Sensitivity to gender marking as a potential for new feature acquisition

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Introduction

Unlike first language (L1) acquisition, the process of the second language (L2) grammar formation does not begin from scratch. L2 acquisition reshapes the existing linguistic system to accommodate new information. The mechanisms of L2 grammar development are highly debated in the field of psycholinguistics. The disagreement concerns the role of Universal Grammar (UG) in adult L2 acquisition, which is a potential to acquire new syntactic features in full. The contradictory opinions overlap in the definition of successful L2 acquisition. It means successful reshaping of syntactic features of the L1 to meet the standards of the L2.

Grammatical markers of tense, number, gender etc., do not pattern across languages, and acquisitional syntactic reassembly mainly occurs at the level of morphology, or "functional morphology" as generalized by Slabakova (2000, 2016). Slabakova (2000, 2008, 2016) belongs to the group of scholars that support UG-driven L2 acquisition and advocate full successful reassembly of morphological features in the L2. In this process, the human parser spots a new feature, and processes its functional specificity to ensure successful acquisition.

The most salient examples of how the parser spots a new feature come from the contexts where a feature that exists in the L1 is absent in the L2, i.e. the contexts of a [- feature] L1 and a [+ feature] L2. The study reported in the paper checks whether adult native speakers (NS) of English are sensitive to the overt gender morphology in their L2 Russian at early stages of acquisition. In the experiment, English is a [-gender] language and Russian in [+gender] language. English has a notional gender, i.e. grammatical gender is not marked overtly, whereas, Russian is rich in overt gender morphology.

Literature Review

A scholarly debate in the field of second language acquisition questions the possibility of successful acquisition of the features that are absent in the L1 but present in the L2. Most of the doubt concerns adult L2 learners. The approaches claiming partial access to UG, argue that features

not instantiated in the L1 cause a learnability problem (the Interpretability Hypothesis, Tsimpli & Dimitrakopoulou, 2007). These features are less accessible for resetting since they cannot be mapped the existing L1 features and even advanced L2 learners do not show native-like performance. This assumption is supported by Hawkins and Chan (1997), Hawkins and Casillas (2008), and Hawkins et al (2008). Their attention focuses on the need to process a new feature to make it possible for acquisition. Thus, the features not instantiated in the L1 are inaccessible for L2 learners and cannot be fully perceived by them (also see, Brown, 2000).

The Failed Functional Features Hypothesis (Hawkins & Chan, 1997) draws attention to feature interpretability and discusses purely grammatical, or uninterpretable, features. Even though L2 learners and NSs have identical vocabulary entries for verb morphology, early L2 learners underdetermine the uninterpretable syntactic features, for example, overt gender marking in the L2. The latter makes a prediction for the current experiment. If a feature comes unnoticed there is no increase in processing load in sentence comprehension. At the very beginning of L2 acquisition adult L2 learners of Russian are not expected to slowdown in the gender marked condition.

The opposite approach to feature reassembly is taken by the proponents of structural processing in L2 and full UG access for adult L2 learners (Ionin, 2003, 2004, 2006; Slabakova, 2000; Montrul and Slabakova, 2008). A detailed description of the mechanisms of feature reassembly comes from Lardiere (2009). She argues that L2 learners are sensitivity to the differences between the L2 and L1 grammars, as well as to the differences within the L2 grammar. At the initial state L2 learners try to map the features of the new language to the existing linguistic system and "seek morphological equivalent of assembled lexical items in the L1" (Lardiere, 2009 p. 213).

The absence of a feature in the L1 does not make its acquisition impossible, i.e. the semantics of the unknown feature can be acquired through L2 input processing, which is UG-constrained (Ionin et al, 2003, 2006, 2008). In the absence of a direct transfer from the L1 the parser seeks ways to assemble and assign new features to newly acquired linguistic items in the L2 (for more information see, Slabakova, 2000; Montrul & Slabakova, 2008).

The target of feature reassembly is to find and assemble the right combination of features to the right linguistic items. To do so "the learner will associate the difference in a minimally contrasting form with some difference in meaning or grammatical function and construct some sort of representation for it" (Lardier, 2009 p 214). As follows, the acquisition of a new feature

starts with noticing and noticing triggers processing, which facilitates acquisition. In the experiment the participants are expected to slow down at the unfamiliar feature as it causes processing difficulties.

In the paper the linguistic problem of overt gender morphology is viewed as the dichotomy of 'invariant-variant(s)', where the invariant is a set of fixed features perceived by the learner as the default form; and the variant(s) is the reconfiguration of new features during the process of acquisition.

The English language does not have a grammatical gender, whereas, Russian has a complicated system of three genders: masculine, feminine and neutral. The experiment compares Russian and English for gender marking as a combination of a [- feature] language vs. a [+ feature] language, where English is a [- gender] language and Russian is a [+ gender] language.

Research Question and Hypothesis

The main research question focuses the study on the first stage of possible feature acquisition – noticing. Based on the revised literature, the study puts forward two contradictory predictions. The proponents of partial access to UG would expect the new feature to come unnoticed due to it complete novelty to the parser. The opposite prediction expects the learners to get focused on the new feature, which gives the parser a chance to process it. This early noticing is possible in UG-driven development of adult L2 grammar.

