not at ceiling (2.9 for adjective agreement, 3.5 for verb agreement on a 1-5 scale). In other words, the native speakers of Russian as a group preferred the masculine agreement pattern with hybrid nouns over the feminine pattern across all experimental conditions. One reason for this result could be related to the association of feminine agreement with generic masculine nouns in Russian with low registers; this agreement pattern is typically avoided in formal styles and in written documents

(Doleschal & Schmid, 2001; Rothstein, 1973). It is possible that some of the native speakers demonstrated a bias against feminine agreement in a test setting, a hypercorrection that would have dissipated in colloquial language use. In this case, they could have assigned higher ratings to forms that they believed to be more prescriptively correct rather than to those that sounded more natural (a similar observation is made in Corbett, 1991, p. 232). In fact, results obtained from production experiments point in this direction. For example, a recent study of child L1 acquisition of Russian reported that 78.5% of adult caregivers produced feminine verb agreement with hybrid nouns referring to females in an oral interview (Rodina, 2008, p. 118). Whether heritage and L2 speakers may also become more accepting of feminine agreement with hybrid nouns in oral production is something that needs to be tested in future experimental work.

The results of the present study also warrant a closer examination of how input frequency may affect the knowledge and use of gender agreement by bilingual speakers. Frequency in input has been discussed as an “all-pervasive causal factor” in language acquisition (Ellis, 2002, p. 179); at the same time, researchers also have underscored the complexity of the issue by showing that the effects of frequency do not always adequately account for the observed empirical facts and must be considered along with other factors, including morpho-phonological regularity, semantic complexity, communicative salience, maturational constraints, and, in the context of L2 acquisition, dominant language transfer (Gass & Mackey, 2002). Interactions among some of these factors in the acquisition of grammatical gender have been examined by several researchers (e.g., Carroll, 2005; Gudmundson, 2013; Szagun, Stumper, Sondag, & Frank, 2007; Unsworth, 2008), but a consensus has not yet been reached with respect to the relative ranking among these factors. For example, Szagun et al. (2007) showed that the frequency with which individual nouns occurred in adult speech had a “mild influence” on the correctness of gender assignment by child L1 learners of German (p. 468); at the same time, the study offered strong evidence for the early use of phonological cues in the L1 learning of gender by German-speaking children.

The results of the current study similarly point to the strong influence of morpho-phonological regularity on the acceptability of gender agreement by HL and L2 speakers of Russian. Across all experimental conditions, the bilingual participants exhibited an overall stronger reliance on formal cues, compared to the monolingual controls, in their acceptability judgments of possible and impossible gender agreement combinations. In fact, this pattern was significant even in conditions involving high-frequency kinship terms represented by formally opaque masculine forms ending in *-а/-я* (*папа* ‘dad’, *дядя* ‘uncle’, *мужчина* ‘man’), for which over-acceptance of the illicit feminine agreement pattern was attested in both bilingual groups. These results indicate that the issue of input frequency is indeed rather complex: at the very least, they suggest that high frequency alone does not guarantee target-like knowledge of the relevant grammatical phenomena. It is hoped that future studies will provide further investigations of the distributional properties of the linguistic input available to bilingual speakers and the specific ways in which its qualitative and quantitative properties may interact with other factors affecting the knowledge and use of gender agreement in distinct populations of bilinguals<sup>6</sup>

Finally, the study addressed the ultimate case of indeterminacy in form-meaning relations in the Russian gender system, represented by the class of common gender nouns, which lack form-internal gender specification. The analysis of agreement preferences with common gender nouns in the native speaker group showed a remarkable uniformity across all experimental conditions.

No statistical differences were detected in the ratings for either the masculine or feminine pattern of agreement, in either adjective or verb agreement contexts. In sharp contrast, speakers in both bilingual groups showed a strong preference for sentences in which common gender nouns occurred with feminine agreement targets, a tendency that proved equally robust in adjective and verb agreement conditions. This major qualitative difference between the monolingual and bilingual groups suggests that different gender allocation mechanisms are likely to be employed by these speakers in categorizing common gender nouns. Whereas baseline speakers were guided by the referential criterion alone, with no statistically detectable impact of formal factors on their judgments, the bilingual speakers did not employ referential agreement and instead followed the formal gender assignment principle in categorizing these nouns as feminine.

