Distributional Regularity of Cues Facilitates Gender Acquisition: A Contrastive Study of Two Closely Related Languages

Tanya Ivanova-Sullivan and Irina A. Sekerina

1. Introduction

Research on various languages and populations has highlighted the role of transparency that leads to perceptual salience in gender acquisition (Janssen, 2016; Kempe & Brooks, 2005; Mastropavlou & Tsimpli, 2011; Rodina, 2008; Rodina & Westergaard, 2017; Szagun, Stamper, Sondag, & Franik, 2007). Transparency is a gradient phenomenon that characterizes inflectional morphology in terms of the phonological regularity of stems or suffixes. Across gender-marked languages, such as Romance and Slavic, consistent associations between noun suffixes and gender classes “allow to set apart nouns where formal cues are highly predictive of the noun gender from nouns where gender cannot be recovered from the surface form.” (De Martino, Bracco, Postiglione, & Laudanna, 2017: 108).

Studies show that learners make use of perceptual properties of noun suffixes that link items within a category and consistently identify words across different contexts as similar to one another (Reeder, Newport, & Aslin, 2013). For example, nouns ending in -a are transparent and typically categorized as feminine in Slavic and some Romance languages, such as Spanish and Italian. However, there are cases of mismatch between the phonological form of some noun endings and the abstract gender, thus making such endings less reliable for establishing form-meaning correlations.

Despite the facilitatory effects of transparency of gender-correlated noun endings in production in various languages (Janssen, 2016; Paolieri, Lotto, Morales, Bajo, Cubelli, & Job, 2010; Rodina & Westergaard, 2017; Szagun et al.,

* This research was partially funded by the PSC-CUNY grant TRADB-48-172 awarded to Irina A. Sekerina. We thank Jared DiDomenico for his help with the statistical analysis. Address for correspondence: Tanya Ivanova-Sullivan, tivanova@unm.edu. Tanya Ivanova-Sullivan, University of New Mexico, tivanova@unm.edu. Irina A. Sekerina, College of Staten Island and The Graduate Center, City University of New York, Irina.Sekerina@csi.cuny.edu.

2007), some scholars have raised questions about the extent to which these endings can serve as a reliable cue for the acquisition of gender classes (Golan & Frost, 2001; Taft & Meunier, 1998). Recently, Grüter, Lew-Williams, & Fernald (2012) suggested that only distributional cues, such as the co-occurrence of nouns and their transparently-marked modifiers (determiners or adjectives) are fully reliable cues to the gender of nouns.

Converging evidence for the significant role of distributional cues (stems and suffixes) in language learning comes from studies of artificial grammars that do not contain semantic or phonological cues. In a series of experiments, Reeder and her colleagues (2013; 2017) found that their adult participants demonstrate an ability to learn categorical structures only with the help of distributional cues. They compare this learning mechanism to natural language acquisition in terms of children applying or withholding category generalizations based on distributional information, such as the breadth and overlap of contextual cues across lexical items. They argue that their approach helps isolate distributional cues from other sources of information (e.g., semantic and phonological) and provides insights about the learning process, especially in cases of unreliability of phonological cues in natural languages.

A third line of research represents a middle ground examining the facilitatory role of both distributional (co-occurrence of modifiers and nouns) and phonological (noun endings) factors in gender assignment (Afonso, Domínquez, Álvarez, & Morales, 2014; Bates, Devescon, Pizzamiglio, D’Amico, & Hernandez, 1995; Holmes & Segui, 2004; Taft & Meunier, 1998). The findings of these studies are interpreted as indicating the strong impact of co-occurrence patterns (determiners and nouns) on the gender assignment of opaque nouns.

However, none of these studies adopt cross-linguistic perspective or take into account the contextual (non-sequential) distribution of gender cues (i.e., noun suffixes) in the language. Our goal in the present study is to analyze both transparency/opacity effects and distributional regularities of these suffixes in the acquisition of gender in two closely related languages (Russian and Bulgarian), which have similar gender systems but differ in their distribution of opaque noun suffixes across gender classes. We argue that distributional regularity of these suffixes facilitates language acquisition in Russian but has adverse effect in Bulgarian.