Research question: Are adult NSs of a [- gender] language (English) sensitive to overt morphology in the [+gender] L2 language (Russian) at early stages of acquisition?

Hypothesis: Low-intermediate L2 learners are sensitive to [+ gender] overt morphology in Russian. A slowdown in their reading time (RT) occurs when the feature is noticed.

The Study

Participants

The respondents of the experiment are university students, whose native language is English and their L2 is Russian. The participants' mean age is 21. Their proficiency in Russian was measured through a C-test and calculated as the average mean score. The result of 50% correct defines the group as (low)intermediate L2 learners. Even though the participants differ in the

amount of exposure to the L2, the one-way ANOVA does not reveal any significant differences between the participants.

Materials

In languages with two- or three-gender grammatical systems, masculine gender presents the default form or the invariant. Despite the fact that masculine gender is overtly marked, it forms the base-line for gender acquisition and its overt morphology does not cause any processing difficulties. Noticing as a sign of sensitivity to a new feature only occurs in processing of neutral and feminine gender.

For the purpose of creating a two-by-two design and preserving the 'variant-invariant' dichotomy, neutral gender was excluded from the experiment. The stimuli sentences are a binary opposition of masculine vs. feminine, or a default vs. marked gender condition. The experiment conditions are [- value] (masc.) vs. [+ value] (fem.), where prospective acquisition of the feminine form requires feature reconfiguration. As the first sign of it, the study expects to see an increase in processing load in the feminine marked forms.

Stimuli sentences. Experimental items are complex sentences with gender-marked relative clauses (RC) and complex noun phrases (NP). The sentences of this type syntactically pattern in Russian and English, which allows for measuring the amount of attention a marked feature requires. The experimental sentences form 10 quadruples. Each quadruple has two sentences per experimental condition, as shown in (1) and (2) below.

(1) Вот идет секретарь директора, **который**$_{masc}$**/ая**$_{fem}$ **сидит** в кафе каждый день.
Vot idet secretr' directora, **kotorij**$_{masc}$**/aya**$_{fem}$ **sidit** v kafe kazhdij den'.
Here comes the secretary of the director **that sits** in a café every day.

In sentence (1), the embedded verb is in the in the present tense. In this case, the verb forms of masculine and feminine in 3rd person singular are homonymous. The gender is only marked on the relative pronoun. It is a gender-marked condition for:

1) [- value] который сидит / kotor**iy** sidit / that (masc.) sits (3rd, sing.)
2) [+ value] которая сидит / kotor**aya** sidit / that (fem.) sits (3rd, sing.)

In (2), the embedded verb is in the past tense and it is marked for gender, together with the relative pronoun. It is a gender-double-marked condition:

(2) Вот идет секретарь директора, **который**$_{masc}$**/ая**$_{fem}$ **сидел**$_{masc}$**/а**$_{fem}$ в кафе каждый день.
Vot idet secretr' directora, **kotorij**$_{masc}$**/aya**$_{fem}$ **sidel**$_{masc}$**/a**$_{fem}$ v kafe kazhdij den'.
Here comes the secretary of the director **that sat** in a café every day.

The double marked condition also preserves the opposition of [+/- value], masculine vs. feminine:

3) double marked [- value] который сидел / kotor**iy** sid**el** / that (masc.) sat (3rd, sing., masc., past);
4) double marked [+ value] которая сидела / kotor**aya** sidel**a** / that (fem.) sat (3rd, sing., fem., past).

The two-by-two design maintains the cross-condition, as shown in the table below.

I. [- value] vs [+ value] with both tenses of the verb
II. a marked feature vs. a double-marked feature, as shown in the contrast between (1) and (2).

Table 1. A sample stimuli quadruple.

	[- value], masculine	[+ value], feminine
marked condition	Вот идет секретарь директора, **который сидит** в кафе каждый день.	Вот идет секретарь директора, **которая сидит** в кафе каждый день.
double-marked condition	Вот идет секретарь директора, **который сидел** в кафе каждый день.	Вот идет секретарь директора, **которая сидела** в кафе каждый день.

Comprehension questions. Every experimental sentence is followed by a comprehension question like in (3).

(3) Who sits in the café? / Кто сидит в кафе?
a) the secretary / секретарь b) the director / директор

To answer question (3), the subjects press a corresponding key to choose either answer (a) or (b). The presence of a comprehension question obscures the experimental pattern and focuses the participants' attention on the general meaning of the sentence. This design ensures naturalistic processing of the target gender-marked fragments of the experimental sentences.

Fillers. The stimuli set contains 40 target sentences and 40-filler sentences. The fillers are complex sentences with the RC and the complex NP in the main clause like in (4). Unlike the target sentences the fillers have no ambiguity for RC attachment resolution.

(4) Вот идет секретарь директора **в кафе**, **которое** находится неподалёку.
Vot idet secretr' directora v **kafe**, **kotoroe** nakhoditsya nepodaleku.
Here comes the secretary of the director **to the café, that** is nearby.