The strong preference for the formal strategy in categorizing common gender nouns in the bilingual speakers' ratings could stem from a combination of several independent factors. On the one hand, this strategy is more economical in processing terms because it minimizes referential ambiguity associated with underspecified forms by eliminating the need to rely on extra-linguistic and contextual information while performing linguistic operations. The reanalysis of referentially ambiguous nouns into feminine forms on the basis of their morpho-phonological properties serves to increase the overall transparency of the resulting gender system by strengthening the predictability of form-meaning mappings within that system. On the other hand, reliance on formal cues in evaluating agreement with common gender nouns could also be a reflection of the bilingual speakers' smaller vocabularies in the non-dominant language, problems or delays with lexical access and retrieval, or, particularly in the case of L2 learners, limited experience with informal and colloquial registers. Common gender nouns are a relatively small nominal class in Standard Russian, and many nouns in this class occur predominantly in vernacular varieties (Comrie et al., 1996; Nikunlassi, 2000; Rothstein, 1973). Coupled with their exceptional dual status within the Russian gender system, all of these factors make the class of common gender nouns a harder target in the acquisition process. With these considerations in mind, it is particularly notable that the preference for formal agreement was attested in both bilingual groups even with high-frequency (Sharoff et al., 2013) common gender forms that are stylistically neutral (e.g., *коллега* 'colleague', *судья* 'judge'), for which the aforementioned lexical and register problems are unlikely. In line with previous work pointing to frequency and economy as separate and independent factors in language acquisition process (e.g., Anderssen & Westergaard, 2010), these observations suggest that the overall greater preference toward formal agreement observed in both bilingual groups does not appear to be confined to low-frequency words across nominal classes and must be considered in relation to a wider range of linguistic and extra-linguistic factors (see Gülzow & Gagarina, 2007; Behrens & Pfänder, 2016).

Taken together, the results reported in this study reinforce the emerging pattern of increased sensitivity to formal cues when computing gender, a trend manifested in different sets of experimental conditions in two distinct populations of bilingual speakers. However, an important difference also emerges between the bilingual groups with respect to the pervasiveness of the formal gender assignment principle in their grammars. In particular, speakers in the L2 group consistently demonstrate a more categorical dependence on a noun's morpho-phonological form than HL speakers when evaluating gender agreement. The across-the-board prevalence of the formal gender assignment strategy in the L2 data is manifested most vividly in the homogeneous treatment of the masculine agreement pattern with different types of nouns ending in *-а/-я*,

regardless of their agreement behavior in baseline Russian. Specifically, masculine agreements with lexically feminine nouns are rated statistically on par with common gender nouns, despite the fact that the former combination is completely ungrammatical in baseline Russian (cf. (3) above) and the latter represents a perfectly grammatical option (cf. (6)). This finding is particularly striking considering that the lexically feminine nouns (e.g., *mother, sister, daughter, wife*) represent the category of natural gender (Corbett, 2013), which cross-linguistically consists of kinship terms belonging to the class of basic vocabulary items. In terms of their overall frequency, these words generally outnumber nouns of the common gender type. With these considerations in mind, the observed uniformity in the acceptance rates of masculine agreements with these distinct types of nouns characterized by formal similarity suggests that L2 learners are guided strictly by the morpho-phonological form of the noun controller in determining the possible and impossible agreement targets. In doing so, they differ from HL speakers, who clearly differentiate between lexical assignment and discourse-level assignment when rating nouns ending in *-a/-я*. In contexts of the latter type, HL speakers fall short of the judgments of monolingual speakers but still outperform L2 learners.

