

**Gender, declension and stem-
final consonants:
An experimental study of
gender agreement in Russian**

Natalia Slioussar

School of Linguistics, HSE, and St.Petersburg State University
slioussar@gmail.com

Gender of Russian nouns

Most Russian nouns: the gender cannot be determined from the inflectional affix.

But the odds are never equal:

- General frequency: $M > F > N$.
- Inflection: most nouns with zero inflection in Nom.Sg are M, most nouns with *-a/ja* inflection are F.
- Stem-final consonant (for nouns with zero inflection)
 - /ž/, /š/, /č' /, /š'č' /: M/F are orthographically different;
 - other non-palatalized: only M;
 - other palatalized: a complex picture presented below.

Gender of Russian nouns

Most Russian nouns: the gender cannot be determined from the inflectional affix.

But the odds are never equal:

- General frequency: $M > F > N$.
- Inflection: most nouns with zero inflection in Nom.Sg are M, most nouns with *-a/ja* inflection are F.
- Stem-final consonant (for nouns with zero inflection)
 - /ž/, /š/, /č', /š'č': M/F are orthographically different;
 - other non-palatalized: only M;
 - other palatalized: a complex picture presented below.

Our study: are Russian speakers sensitive to this in language processing?

Distribution of nouns: our Exp.1

Genders: 48% M vs. 35% F and 17% N in the disambiguated subcorpus of the Russian National Corpus (RNC).

Genders and declensions*:

2 nd decl. M	46% nouns	<i>syn_ / zjat'_</i> 'son _M / son-in-law _M '
1 st decl. F	29% nouns	<i>sestra</i> 'sister _F '
2 nd decl. N	18% nouns	<i>okno</i> 'window _N '
3 rd decl. F	5% nouns	<i>mat'_</i> 'mother _F '
1 st decl. M	1% nouns	<i>papa</i> 'daddy _M '
irregular	1% nouns	

3rd decl. F and 1 decl. M nouns are termed 'non-prototypical'.

*Numbers from Slioussar & Samojlova (2015), based on the disambiguated subcorpus of the RNC. The adjectival declension was not taken into account.

Distribution of nouns: our Exp.2

Genders and stem-final consonants:

Final consonant	RNC (<u>Nom.Sg forms</u>)		GDRL (lemmas)	
	M	F	M	F
/bʲ/	34 (24%)	110	1	11
/pʲ/	3 (2%)	169	-	19
/vʲ/	13 (1%)	1448	1	20
/fʲ/	0	2	-	2
/mʲ/	0	16	-	3
/dʲ/	748 (51%)	707	10	55
/tʲ/	713 (5%)	13184	17	3414
/zʲ/	319 (49%)	327	7	34
/sʲ/	80 (14%)	491	5	57
/nʲ/	2354 (45%)	2842	126	112
/rʲ/	2160 (76%)	677	177	34
/lʲ/	6648 (71%)	2653	1083	215

GDRL = Grammatical dictionary of Russian language (Zaliznyak 1987).

Gender: relevant experiments

Many experimental studies of (gender) agreement: feature hierarchy / markedness.

Russian: M is the most frequent, N used in impersonal sentences.

Experiments with 'Adj+N' phrases (Akhutina et al. 1999, 2001; Romanova & Gor 2017).

Materials: agreeing / non-agreeing adjectives (and sometimes a baseline) + nouns. Tasks: lexical decision, grammaticality judgment etc. RTs and accuracy are measured.

Akhutina et al. (2001): significant facilitation and inhibition for F nouns, only inhibition was significant for M nouns, only facilitation was significant for N nouns.

Gender: relevant experiments

Experiments on agreement attraction (Slioussar & Malko 2016). One production and three comprehension studies.

Gender match cond. M – M <i>recept na porošok</i> 'prescription _M for powder _M '	Predicate match cond. M: <i>byl pomjatym</i> 'was _{M.SG} crumpled _{M.INSTR.SG} '
	Predicate mismatch cond. F: <i>byla pomjatoj</i> 'was _{F.SG} crumpled _{F.INSTR.SG} '
Gender mismatch cond. M – F <i>recept na maz'</i> 'prescription _M for ointment _F '	Predicate match cond. M: <i>byl pomjatym</i> 'was _{M.SG} crumpled _{M.INSTR.SG} '
	Predicate mismatch cond. F: <i>byla pomjatoj</i> 'was _{F.SG} crumpled _{F.INSTR.SG} '

Gender: relevant experiments

Key findings:

- Different patterns in production and in comprehension.
- Feature hierarchy in production: $N < M < F$, as in (Badecker & Kuminiak 2007) for Slovak.
- Feature hierarchy in comprehension: M vs. F and N.

Comprehension experiments: the features of the head, not of the attractor are crucial. Effects with all attractors, but only with F and N heads. No attraction with M heads!

Inflections: relevant experiments

Word-level experiments (Italian, French, Hebrew, Bulgarian etc.): nouns with more typical inflections (regular?) are associated with faster and more accurate answers (e.g. Andonova et al., 2004; Bates et al., 1995; Gollan & Frost, 2001; Spalek et al., 2008).

