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One, three, five...

Ming Xiang

Boris Harizanov

Maria Polinsky

One, three, five...

Resolving mismatches:
number forms in native and
heritage Russian



Acknowledgments

Katia Kravtchenko
Maša Dikanovic
Tom Devine
Olga Kagan

Main questions

- Question 1: How do speakers represent interface mismatches?

Where can we look?

Case study: Mismatch between
conceptual and formal features

Main data point: inflectional forms
combining number and case in Russian

Main questions

- Question 2: Do native speakers and heritage speakers build similar representations when confronted with contrast between conceptual semantics and surface form?

Mismatches at the interface

When mismatch arises at the surface, what representations do speakers rely on?

- Surface morphological form: WYSIWYG
- Conceptual semantics
- Some other abstract representation

Russian genitive singular

- Obligatory form with some negative existential predicates:
net mal'čik-a/*mal'čik 'there is no boy'
no boy-**gen.sg**/nom.sg
- Assigned by prepositions:
do/u/bez/za mal'čik-a 'to/by/without/for boy'
to/by/without/for boy-**gen.sg**
- Possessive
sobaka mal'čik-a 'boy's dog'
dog boy-**gen.sg**
- Partitive
nemnogo spirt-a 'some alcohol'
some alcohol-**gen.sg**

Counting in Russian

- 1 mal'čik/apel'sin
1 boy-**nom.sg**/orange-**nom.sg**
- 3 mal'čik-a/apel'sin-a
3 boy-**gen.sg**/orange-**gen.sg**
- 6 mal'čik-ov/apel'sin-ov
6 boy-**gen.pl**/orange-**gen.pl**

(we will consider masculine nouns only, because case distinctions are more transparent there)

Russian genitive singular

- The form of Russian genitive singular does not entail any special numerical value
- However, because of diachronic change, it is used with some plural numerals as a count form: **“gen.sg.”**

☞ mismatch between form and concept

Explaining the mismatch

Relationship to number:

- **“Gen sg”** is singular
- **“Gen sg”** is not singular

Relationship to case:

- **“Gen sg”** is part of the case paradigm
- **“Gen sg”** is independent of the case system

Explaining the mismatch

Analysis 1: **“Gen. sg.”** is singular:

- Gen sg is the least marked form of Russian nouns (~possibly what is stored in the lexicon); the numeral simply takes an unmarked N', but for higher numerals the plural is added on (Pesetsky 2007)

Explaining the mismatch

Analysis 2: “Gen. sg.” is not singular:

- It is a **paucal form**, which accidentally looks like a singular (Rappaport 2002, Bailyn & Nevins 2007)

Explaining the mismatch

Analysis 3 (single categorial chunk):

- “Gen sg” represents a separate category, whose **number is unspecified** (Zaliznjak 1968: 2.8)
- as a special count form, it is not part of the case paradigm

Comparing the analyses

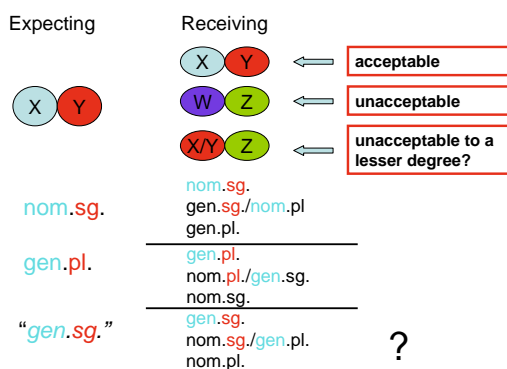
	A-1	A-2	A-3
Is the form used with 2-4 simply homophonous with the gen.sg. used outside numerals?	✗	✓	✓
Is the form used with 2-4 part of Russian case system?	✓	✓	✗

How is “gen.sg.” represented?

In numerical expressions, if “gen.sg.” is underlyingly a true gen.sg., speakers should represent it the same way as other case-number feature combinations (such as nominative or gen. pl.)

Can we find processing evidence for this?

Experimental paradigm



Experimental conditions

12 conditions:

	Match NC	Match N	Match C	Match zero
One (1) (nom.sg.)	nom.sg.	gen.sg.	nom.pl.	gen.pl.
Small N (2-4) (“gen.sg.”)	gen.sg.	nom.sg.	gen.pl.	nom.pl.
Big N (5+) (gen.pl.)	gen.pl.	nom.pl.	gen.sg.	nom.sg.