In Russian, transparent nouns are present in all genders. Nouns ending in a consonant are typically masculine (MASC), in -a are feminine (FEM), and in the stressed -o/-e are typically neuter (NEUT) (Rodina & Westergaard, 2017; Schwartz, Minkov, Dieser, Protassova, Moin, & Polinsky, 2015). Phonologically opaque nouns, such as nouns ending in palatalized consonants that can be either MASC or FEM and NEUT nouns with unstressed ending could not be used reliably as gender markers (Taraban & Kempe, 1999). In the stem-stressed NEUT nouns, vowel reduction results in an ending that is pronounced as shwa [ǝ] neutralizing the contrast between these nouns and the FEM transparent nouns.

Several psycholinguistic studies on gender production in Russian that our study follows found that monolingual Russian children (age 4;0-6;0) performed
at ceiling with transparent nouns in all genders but had difficulties producing FEM opaque nouns, with only around 80% accuracy (Rodina & Westergaard, 2017). Mitrofanova and colleagues (Mitrofanova, Rodina, Urek, & Westergaard, 2018) found that monolingual Russian children also underperformed with NEUT opaque nouns (85% accuracy). Schwartz and colleagues (Schwartz et al., 2015) revealed a slow trajectory of acquisition of opaque nouns in Russian, with younger children aged 3;0-4;0 having more difficulty than older ones (4;0-5;0). A notable exception is the study of Janssen (2016) who did not observe differences in production between stem-stressed and end-stressed NEUT nouns in Russian children. However, the group of Polish children in the same study significantly outperformed the Russian participants with NEUT nouns of both types. (FEM and MASC opaque nouns were not tested in the study.

In Bulgarian, nouns can be also transparent or opaque. Similar to Russian, nouns ending in a consonant are typically masculine, in -a are feminine, and in -o/-e are neuter. There are, however, some differences between the two languages regarding opaque nouns. In Russian, these nouns are distributed regularly across all three gender classes whereas in Bulgarian, there is a small group (around 150) that end in a consonant but are FEM; they are semantically and morphologically unpredictable (Hauge, 1999; Manova & Dressler, 2001; Nicolova, 2017; Pašov, 1989). To date, no studies on the role of transparency in gender acquisition in Bulgarian have been conducted.

2. Gender agreement and its acquisition in Russian and Bulgarian

Russian has a tripartite system of gender (MASC/FEM/NEUT), in which grammatical gender is distinguished from natural gender. Obligatory gender agreement is displayed in the syntactic relationship between the controller (the noun) and its target modifiers (adjectives, numerals, pronouns, participles and verbs in past tense). Example (1) illustrates this agreement between an adjective bol’shoj ‘big’ and transparent nouns (1a) and opaque ones (1b):

(1) a. Na stene visel/a/o bol’šoj/aya/oe portret/kartina/vesló
On the wall hung-PAST-M/F/N big-M/F/N portret/picture/oar

b. Na polu ležal/a/o bol’šoj/aya/oe gvozd’/kost’/odeyalo
On the floor laid-PAST-M/F/N big-M/F/N nail/bone/blanket

Similar to Russian, Bulgarian has a tripartite gender system (2), but, unlike Russian, gender is expressed not only on agreement targets but also on the postponed definite article, a morpheme attached to the first element of the NP. This attachment could be based on either phonological or morphological criteria, i.e., the noun ending, or the gender of the noun determines the choice of the definite article. The morpheme -ta is attached to MASC and FEM nouns ending in -a/-ya, and -to is added to nouns of all genders ending in -o, -e, -i, or -u (3a, b,c). When FEM nouns end in a consonant, the definite article attached to these nouns depends on the gender of the noun, as illustrated in (3d).
Earlier research established that Russian children acquire transparent MASC and FEM nouns by 3;0 and NEUT nouns, by 4;0 (Rodina & Westergaard, 2017; Schwartz et al., 2015). The acquisition of opaque nouns in all genders continues up to 6;0-7;0 years of age (Ceytlin, 2009; Gvozdev, 1961).

Bulgarian children acquire the grammatical system of their language by the age of 3;0, but the literature on the topic lacks details about the particular developmental trajectory. However, there is some evidence based on naturalistic data that phonological cues, such as noun endings play a visible role. This is illustrated by the presence of the so-called rhyme agreement in child speech (Popova, 2004). Children change the ending -e of the noun controller meče ‘teddy bear’ to -o to match it to the ending -o of the modifier malkoto ‘the little’, as seen in Example (4).