Sentence-level experiments: fewer findings.

- Caffarra et al. (2015): Italian nouns with more and less typical endings (preceded by articles, presented in the same sentences) elicited different ERP responses.
- Franck et al. (2008), Vigliocco & Zilli (1999): heads with regular inflections are more resistant to gender agreement attraction (Italian, Spanish, French). Also true for number agreement attraction (e.g. Bock & Eberhard, 1993; Vigliocco et al., 1995).

On inflections in Russian

Nouns with ‘non-prototypical’ inflections are **problematic for the L1 and L2 acquisition.**

(1) a. **Gde moja papa?* Correct: *moj.*
where my_{F.NOM.SG} dad_{M.NOM.SG}
‘Where is my dad?’

b. **Ty mužčin?* Correct: *mužčin-a.*
you man_{M.NOM.SG}
‘Are you a man?’

c. **Peč’ sam topitsja?* Correct: *sama.*
stove_{F.NOM.SG} itself_{M.NOM.SG} burns
‘Does the stove burn by itself?’

d. **Ja bojus’noča.* Correct: *noči.*
I fear night_{F.GEN.SG}
‘I am afraid of the night’.

(e.g. Janssen, 2016; Rodina & Westergaard, 2012; Schwartz et al., 2015; Tseitlin 2000).

On inflections in Russian

But adult native speakers **do not make more errors** with 'non-prototypical' nouns (e.g. Rusakova, 2013)

Only certain cases with gender variation are problematic (Savchuk, 2011).

But what does not show up on the surface may show up in the process... Online experimental methods.

On inflections in Russian

Taraban and Kempe (1999): **the only experimental study.** L2 learners vs. native speakers. Task: self-paced reading + forced choice of the predicate. No prototypicality effects for native speakers. Let's try a different task?..

(2) a. *Daže (obyčnaja) muka/sol' teper'...*
even ordinary_F flour_{F.1D}/salt_{F.3D} now

b. *isčez/isčezla iz magazinov.*
disappeared_{M/F} from stores

(3) a. *Nakanune (otëkšij) palec/lokot' sil'no...*
the-day-before swollen_M finger_{M.2D}/elbow_{M.2D} strongly

b. *bolel/bolela ot udara.*
hurt_{M/F} from injury

Experiment 1: method

Together with Pavel Shilin (St.Petersburg State Uni.).

Task: self-paced reading. **Materials:** sentence sets with a subject, a predicate and a three-word PP.

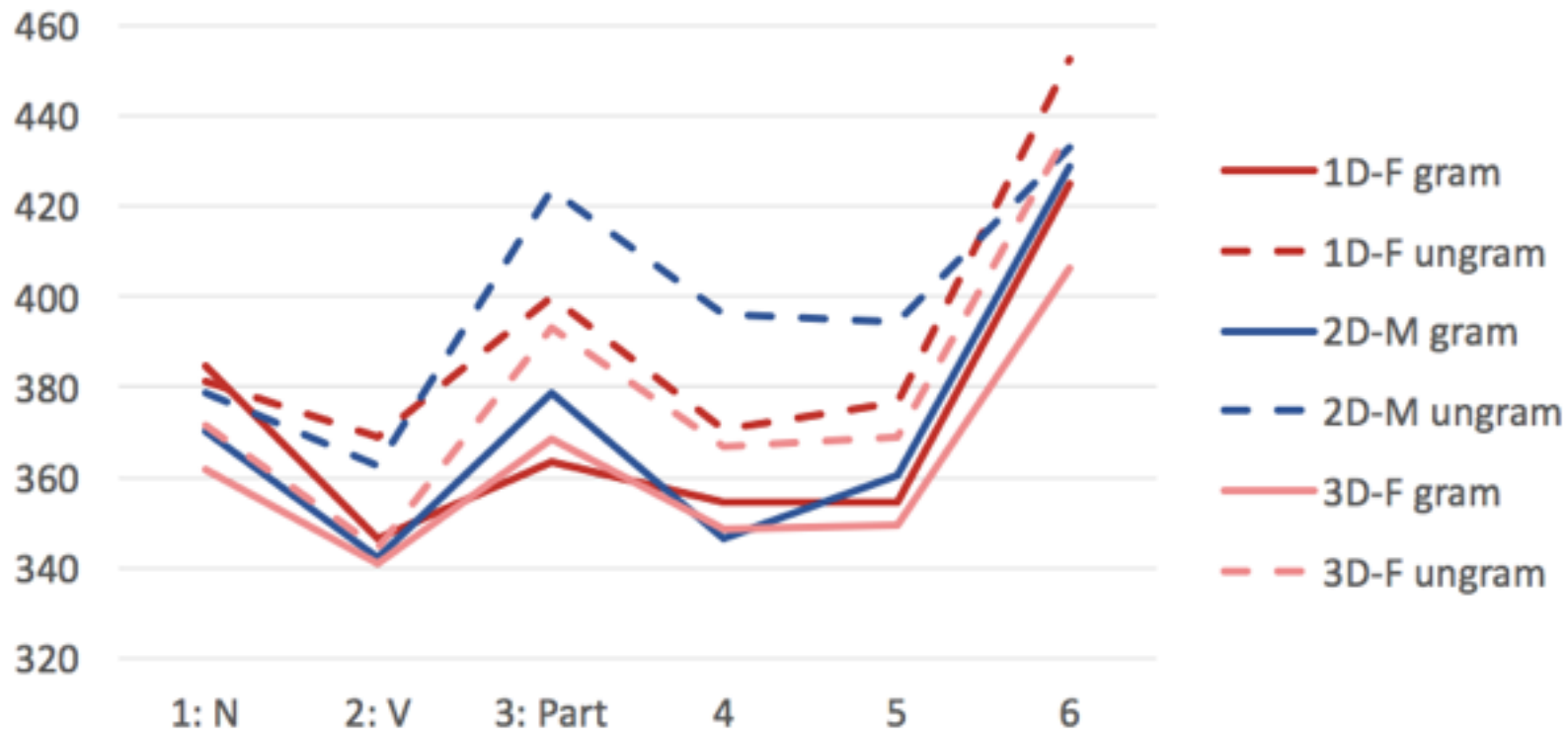
- (4) a. *razgul / draka / bran'* _____ balanced in
debauch^{2D-M} / fight^{1D-F} / quarrel^{3D-F} frequency
and length
- b. *byl nepriemlym / byla nepriemloj*
was^{M/F} unacceptable^{M/F}
- c. *dlja požilix sosedej*
for elderly neighbors'

