Redundancy in person marking: **Subject pronoun expression** in a cross-linguistic multifactorial design

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Redundancy

Language as a communicative system is optimized for efficiency: language users aim to minimize their effort while ensuring that meanings are effectively conveyed (Levshina 2022: 6).

Despite this, languages commonly avoid optimal encoding and incorporate repetitions and redundant coding of information on all linguistic levels (Trudgill 2011; Leufkens 2020; 2022).

Redundant use of grammar has the function of making communication more robust and predictable, and it protects us against noise (Shiffrin & Schneider 1977, Levshina 2022: 9; Wit & Gillette 1999: 4; Chiari 2007: 12–13).

Pronominal subject expression

In many languages, subject pronouns are not obligatorily expressed (*pro-drop*, *null subject, variable subject pronoun expression*).

(Partial) pro-drop languages include Finno-Ugric, Slavic, Romance languages, but also Greek, Arabic, Hindi, Japanese, and others.

EST:	***Ma***	*kuula-**n***	*muusika-t*.
	1SG	listen-1SG.PRS	music-PART
POL:	***Ja***	*słucha-**m***	*muzyki*
	1SG	listen-1SG.PRS	music.GEN

‘I am listening to music.’

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Pronominal subject expression

Berdicevskis, Schmidtke-Bode and Seržant (2020) based on WALS data and Treebank corpus data of Slavic languages:

> There is a cross-linguistic **tendency to use only one referential device for encoding subject** and to avoid double marking or non-marking. This is motivated by **efficiency of communication**
>
> > “that equilibrates production effort and the robustness of information transfer”,
>
> while double encoding
>
> > “is **obviously redundant** in pragmatically unmarked topic-comment clauses and is therefore **costlier than necessary**”.

Pronominal subject expression

Torres Cacoullos & Travis (2019: 655)