(4) *malkoto mečo (correct: malkoto meče)
the little teddy bear

Despite the general consensus that phonological transparency facilitates gender acquisition cross-linguistically, due to the substantial variability of experimental methods and the differences in the gender systems in the studied languages, there is no unified theoretical account on the effect of transparency on gender assignment and gender agreement. Integration of the principles of distributional learning in our study allows us to propose a novel account based on the interaction between phonological transparency and distributional regularity and their impact on gender acquisition.

3. Method
3.1. Participants

Twenty-two L1 Bulgarian-speaking children (16 girls; age range: 3;10-6;8; mean age 5;11) and 23 L1 Russian-speaking children (14 girls; age range 3;8-6;8; mean age 5;4) were recruited in daycares in Sofia and Moscow. The parents of all the participants indicated that their children were exposed only to Bulgarian or Russian in the home and in daycare. This study was carried out in accordance with the ethical principles of psychologists and code of conduct of the American Psychological Association and was approved by the Institutional Review Boards
of the University of New Mexico and the College of Staten Island. The parents of
the participants signed written informed consent in accordance with the
Declaration of Helsinki.

3.2. Materials and procedure

The elicited production study had a factorial design, Language (Russian vs.
Bulgarian) x Gender (MASC, FEM, and NEUT) x Condition (Transparent vs.
Opaque; only for FEM in Bulgarian). Each participant saw two pictures of the
identical object side-by-side that differ only in color or size (Figure 1). Children’s
task was to describe one of the pictures using an ADJ(-N) in singular after hearing
several previously recorded prompts that named the two depicted objects in plural.

315

Figure 1. Sample picture materials

The instructions were borrowed from Rodina and Westergaard’s (2017)
elicited production study with slight modifications, illustrated in (5) for Russian
and in (6), for Bulgarian. The first two sentences introduced the objects in plural
(5,6a-b). This was done to avoid giving out the singular form of the noun because
in both languages, the gender distinction on the ADJ is neutralized in plural. The
participant responded to three question prompts (5,6b-d) using the ADJ that could
be but did not have to be followed by the N.

(5) a. Èto ladoni. RUSSIAN
   These [are] palms-Pl.
   b. Kakie oni po razmeru?
      What size are they?
      [Participant responds: Malen’kaya i bol’shaya ‘Small and large-Sg’]
      [The big palm disappears using the PowerPoint animation.]
   c. Čto propalo?
      What disappeared-N?
      [Participant responds: Bol’shaya [ladon’] ‘large-F palm-F-Sg’]
   d. Čto ostalos’?
      What is left-N?
      [Participant responds: Malen’kaya [ladon’] ‘small-F palm-F-Sg’]

(6) a. Tova sa dlani. BULGARIAN
   These [are] palms-Pl.
b. Kakvi sa te po golemina?
   What size are they?
   [Participant responds: Malka i golyama ‘Small and large-Sg’]
   [The big palm disappears using the PowerPoint animation.]

c. Kakvo izčezna?
   What disappeared-N?
   [Participant responds: Golyamata [dlan] ‘the large-F palm-F-Sg’]

d. Kakvo ostana?
   What is left-N?
   [Participant responds: Malkata [dlan] ‘the small-F palm-F-Sg’]

In the Russian experiment, there were 30 inanimate nouns, 15 transparent and 15 opaque ones, with 5 nouns in each gender. Due to the absence of opaque nouns in MASC and NEUT in Bulgarian, only 20 nouns (5 transparent nouns in each gender and 5 nouns in FEM opaque) were included in the experiment. Capitalizing on the fact that Russian and Bulgarian are closely related languages, we were able to use the same nouns in both languages except in cases when the gender or the word was different (e.g., RUSS pedal ‘FEM and BULG pedal-MASC, ‘pedal’). Naturally, there were differences that had to do with phonology (e.g., liquid diphthongs, reduced vowels, and palatalized consonants in Russian).

The nouns in each condition and gender (MASC transparent, FEM transparent, MASC opaque, etc.) in both languages were matched for final consonants that preceded the ending, namely, [d],[t],[r],[l], and [n]; e.g., the Russian words ending in [n] were kartina ‘picture-F’, banan ‘banana-M’, pijatnó ‘stain-N’, ladon ‘palm-F’, remen ‘belt-M’, and kolyano ‘knee-N’, Bulgarian, kartina ‘picture-F’, banan ‘banan-M’, kolyano ‘knee-N’, and dlan ‘palm-F’. Matching items for their final consonants in the coda ensured the phonotactic compatibility in the two languages. All nouns were of a comparable frequency in the Bulgarian and the Russian child-language speech.