These results place HL speakers into a unique intermediate position between the L1 and L2 populations. The “in-between” status of these speakers has been discussed in numerous studies by researchers striving to outline specific parallels and differences among uninterrupted L1, heritage, and L2 acquisition, with particular attention to such factors as the age and environment of acquisition and the amount and type of input in the target language (Montrul et al., 2008; Montrul, 2010; O’Grady et al., 2011; Polinsky, 2015). One common theme of these studies, and many others, has been the question of what specific advantages, if any, the early linguistic experience of HL speakers may offer for subsequent language maintenance and re-learning. With respect to gender categorization with animate nouns in Russian, one consistent advantage of HL speakers observed in the present study had to do with greater sensitivity to lexical and referential factors, particularly in contexts where these factors clashed with formal cues. As is generally assumed in the language acquisition literature, the mastery of nouns whose gender value is not fully predictable from their morpho-phonological form typically requires greater exposure to input. The global advantage demonstrated by HL speakers over L2 learners in resolving the form-meaning conflict in favor of meaning is a likely consequence of these speakers’ access to the relevant input in an early naturalistic setting, an experience that allows them to encounter a greater variety of form-meaning mappings in the target language.

#### **4. CONTEXTUALIZING THE FINDINGS: LINGUISTIC AND PEDAGOGICAL IMPLICATIONS**

As the field of heritage language acquisition continues to emerge as an interdisciplinary field of inquiry, our understanding of the linguistic properties of heritage languages expands in tandem with advances in heritage language pedagogy (Polinsky & Kagan, 2007; Polinsky, 2015). In this section, I discuss some linguistic and pedagogical implications of the results obtained in the present study in light of the pertinent questions of each field and discuss some ways in which the present study can inform these issues.

In striving to account for the lack of full convergence between a heritage grammar and a corresponding baseline system, researchers have proposed various explanations for what might determine the development of a heritage language. On the one hand, divergence from the baseline has been attributed to *incomplete acquisition* of the target language due to arrested language

development and fossilization in the childhood years (Montrul, 2006, p. 351). On the other hand, subsequent *attrition and reanalysis* of the linguistic representations in the heritage language have been shown to affect the outcome of heritage language acquisition (Polinsky, 2008b, p. 161). These two possible sources of divergence can be teased apart in a longitudinal study, in a cross-sectional study comparing child and adult HL speakers, or by analyzing the acquisition of the same linguistic phenomenon in heritage and child L1 speakers. While longitudinal studies addressing this question are yet to come, other methods have been successfully applied in recent work on heritage Russian. For example, based on comparisons between child and adult HL speakers of Russian on their narrative structure (Polinsky, 2008b) and comprehension of relative clauses (Polinsky, 2011), Polinsky demonstrates that the grammar of adult HL speakers is not a fossilized child grammar but a system that undergoes gradual attrition and reanalysis.

When compared with the existing data on early L1 acquisition of Russian, the findings of the present study reveal several points of difference between adult HL speakers and monolingual children, which provide additional support for the reanalysis hypothesis. Recent work on the acquisition of gender in L1 Russian shows that children do not rely on morpho-phonology in assigning gender to novel common gender nouns, but use these nouns in referentially-appropriate ways (Rodina, 2008, p. 172). In contrast, the results reported in the present study demonstrate that adult HL speakers of Russian, unlike early L1 acquirers, exhibit a strong tendency to assign common gender nouns to the feminine class, based on their morpho-phonological form. This qualitative difference in gender allocation strategies observed between early L1 acquirers and adult HL speakers lends support to the idea that heritage language acquisition cannot be reduced to fossilization of an early L1 grammar.

Another contrast between child acquirers and adult HL speakers is evident in these speakers' differential sensitivity to different nominal subclasses within the Russian gender system. In their acquisition of Russian, children treat hybrid nouns very differently than common gender nouns: in particular, hybrids are initially assigned gender on the basis of their morpho-phonological form, whereas common gender nouns appear to be exempt from the morphological overgeneralization and exhibit referential assignment from an early age (Rodina, 2008, p. 156; Rodina & Westergaard, 2012, p. 1098). In contrast, the findings reported here show that the Russian HL speakers rely on the same formal assignment strategy with both types of nouns, a result that suggests that some of the finer distinctions made by child acquirers are not present in these adult grammars.