Procedure

In the experiment, 13 participants performed a self-paced reading task that contained 40 stimuli and 40 filler sentences. A flexible platform for language processing experiments Linger was used to administer a computerized self-paced reading test. The participants were presented with a context in English that was followed by practice sentences. The participants read the sentences in a moving window screen, where only one word appeared at a time. To call a new word the subjects had to press the "space" key. To choose the answer they pressed either the "F" or the "J" key, respectively. The entire experiment lasted for 30 minutes, on average.

The main measurement of the study was Reaction Time (RT). A slowdown in RT means an increase in processing load. It is measured in the region of spill over, the segment following the target constituent, i.e. the noun *cafe* (в *кафе*) after the embedded verb in (1) and (2). The RTs were compared across all the experimental conditions: [- value] vs. [+ value] and [marked] vs. [double-marked]. Linear Mixed Model and ANOVA variance analyses were used to process the data of the experiment.

Results and Discussion

Results

Table 1 shows the RT in milliseconds for every experimental condition. Table 2 shows the results of Pairwise Comparison of the RT in the spillover by condition. Though RT in every [+ value] (feminine) condition is longer that in every [- value] (masculine) condition in the same segment, Linear Mixed Model analysis revealed no effect of condition on the RT ($p \geq 1.0$). The only significant effect was established in the double-marked [+ value] condition, in the spillover region ($p < .03$).

Table 1. RT for each segment by condition.

Segment	[- value] RT, ms (kotor**iy** sidit)	[+ value] RT, ms (kotor**aya** sidit)	Double marked [- value] RT, ms (kotor**iy** sid**el**)	Double marked [+ value] RT, ms (kotor**aya** sid**ela**)
NP1 (the secretary)	1124	1072	1042	1073
NP2 (the director)	1332	1196	1261	1143
Relativizer that / kotoriy(aya)	732	835	746	843
Verb sidit / sidel(a)	677	745	728	750
Spillover cafe	491	508	482	**565** **p < .05**

Table 2. Correlation between RT in spillover by experimental conditions.

mascfem	(I) prespast	(J) prespast	Mean Difference (I-J)	Std. Error	df	Sig.[c]
1	1	2	.002	.020	504.000	.905
	2	1	-.002	.020	504.000	.905
2	1	2	-.045*	.020	504.000	**.030**
	2	1	.045*	.020	504.000	**.030**

The results offer for a conclusion that feminine gender is processed as a marked form, but when marked on the pronoun only it is not salient enough for the learners at early stages of L2 acquisition. To be fully noticed the feature needs to be double marked.

To get additional support for L2 learners' sensitivity to the new language, the study checked the general interpretation preferences for RC resolution. L2 learners of Russian prefer the first noun *the secretary* in the complex noun phrase *the secretary of the director* to interpret the ambiguous RC more often than the second noun *the director*, see Table 4.

Table 4. The mean numbers of NP1 and NP2 choices, $p < .05$.

Segment	Mean number of choices	Mean percentage of choices	Total number of items
NP1	23	54%	40
NP2	17	46%	40

L2 learners override their L1 default preference for low attachment in RC. It has been established that NS of English prefer the second noun for RC interpretation, whereas, NS of Russian choose the first noun most of the time (Fodor, 2002).

At early stages of acquisition, L2 learners of Russian switch to the target-like processing model in the L2. RC interpretation is not influenced by gender marking or new feature acquisition ($p = 0.21$). Meanwhile, sensitivity to new grammatical features develops hand in hand with the overall sensitivity to the inner structure of the L2.

Discussion

The results of the study show that (low)intermediate L2 learners of Russian are sensitive to the overt morphology of the L2. A [+ value] condition causes a slowdown in sentence processing. The new feature does not come unnoticed. The prediction of the theories claiming partial access to UG and underdetermination of a new feature in adult learners is not confirmed.

On the other hand, feature-noticing is significant only in the double-marked condition. Even though the general predictions of the UG-oriented scholars hold true, the process of feature acquisition does not go easily.

The feature becomes salient enough only in the double-marked condition. The partial UG-scholars are right to pinpoint a difficulty in new feature recognition. The acquisition of a new feature is possible only if the feature becomes salient enough for the parser to notice it

The study captures early stages of L2 acquisition, the moment when a new feature is noticed to be processed and acquired further on. These results get additional support when the general preference for the first noun in RC interpretation is considered. The learners not only notice new syntactic features, they are also sensitive to the internal organization of their new language. The L2 grammars of the participants are in the process of restructuring to the standards of the L2.

Conclusion

The study supports the claim that L2 features that are absent in the L1 are possible to acquire in the L2. This acquisition is UG-governed and involves L2 input analysis. L2 learners' sensitivity to minimal syntactic changes in the L2 and their influence on the change of meaning ensure new L2 feature acquisition. The parser can spot the area of a morphosyntactic change and assemble a set of features that are functional for a certain phenomenon.

The study may be extended to testing L2 learners at different levels of proficiency and with different linguistic backgrounds. Another possible line of research could compare feature reassembly in L2 and L3 acquisition.

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