The participants were seated in front of a laptop. One of the researchers sat next to the child during the whole experiment and controlled the PowerPoint presentation of the slides on the screen. Each pair of objects (see Fig. 1) appeared on a separate slide that was replaced by the next slide as soon as the participants answered all questions in the prompts. The presentation was not timed; the researcher provided verbal explanations and constant encouragement to the participants if they seemed to hesitate or did not understand the task. The average duration was 15 minutes for the Russian and 10 minutes for the Bulgarian experiment. All the responses were audio recorded and coded by native speakers.

3.3. Research questions and predictions

Our research questions continue the line of inquiries from the previous gender acquisition studies (Janssen, 2016; Mitrofanova et al., 2018; Rodina, 2008; Rodina & Westergaard, 2017; Schwartz et al., 2015) but add another important
dimension namely, the interaction of the distributional regularity of gender cues (i.e., noun suffixes) with their transparency across gender classes and the ways, in which these two factors differ in gender acquisition in Russian and Bulgarian. More specifically, our research questions are:

RQ1: What role does transparency/opacity of gender cues play in gender acquisition?

RQ2: Do the higher number and distributional regularity of opaque nouns facilitate gender acquisition in Russian in comparison to Bulgarian that has only one restricted and smaller opaque class of FEM nouns?

Based on the previous research, we expect that transparency will facilitate gender production in both languages, i.e., children will be more accurate in assigning gender to transparent than opaque nouns in both Russian and Bulgarian. However, the distribution of noun suffixes across gender classes will impact the two languages differently, namely, Russian children will be more accurate in assigning correct gender to opaque FEM nouns than Bulgarians due to the differences in the distributional regularity of opaque nouns in the two languages.

4. Results

Russian children were significantly more accurate in elicited gender production than Bulgarian children, 92.6% vs. 77.9%, respectively. Mixed effect modeling showed that this difference was significant ($z = 4.355, p < .001$).

**Transparency and gender effects.** Figure 2 shows the accuracy for transparent nouns and Figure 3, for opaque nouns.

![Transparent nouns](image)

*Figure 2. Transparent nouns: Accuracy of production in RUSS and BULG*
Figure 3. Opaque nouns: Accuracy of production in RUSS and BULG

Statistical analysis using mixed effects logistic regression revealed the effect of transparency in both languages, with significantly better accuracy for the transparent nouns than the opaque ones (96.7% vs. 88.5%, Table 1 for Russian; 91.5% vs. 49.5%, Table 2 for Bulgarian).

Table 1. Effect of transparency and gender in Russian

<table>
<thead>
<tr>
<th></th>
<th>$\beta$</th>
<th>SE</th>
<th>z-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.69478</td>
<td>1.33862</td>
<td>-0.519</td>
<td>0.603</td>
</tr>
<tr>
<td>MASC</td>
<td>-0.03320</td>
<td>0.30953</td>
<td>-0.107</td>
<td>0.914</td>
</tr>
<tr>
<td>NEUT</td>
<td>-1.79743</td>
<td>0.25141</td>
<td>-7.150</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Transparency</td>
<td>1.46804</td>
<td>0.21390</td>
<td>6.863</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Table 2. Effect of transparency in Bulgarian FEM nouns

<table>
<thead>
<tr>
<th></th>
<th>$\beta$</th>
<th>SE</th>
<th>z-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.05411</td>
<td>0.35003</td>
<td>-0.155</td>
<td>0.877</td>
</tr>
<tr>
<td>Transparency</td>
<td>3.13412</td>
<td>0.31760</td>
<td>9.868</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

There was no effect of gender in the transparent nouns in Russian (FEM: 98.8%, MASC: 98.2%, and NEUT: 93.1%). However, in the opaque nouns, NEUT were significantly less accurate (76.1%) than the other two genders (FEM: 94.5% and MASC: 94.8%, Table 1).
In contrast to Russian, effect of gender in the Bulgarian group was significant (Table 3). The participants were significantly less accurate in MASC (82.3%) and NEUT (87.7%) transparent nouns than in FEM nouns (91.5%).