36 target items in one of the 6 conditions (1D-F, 2D-M, 3D-F subjects, M/F predicates)+ 80 fillers.

Participants: 36 native speakers.

Experiment 1: results

Fig. 1. Average word-by-word RTs (in ms) in different conditions.



- Informal observation: differences only in ungram. sentences.
- Mixed-effects regressions: Region 2: 3D-F \ll 1D-F.
Region 4: all F \ll M.

Experiment 1: conclusions and further questions

- Both factors (gender and declension) play a role, but at different stages.
- No gender or declension is intrinsically more difficult to process (on the noun or on a correctly agreeing predicate).

Experiment 1: conclusions and further questions

- Both factors (gender and declension) play a role, but at different stages.
- No gender or declension is intrinsically more difficult to process (on the noun or on a correctly agreeing predicate).

Prototypicality:

- Non-prototypical F nouns: apparently, their gender is more difficult to retrieve — only after M predicates (because they ‘look like M’) or after any agreement error (i.e. M and N)?
- What about non-prototypical M nouns like *papa* ‘dad’? Different gender + animacy. Vigliocco & Franck (1999): animacy plays a role for gender agreement attraction.

Experiment 1: conclusions and further questions

Gender:

- F subject + M predicate << M subject + F predicate. At least two possible explanations: (i) M subjects generate stronger expectations or (ii) F errors cause more disruption.

In line with previous studies (Akhutina et al., 1999, 2001; Romanova & Gor, 2017; Slioussar & Malko, 2016).

- Further studies: adding N subjects and predicates, as well as animate subjects.

Pilot experiment 2: goal

Next question: **are speakers sensitive to the final consonant of the stem?**

- /b' /, /p' /, /v' /, /f' /, /m' /, /t' /, /s' / — only or mostly F;
- /d' /, /z' /, /n' / — 50x50;
- /r' /, /l' / — mostly M.

Exp.1 was not designed to test this, but, as far as we can judge, there are no relevant reading time differences.

Exp.2: defining the gender of different real and nonce nouns.

Together with Natalia Chuprasova (St.Petersburg State Uni.) and Varvara Magomedova (SUNY, Stony Brook).

Pilot experiment 2: method

Main goal: to find out how Russian speakers determine the gender of nouns with diminutive and augmentative suffixes.

Materials = fillers: different nouns including 12 real and 12 nonce nouns ending in palatalized consonants.

Task. Participants received a list of seven adjectives and then were presented with nouns one by one. They were asked to pick a matching adjective and pronounce the resulting phrase.

Participants: 30 native speakers.

Pilot experiment 2: results

12 real nouns (6 M + 6 F): only 7 errors out of 360 responses.
3 errors with *žen'sen* 'ginseng_M', 2 errors with *stupen* 'step_F'...

12 nonce nouns (2 per consonant):

RNC		Exp.2: M responses
80 (14%)	/s'/	38 (63%)
34 (24%)	/b'/	22 (37%)
2354 (45%)	/n'/	30 (50%)
748 (51%)	/d'/	26 (43%)
6648 (71%)	/l'/	44 (73%)
2160 (76%)	/r'/	51 (85%)

Mixed effects logistic regression: only nonce nouns ending in *-l'* and *-r'* are significantly different from the other groups. Two consonants more characteristic for M nouns.