Despite a significant reanalysis of certain aspects of the Russian gender system, the HL speakers in this study nevertheless outperformed L2 learners in several domains, and these advantages cannot be overlooked. HL speakers were systematically closer to the baseline speakers in their ratings than L2 learners, particularly when evaluating agreement in the more local adjective-noun contexts, in which the noun controller and agreement target are housed within the same phrasal domain and do not need to be linked at a distance. In these contexts, HL speakers displayed advantages over L2 learners and were more on target in resolving conflict with different types of nouns, including morpho-phonologically opaque nouns and hybrid nouns. Further still, while HLs lagged far behind the monolingual controls in under-using referential agreement with common gender nouns, their ratings in these conditions were nevertheless outside the L2 range and closer to the baseline. Taken together, these findings point to the linguistic benefit of early naturalistic



exposure to Russian and warrant further discussion of how these potential linguistic advantages may be reinforced in the classroom setting.

On the pedagogical plane, one of the central issues pertaining to the teaching and learning of grammatical gender in an L2 context concerns the role of explicit instruction in this process. Existing studies on the effect of formal instruction in adult L2 acquisition of gender report mixed results. On the one hand, some studies focusing on L2 acquisition under immersion have shown that some active intervention may be necessary for the acquisition of grammatical gender by adult learners (Harley, 1979; Stevens, 1984). Controlled comparisons between teaching methods with or without explicit rule instruction also pointed to a measurable advantage of methods that provide the learners with explicit rules in gender categorization (Presson, MacWhinney, & Tokowicz, 2014). Similarly, experiments on the acquisition of gender-like categories in an artificial language showed benefits of direct instruction in focusing the learners' attention on the relevant grammatical morphemes and syntactic contexts (Taraban, 2004).

On the other hand, other studies have found no support for a significant role of instruction in the L2 acquisition of gender. Some researchers demonstrated a lack of correlation between the amount of formal instruction in the L2 and the mastery of gender agreement (Granfeldt, 2000), but instead showed that naturalistic exposure to the L2 outside the classroom had a positive effect on the acquisition of gender (Dewaele & Véronique, 2001). The explicit approach focusing on form has found some support in research on L2 acquisition under immersion in early (elementary school) learners, compared to lack of instruction; however, this facilitative effect was rather limited because the learners did not extend this knowledge productively to new words (Harley, 1998). All told, these findings suggest that both explicit instruction and naturalistic methods may be necessary for developing target-like knowledge of the grammatical gender system in adult learners and warrant a more in-depth analysis of how these various methods can be applied across the different domains of the system.

It is hard to disagree with the assessment made in DeKeyser (2005), who notes that "instruction is not necessary for the easiest structures and doomed to failure for the hardest" (p. 17). Applying this observation directly to the issues at hand, it seems logical to suggest that the recipe for successful teaching of gender would require teasing apart the "easy" ingredients of the gender system from those associated with greater difficulty for learners. The experimental results reported in this study may offer us some preliminary insights into this distinction in the domain of gender marking with animate nouns in Russian. In particular, they provide an empirical basis for identifying those aspects of the Russian gender system where excessive emphasis on form may be redundant and those where form-based instruction, while useful, will likely not have the desired positive effect unless integrated with more naturalistic methods.

With respect to the "easy" areas, the results of the study demonstrate that both HL speakers and L2 learners are able to draw generalizations based on nominal endings in order to evaluate gender agreement in morpho-phonologically transparent contexts. Since this strategy works well for the majority of nouns in Russian, form-based instruction may help attune learners to the availability of morpho-phonological gender cues during the initial stages of L2 learning. However, once the typical form-meaning associations have been successfully established, additional evidence will

become necessary to draw learners' attention to the fact that the nominal endings do not single-handedly determine the pattern of gender agreement in Russian.