Table 3. Effect of gender in Bulgarian

<table>
<thead>
<tr>
<th></th>
<th>( \beta )</th>
<th>SE</th>
<th>z-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-1.72103</td>
<td>1.04922</td>
<td>-1.64</td>
<td>0.100944</td>
</tr>
<tr>
<td>MASC</td>
<td>0.71976</td>
<td>0.20113</td>
<td>3.579</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>NEUT</td>
<td>0.99539</td>
<td>0.20911</td>
<td>4.76</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Comparison of Russian and Bulgarian. Recall that there are no opaque MASC and NEUT nouns in Bulgarian, therefore, the comparison with regards to the effect of transparency between the two languages was possible only with feminine nouns. Our analysis revealed effect of opacity with Russian children strongly outperforming Bulgarian children in FEM (94.5% vs. 49.5%, Table 4).

Table 4. Effect of gender and opacity in Russian vs. Bulgarian

<table>
<thead>
<tr>
<th></th>
<th>( \beta )</th>
<th>SE</th>
<th>z-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-1.75166</td>
<td>0.77892</td>
<td>-2.249</td>
<td>0.024</td>
</tr>
<tr>
<td>MASC</td>
<td>0.57912</td>
<td>0.14607</td>
<td>3.965</td>
<td>0.001</td>
</tr>
<tr>
<td>Opacity</td>
<td>1.15037</td>
<td>0.26413</td>
<td>4.355</td>
<td>0.001</td>
</tr>
</tbody>
</table>

5. Discussion

Transparency and gender. Our first research question addresses the role of transparency of noun suffixes in gender acquisition. Similar to previous studies of Russian (Mitrofanova et al., 2018; Rodina & Westergaard, 2017; Schwartz et al., 2015), we found that transparency does facilitate gender assignment in Russian and in Bulgarian, i.e., children’s accuracy of gender production was consistently better for the transparent nouns than the opaque ones. In Russian, the effect was driven exclusively by low accuracy with opaque NEUT nouns. However, in Bulgarian, there was an additional effect of gender within the transparent nouns, i.e., lower accuracy with MASC and NEUT nouns. Thus, there seem to be factors other than transparency that might have contributed to the way children make use of the perceptual properties of noun suffixes in Bulgarian.

We assume that one such factor is diminutivization, a pervasive phenomenon in Russian and Bulgarian that regularizes the associations between noun suffixes and gender classes making opaque nouns transparent, e.g., korabl’-MASC ‘ship’ – korablik-MASC ‘ship-DIMIN.’ Studies of Russian diminutives found that they contribute to the regularization and simplification of the Russian gender system, which, in turn, supports gender acquisition (Kempe & Brooks, 2005; Kempe, Brooks, Mironova, & Fedorova, 2003).

Similar proposals have been put forward for Bulgarian diminutives and their facilitatory role in the acquisition of FEM opaque nouns. There they provide the
regular (and predictable) ending –a instead of the irregular consonant ending, for example pesen ‘song’– pesnička ‘song-DIMIN’ (Stoyanova, 2006). However, Stoyanova’s own naturalistic observations of parent-child interactions with three children (mean age 2;4) showed only one instance of FEM diminutive formed from a FEM opaque noun. In her opinion, this is not sufficient evidence to support her hypothesis about the diminutives’ role in making the Bulgarian gender system “more transparent and regular” (2006: 120).

Unlike FEM nouns, where there is no gender change in the diminutives, such change is always part of the diminutivization of simplex MASC nouns in Bulgarian, resulting in the following form: tractor-MASC ‘tractor’ – traktorče-NEUT ‘tractor-DIMIN’. In child-directed speech many of the MASC words denoting objects are heard in their diminutive forms, thus, affecting the process of forming regular associations between the noun suffixes and gender classes. We speculate that this phenomenon might have contributed to the significantly lower accuracy of our participants with MASC transparent nouns.

As far as the NEUT nouns are concerned, there are significantly fewer NEUT nouns in Russian (14%) compared to FEM (41%) and MASC (46%) (Comrie, Stone, & Polinsky, 1996). Our Russian children produced numerically fewer correct NEUT nouns, a finding in line with the previous studies (Ceytlin, 2009; Gvozdev, 1961; Rodina & Westergaard, 2017) that show slightly protracted acquisition of Russian NEUT transparent nouns although this difference did not reach significance. On the other hand, they were significantly less accurate with NEUT opaque nouns, which was also expected based on the previous research.