Sample stimuli

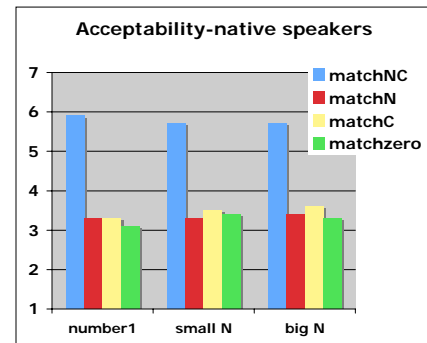
	odin one.NOM	malen'kij little.SG.NOM	mal'čik (boy.SG.NOM) *mal'čika (boy.SG.GEN) *mal'čiki (boy.PL.NOM) *mal'čikov (boy.PL.GEN)		stojal stood.SG	
v xore in choir	tri three.NOM	malen'kix little.PL.GEN	*mal'čik (boy.SG.NOM) mal'čika (boy.SG.GEN) *mal'čiki (boy.PL.NOM) *mal'čikov (boy.PL.GEN)	v očkax in glasses		vperedi vsex in front of all
	pjat' five.NOM	malen'kix little.PL.GEN	*mal'čik (boy.SG.NOM) *mal'čika (boy.SG.GEN) *mal'čiki (boy.PL.NOM) mal'čikov (boy.PL.GEN)		stojali stood.PL	

Sample stimuli

(1)	В хоре один маленький мальчик In choir one little boy	мальчик *мальчика *мальчики *мальчиков boy	sg.nom sg.gen pl.nom pl.gen	в очках стоял впереди всех. in glasses stood.sg in-front-of all
(2)	В хоре три маленьких мальчиx In choir one little boy	*мальчик мальчиx *мальчики *мальчиков boy	sg.nom sg.gen pl.nom pl.gen	в очках стояли впереди всех. in glasses stood.pl in-front-of all
(3)	В хоре пять маленьких мальчиx In choir one little boy	*мальчик *мальчиx *мальчики мальчиков boy	sg.nom sg.gen pl.nom pl.gen	в очках стояли перед всеми. in glasses stood.pl in-front-of all

Experiment 1: acceptability judgments

- 1-7 scale (7 is the best)
- 60 items
- 108 fillers
- 35 native speakers



Summary of the results

- Native speakers show clear grammaticality judgments
- No graded effect: what's bad is just bad

Experiment 2: self-paced reading

- 60 items
- 108 fillers
- 37 native speakers

Self-paced reading demo

Три маленьки е мальчики в очках

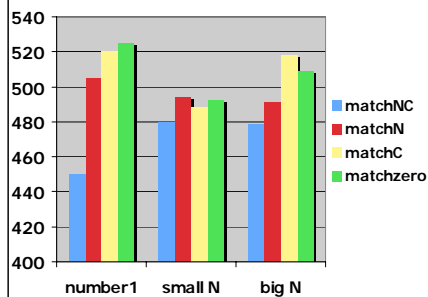
By way of reminder: Conditions

... one boy- $\left. \begin{array}{l} \text{nom.sg.} \\ \text{nom.pl} \\ \text{gen.sg.} \\ \text{gen.pl.} \end{array} \right\}$ in glasses

... three boy- $\left. \begin{array}{l} \text{nom.sg.} \\ \text{nom.pl} \\ \text{gen.sg.} \\ \text{gen.pl.} \end{array} \right\}$ in glasses

... six boy- $\left. \begin{array}{l} \text{nom.sg.} \\ \text{nom.pl} \\ \text{gen.sg.} \\ \text{gen.pl.} \end{array} \right\}$ in glasses

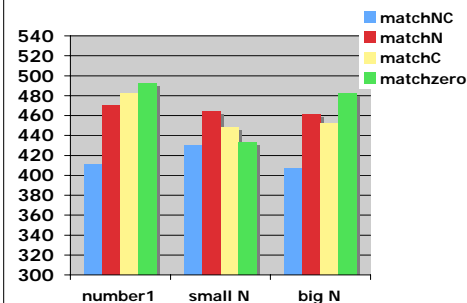
Critical N-native speakers



Privileged status of 'one N'?

- Way of expressing indefinites, which are less marked/unmarked
- Nominative sg is the citation form
- 'one N' may be more frequent
- Anything else?

Spill over - native speakers



Summary of results

online performance, native speakers:

- sensitivity to grammaticality in **number 1** and **big number** environments, but not in **small number** context
- no graded effect

Linguistic implications

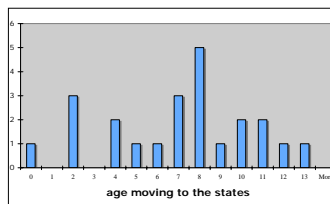
- “Gen.sg.” does not receive the representation as a sg genitive—otherwise subjects would have shown sensitivity to the wrong representations
- The exact representation of “gen.sg” is yet to be determined

Main questions

- Question 2: Do native speakers and heritage speakers build similar representations when confronted with contrast between conceptual semantics and surface form?