Three particular cases illustrating this circumstance were examined in the study. Within the subclass of animate nouns, both lexical and referential factors were shown to either completely override or diminish the weight of formal cues in gender assignment in native speakers. Both groups of bilinguals were closer to the baseline speakers in conditions involving lexical assignment. This pattern was particularly evident in the data from HL speakers, who performed on par with the monolingual controls in adjective agreement conditions involving opaque masculine nouns. These findings suggest that target-like resolution of this type of form-meaning conflict in Russian is not out of these speakers' reach. More target-like knowledge of agreement with non-transparent nouns inherently marked for gender may be achieved, for example, by systematically drawing the learners' attention to the syntactic contexts in which these nouns occur. Because syntactic agreement with nouns inherently marked for gender is consistent and invariable, these transparent grammatical cues may provide sufficient data for establishing a target-like pattern in adult bilingual speakers. In contrast, the referential ambivalence of common gender nouns and the absence of formal grammatical cues in the use of feminine agreement with hybrid nouns will likely call for a greater extent of communicative interaction in the acquisition of such forms. Exposure to naturalistic data and opportunities for language use in context, possibly through immersion, may provide learners with the necessary input to strengthen the weight of pragmatic and referential factors in relation to gender.

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## NOTES

1. Based on their formal properties, animate nouns in Russian are classified into three declension classes, each with a different case inflection paradigm. Declension I contains masculine nouns that end in a non-palatalized consonant (e.g., *брат* ‘brother’); declension II includes mostly feminine and some masculine nouns ending in *-а/-я* (e.g., *сестра* ‘sister,’ *папа* ‘dad’), and declension III consists of feminine nouns ending in a palatalized consonant (e.g., *мать* ‘mother’) (Corbett & Fraser, 2000).
2. Several researchers have reported errors with phonologically opaque feminine nouns ending in a consonant even in 6-7 year-old children (Corbett, 1991, p. 84; Gvozdev, 1961; Zakharova, 1973).
3. Since semantic (i.e., feminine) agreement with hybrid nouns is usually restricted to the nominative case and occurs only rarely in oblique cases (Švedova, 1980), this design ensured consistency across the experimental conditions.
4. Since the class of opaque masculine nouns ending in *-а/-я* consists primarily of male kinship terms belonging to core vocabulary (*папа* ‘dad’, *мужчина* ‘male, man’ *дядя* ‘uncle, man’), characterized by a high frequency of occurrence in Russian (Sharoff, Umanskaja, & Wilson, 2013), any observed difficulties in conditions involving these nouns would likely stem from their formal opacity and the need to resolve conflict between lexical and morpho-phonological cues, rather than from a lack of the relevant lexical knowledge in bilinguals.
5. The following abbreviations are used in the graphs: the capital letter indicates the gender of the noun controller (M/F); the small letter represents the gender of the agreement target, adjective (adj) or verb (v). Feminine nominal forms with indexes F<sub>-lex</sub> and F<sub>-morph</sub> signal lexical and morphological gender assignment strategies, respectively. M<sub>-a</sub> stands for opaque masculine nouns. Incongruous agreement combinations are marked with an asterisk.
6. Two separate frequency-related factors should be considered in this respect: (i) the type and token frequency of the *noun controllers*, and (ii) the relative frequencies of the different *controller-target combinations* in contexts where both options are available. Crucially, studies examining the role of input frequency should account for the different *input types* available to the two distinct populations of bilinguals. In contrast to adult L2 learners, who typically have access to the standard registers via formal instruction, HL speakers are as a rule not exposed to the standard dialect in the same way (see Polinsky & Kagan, 2007; Rothman, 2007; Pires & Rothman, 2009 for further discussion); therefore, the relevant input frequency counts would need to be obtained from a corpus of spoken American Russian (or Émigré Russian), rather than a corpus of monolingual speech.