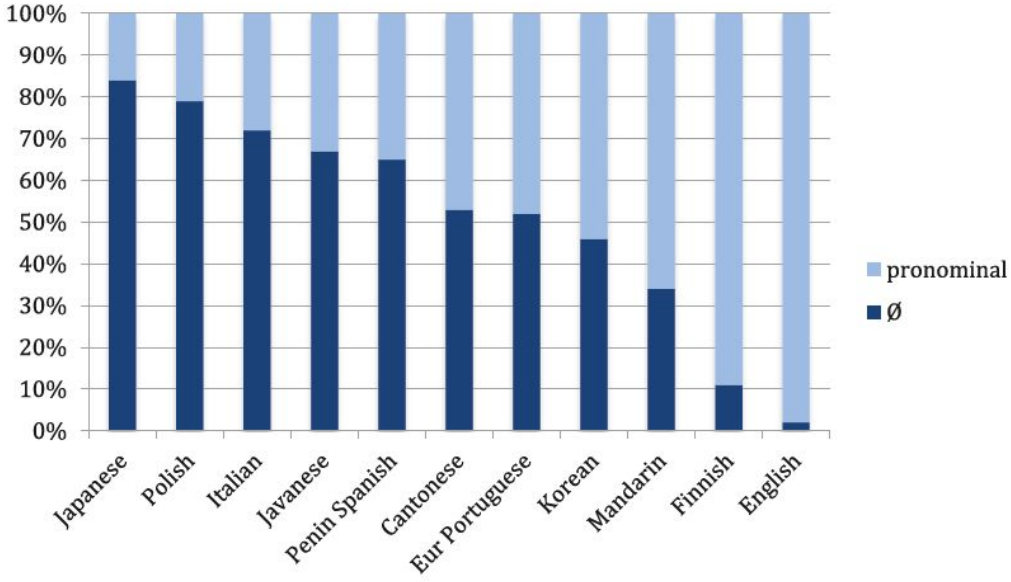

Figure 1: Rates of 1sg subject expression (Ø vs. pronominal) across different languages. Sources and rates of unexpressed 1sg subjects: Japanese 84% (Lee and Yonezawa 2008: 738, N = 1571), Polish 79% (Chociej 2011: 52, N = 536), Italian 72% (Nagy p.c. cf. Nagy et al. 2011, N = 224), Javanese 67% (Ewing 2014: 51, N = 289), Peninsular Spanish 65% (Posio 2013: 269, N = 787), Cantonese 53% (Nagy p.c. cf. Nagy et al. 2011, N = 362), European Portuguese 51% (Posio 2013: 269, N = 704), Korean 46% (Oh 2007: 466, N = 433), Mandarin 34% (Jia and Bayley 2002: 13, N = 393), Finnish 11% (Helasvuo 2014: 68, N = 1793), English ~ 2% (Torres Cacoullos and Travis 2014: 22, N = 6,600 (estimated)).

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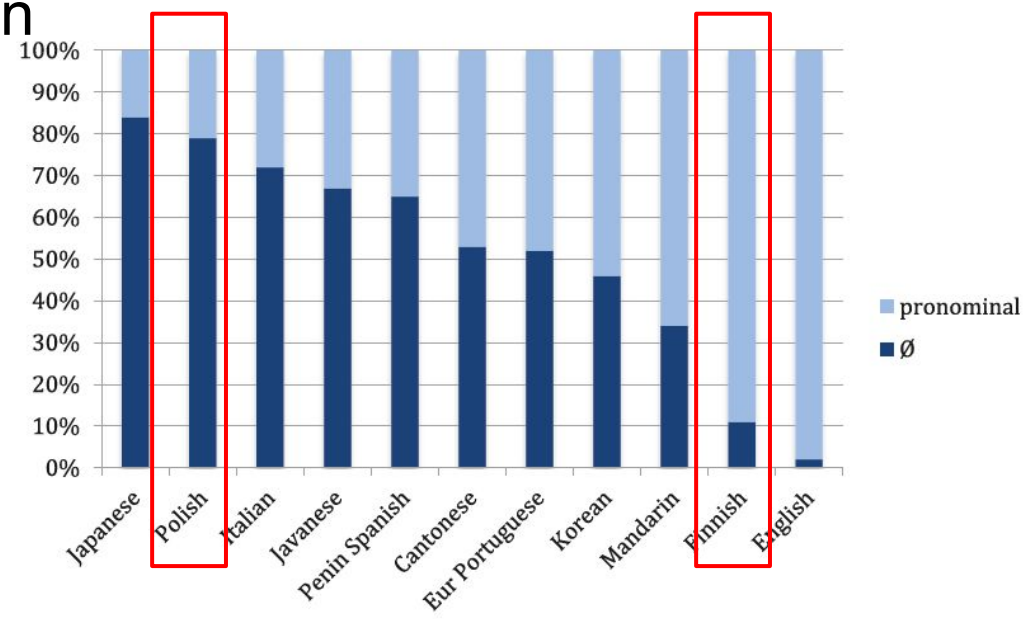