Biographical data

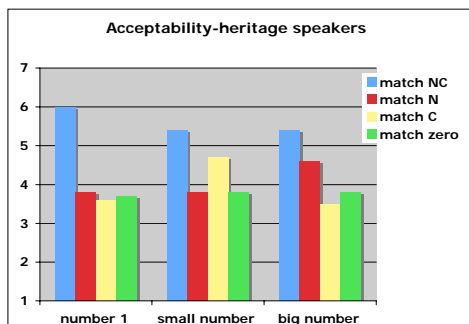
- 6 males, 17 females
- age ranges between 19-26 (average 22.5)
- age moving to the States
 - between 0 to 13; average 7 years old



Experiment 3: acceptability judgments, heritage speakers

- Offline 1-7 scale (7 is the best)
- 60 items
- 108 fillers
- 23 heritage speakers

Acceptability-heritage speakers

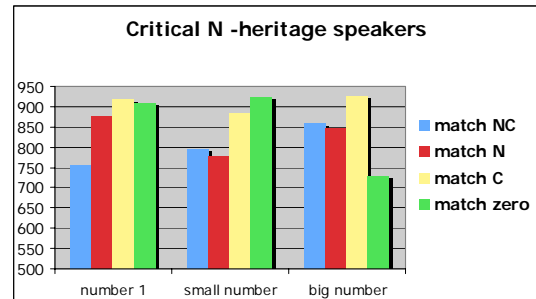


Summary

- Although still noisy, heritage speakers show the basic grammaticality pattern, except for the big number context
- The fine detailed patterns on individual features are yet to be determined when more data are collected

Experiment 4: self-paced reading, heritage speakers

- 60 items
- 108 fillers
- 25 heritage speakers, advanced (can read Cyrillic)



Some tendencies...

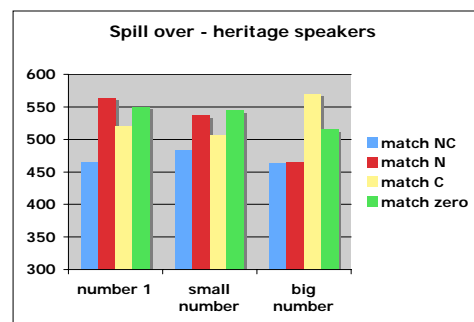
- Number trumps case in the small N and big N environments (these are semantically plural)
- In the big N category, the use of nom. sg is tolerated better—possibly an indication of the #+citation form as the unmarked version

One step forward, two steps back...

- Does the partially matched number feature have a facilitation effect for semantically plural context (any number above 1)?
- Is the big number context really special, or it is just noisy at this stage?

Heritage speakers: Critical N

- Heritage speakers show the basic grammaticality pattern, except for the big number context
- However, the sensitivity to grammaticality in the small number context is strikingly different from what we found with native speakers
- As with other grammatical patterns, this may be evidence of divergent grammar (different from the baseline) (cf. Polinsky 2008)



Heritage speakers: Spill over

- The spill over region confirms that heritage speakers show the basic grammaticality pattern in all three numerical contexts
- Finer details on individual features are yet to be determined

Native and heritage speakers

- It is the heritage speakers, not the native speakers, who showed the sensitivity to grammaticality in the small number context!
- This suggests that heritage speakers build their representation more directly based on the input form they see

“Gen.sg.” is different for the two subject groups

- Native speakers: “Gen.sg.” is a special form and does not map to the deep representation of gen. sg
- Heritage speakers: what you see is what you get, “Gen.sg.” is gen. sg.

Tentative conclusions

- For native speakers, there is no clear evidence of graded grammaticality effects based on partial feature match
- Confronted with the surface mismatch at the morphological-conceptual interface, native speakers pay attention to deeper representations, while heritage speakers rely more on surface representations

Tentative conclusions

- Heritage speakers do not recognize surface homophony
- Heritage speakers are more tolerant to morphological mismatches
- For heritage speakers, conceptual number might potentially play some role (stay tuned)

The nature of “gen.sg.”

Recall the three analyses:

- Gen. sg. is gen. sg. is gen. sg.
- “Gen.sg.” is non-singular (paucal)
- “Gen.sg.” is not a case form

The nature of “gen.sg.”

Processing data do not support the analysis according to which gen. sg. is an invariant category, most likely given in the lexicon (Pesetsky 2007, 2008)

The nature of “gen.sg.”

The experimental data presented here are compatible with the other two analyses:

- “Gen.sg.” is non-singular (paucal)
- “Gen.sg.” is not a case form

What kind of evidence can distinguish between these analyses?

A note on methodology

- Offline results show only quantitative difference between the two groups
- Online data, however, show qualitative difference between the two groups

Outstanding questions

- How do native children learn that “gen.sg.” is a special form?
- Possibly through exposure to massive input, including large numbers:
643 mal’čik-**a**/*-**ov**

Outstanding questions

- If the massive input is the answer, do we find more fine-grained distinctions based on age of exposure variability within the HS group?
- Ongoing: separate HS who were interrupted at 5 from those who were interrupted later

Thank you
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