Our Bulgarian participants’ accuracy in NEUT nouns was better than in MASC nouns but still was significantly worse than in Russian. The diminutive explanation does not apply to NEUT nouns in Bulgarian because their diminutives remain neuter, e.g., kolyano-NEUT ‘knee’ – kolyance-NEUT ‘knee-DIMIN’. It is possible that the results with the NEUT nouns are modulated by the allomorphic variation between the plural ending of NEUT nouns (-a) and the ending -a of singular FEM transparent nouns, e.g., kopito-NEUT ‘hoof’ – kopita ‘hoofs.’ Regardless of which explanation is ultimately correct, it is evident that the gender of NEUT nouns causes difficulties for Bulgarian children as they struggle with forming more stable links between noun suffixes and that particular gender class.

Distribution of cues across gender classes. Our second research question addresses the distributional regularity of opaque nouns across genders and cross-linguistically. We compared the performance of Russian and Bulgarian children in FEM opaque nouns as evidence of forming consistent associations between their irregular (and less predictable) endings and gender classes. We suggest that the distributional regularity of these endings across genders is a critical but somewhat overlooked factor. The presence of a large number of opaque nouns in all three gender classes in Russian facilitates gender acquisition in contrast to the asymmetrical distribution of opacity in the Bulgarian gender system present only in FEM.

Recent inquiries about the relationship between regularity and gender in various languages argue for the facilitatory effect of distributional regularity.
because of speakers’ heightened sensitivity to morphophonological correlates of gender with both real and nonce words (Bobb et al., 2015 for German; Mastropavlou & Tsimpli, 2011 for Greek; Paolieri et al., 2010 for Spanish and Italian; Taft & Meunier, 1998 for French, *inter alia*). Specifically, Afonso and colleagues (Afonso et al., 2014) suggest that there are two mechanisms operating in the gender domain in Spanish. According to the first one, transparent noun suffixes facilitate gender assignment. Conversely, opaque nouns seem to require the retrieval of the corresponding definite article, regardless of the distribution of the noun ending across genders. Thus, the authors rule out the existence of a universal mechanism of gender assignment based on the probability of noun endings (transparent and opaque) but do not discuss the application of their proposal to languages without determiners or with determiners in post-nominal position.

Gender assignment in the languages tested in our study could not be affected by the co-occurrence of DET and N: Russian does not have determiners and the Bulgarian definite article is a morpheme attached to the noun, without its own syntactic projection. Taking these properties into account, we suggest that in languages with NPs, similar in their structure to Russian and Bulgarian, distributional information across contexts provides cues in gender acquisition. Specifically, we argue that if in a language distributional patterns cannot be identified on the basis of the co-occurrence of determiners and nouns, then the regularity of distribution of the noun suffixes across gender classes would modulate gender assignment, at least in the early stages of gender acquisition.

The proposed integration of the effects of distributional regularity across genders with transparency of noun endings in our study is also supported by recent accounts on cue-based learning, i.e., gender acquisition is seen as positively affected by more complexity and richness of various types of cues, thus providing more evidence to the child (Audring, 2016; Erickson & Thiessen, 2015). Similar arguments about learners taking advantage of the density of sampling of a particular category were put forward in the context of artificial language learning (Aslin & Newport, 2014; Reeder et al., 2013; 2017). Our findings with transparent and opaque noun suffixes add to the growing body of research on the role of distributional cues in the acquisition of grammatical categories. In addition, they have important theoretical implications about the operation of learning mechanisms based both on phonological and distributional cues. Our analysis strengthens existing views about the advantage of these cues for the learners’ generalizations over exemplars extracted from the complex input and the subsequent creation of higher-order linguistic representations of grammatical categories.

In conclusion, we aimed to show that the systematic and pervasive presence of opaque nouns in Russian across all gender classes makes children more aware of its role in the input. This leads to earlier formation of the links between class and category, resulting in a mature representation of grammatical gender. In Bulgarian, on the other hand, irregularly distributed opacity functions as a difficult-to-notice exception prompting the operation of rote memorization of
FEM opaque nouns. The links between class and category are weaker, resulting in initial delay in the acquisition of the gender of these nouns.

References