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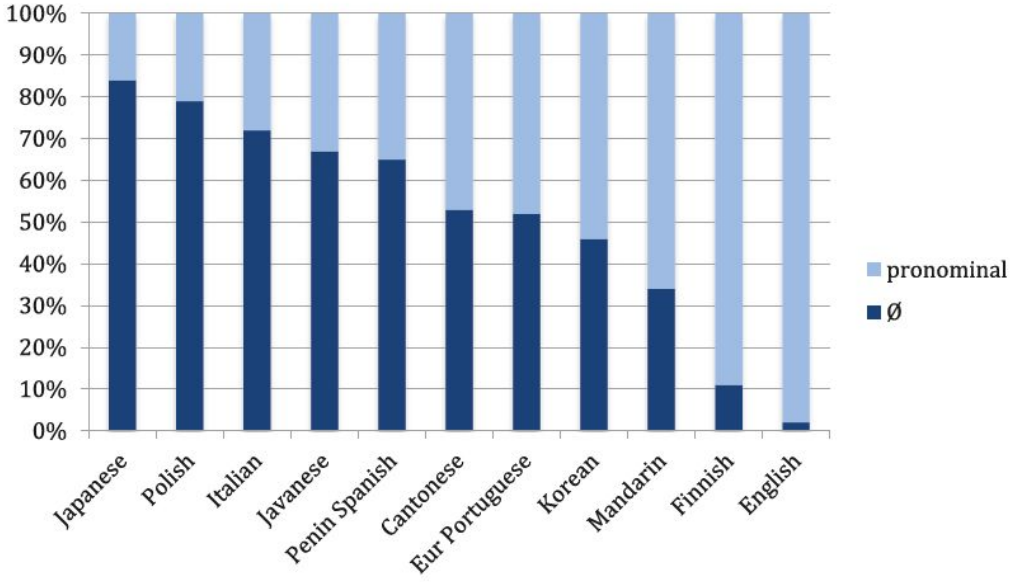
"***Grammatical (dis)similarity*** *is detected not by the presence or absence of a feature,* ***nor by its overall rate of use****. The loci of cross-language comparisons are instead both* ***the probabilistic constraints and the variable context*** *within which they are operative.*" (Torres Cacoullos & Travis 2019: 682)



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(Some) factors found to influence pronominal subject expression

STRUCTURAL-GRAMMATICAL

Syntactic complexity:

- coordination
  (Torres Cacoullos & Travis 2014)
- subordination
  (Lindström et al. 2009, Väänänen 2016)
- length of syntactic unit
  (Helasvuo & Kyröläinen 2016)
- transitivity
  (Orozco & Hurtado 2021)
- complexity of the verb phrase
  (Wagner 2018)

Grammatical categories:

- tense, aspect, polarity
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Discourse continuity & unambiguity:

- recency of mention
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- referential distance
  (Lindström et al. 2009, Väänänen 2016, Helasvuo & Kyröläinen 2016)
- subject/topic continuity
  (Givón 1983)
- referent switch
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Structural persistence
(Helasvuo & Kyröläinen 2016, Torres Cacoullos & Travis 2014, 2016, 2019, Orozco & Hurtado 2021)

Constructional entrenchment / conventionalization
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Verb type, esp. cognition verbs
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REGISTER DIFFERENCES

(Helavsuo & Kyröläinen 2016, Helasvuo 2014b)

Questions

1. How ‘redundant’ is 1st and 2nd person marking in 4 languages originating from 2 different language families: Estonian (Finno-Ugric), Finnish (Finno-Ugric), Russian (Slavic), and Polish (Slavic)?

    What is the overall distribution of expressed vs. unexpressed pronouns in the 4 languages?

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   What is the overall distribution of expressed vs. unexpressed pronouns in the 4 languages?

2. When does redundant marking happen?

   Which factors are significantly associated with subject pronoun expression intra- and cross-linguistically?

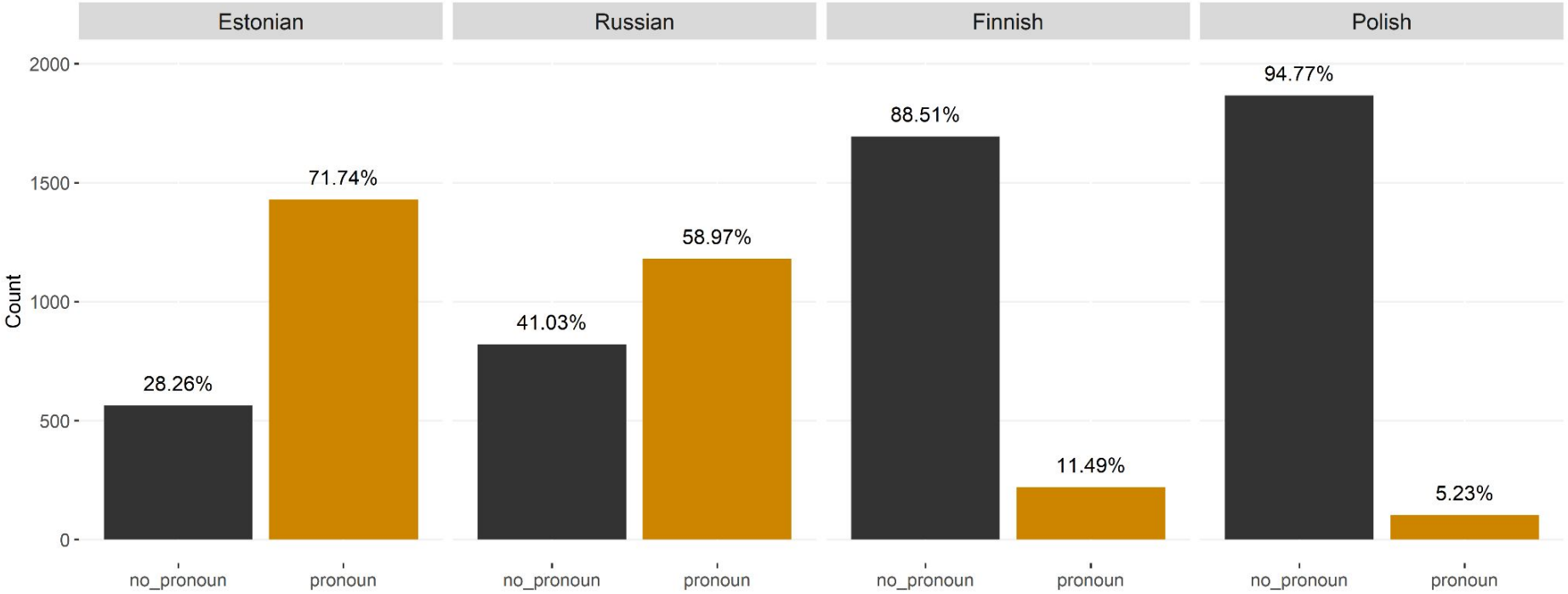
   In which direction do the effects affect subject pronoun expression?

Data

- Only 1SG, 2SG, 1PL,and 2PL (sampled proportionally to their frequencies in the corpora)
- Only indicative mood
- No negation
- No coordination
- No nonreferential uses (e.g., particles)

	Finno-Ugric	Slavic
Spontaneous speech	**ESTONIAN** The Phonetic Corpus of Estonian Spontaneous Speech (Lippus et al. 2023) ~ 600,000 tokens **1992** obs.	**RUSSIAN** Russian National Corpus spoken subcorpus (Savchuk et al. 2024) ~ 7,000,000 tokens **2001** obs. (1193)
Subtitles	**FINNISH** Open Subtitles 2018 (Lison & Tiedemann 2016) ~ 175,000,000 tokens **1914** obs. (1910)	**POLISH** Open Subtitles 2018 (Lison & Tiedemann 2016) ~ 496,000,000 tokens **1969** obs.

Results 1: Distribution of expressed vs. unexpressed pronouns



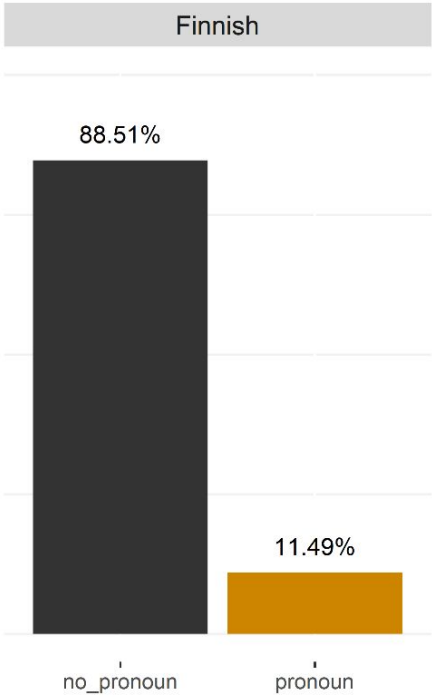
Results 1: Distribution of expressed vs. unexpressed pronouns

Expressed pronoun rates in Finnish

Helasvuo 2014a:
conversational data 1SG **89%,** 2SG **76%**

Duvallon & Chalvin 2004:
radio debates **60%**

Helasvuo 2014b:
written Finnish **20%**
text messages **19%**



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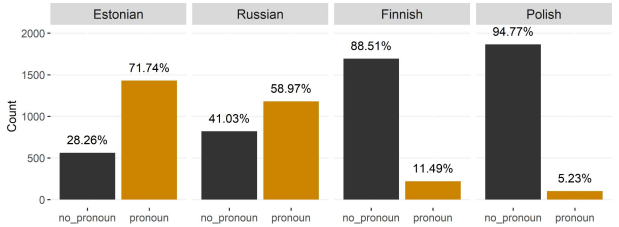
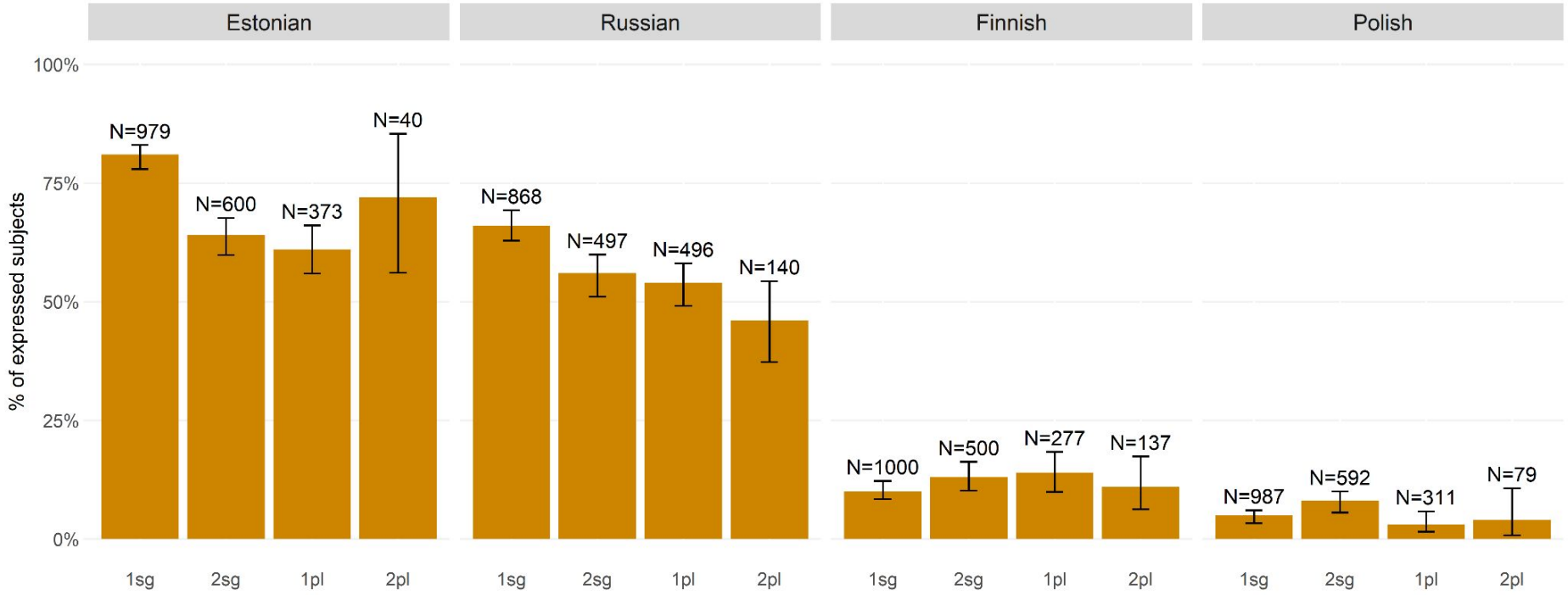

Estonian
Russian
Finnish
Polish
Count
2000
1500
1000
500
0
28.26%
71.74%
41.03%
58.97%
88.51%
11.49%
94.77%
5.23%
no_pronoun
pronoun


Estonian
Russian
Finnish
Polish
% of expressed subjects
100%
75%
50%
25%
0%
N=979
N=600
N=373
N=40
N=868
N=497
N=496
N=140
N=1000
N=500
N=277
N=137
N=987
N=592
N=311
N=79
1sg
2sg
1pl
2pl

Explanatory factors (structural)

- **Tense of the finite verb form** (TENSE: past, present, future)
- **Complexity of the verb** (VERB_COMPLEXITY: main, non-main)
- **Complexity of the verb phrase** (VP_COMPLEXITY: compl, no_compl)
- **Subordination** (CLAUSE_TYPE: main, subord)
- **Sentence type** (SENTENCE_TYPE: declarative, interrogative)
- **Person** (PERSON: 1, 2)
- **Number** (NUMBER: SG, PL)

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Explanatory factors (structural, semantic & discourse-related)

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- **Semantic type of the main verb** (VERB_TYPE: communicative, mental, perception, other)

- **Referent switch compared to the previous clause** (REFERENT_SWITCH: same, switch)
- **Mention of the referent in the immediately preceding context** (REF_SAMESPEAKER: yes, no, REF_ANYSPEAKER: yes, no)
- **Form of the mention in the immediately preceding context** (REFFORM_SAMESPEAKER: verb, pronoun, no, REFFORM_ANYSPEAKER: verb, pronoun, no)

Results 2

Which factors are significantly associated with subject pronoun expression?

1. Univariate analyses:

- Chi-squared test of independence;
- Simple log-linear models

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	EST	RUS	FIN	POL
TENSE (past, present, future$_{SL}$)		***		
VERB_COMPLEXITY (main, non-main)			**	***
VP_COMPLEXITY (compl, no_compl)	***	***		(*)
CLAUSE_TYPE (main, subord)	***			***
SENTENCE_TYPE (declarative, interrogative)				
PERSON (1, 2)	***	**		**
NUMBER (SG, PL)	***	**		
VERB_TYPE (comm_ment_perc, other)	***	***	*	
REF_SAMESPEAKER (yes, no)	**	*	**	**
REF_ANYSPEAKER (yes, no)	**	*	**	*
REFFORM_SAMESPEAKER (verb, pronoun, no)	***	***	**	***
REFFORM_ANYSPEAKER (verb, pronoun, no)	***	***	**	***
REFERENT_SWITCH (same, switch)	***	***		NA

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PERSON (1, 2)	***	**		**
NUMBER (SG, PL)	***	**		
VERB_TYPE (comm_ment_perc, other)	***	***	*	
REF_SAMESPEAKER (yes, no)	**	*	**	**
REF_ANYSPEAKER (yes, no)	**	*	**	*
REFFORM_SAMESPEAKER (verb, pronoun, no)	***	***	**	***
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2. Multivariate analyses:

- Conditional Random Forests;
- Complex log-linear models

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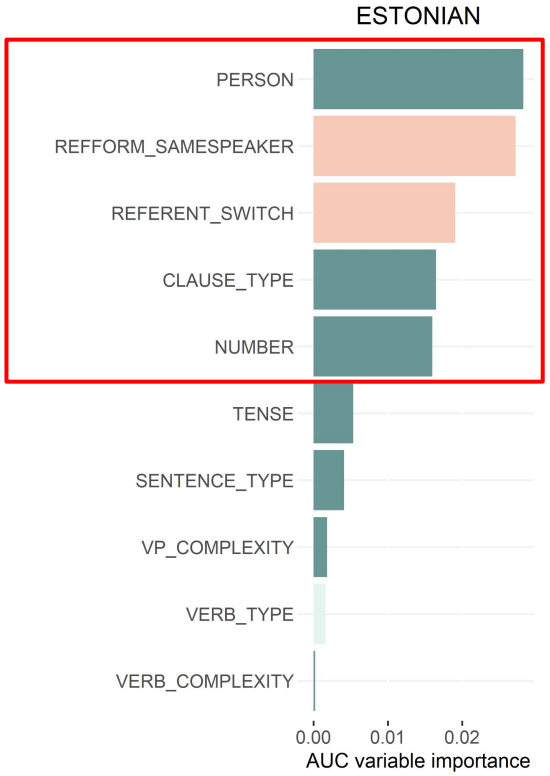

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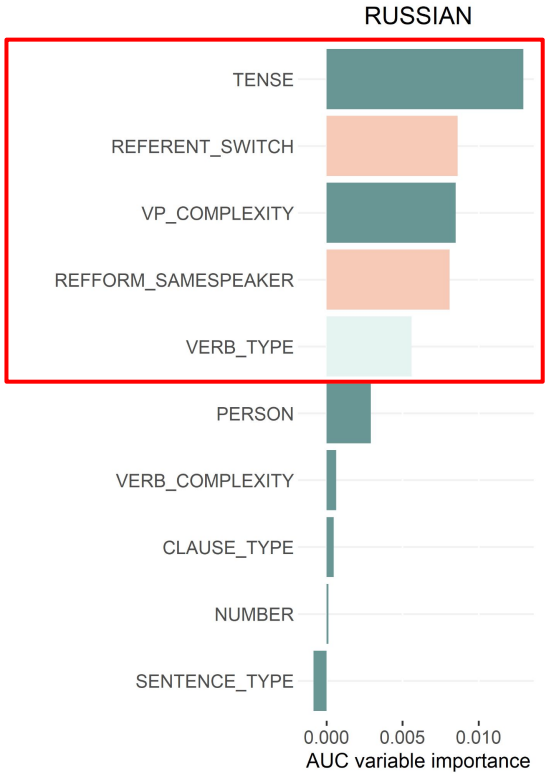

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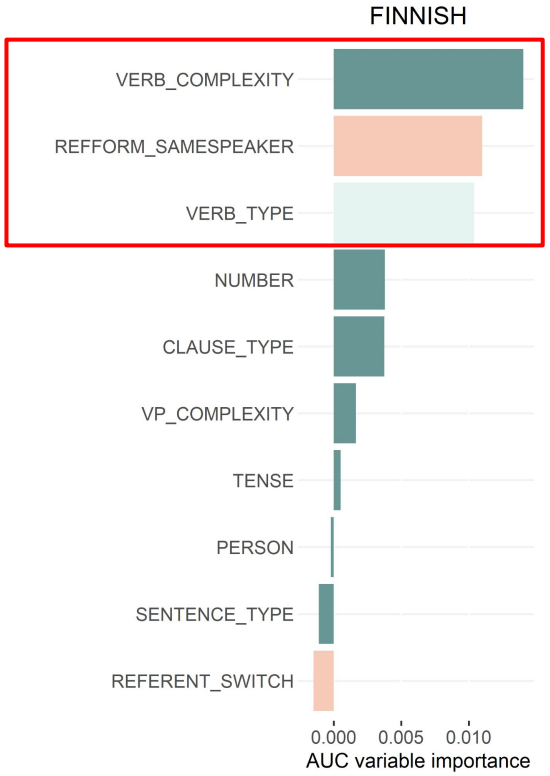

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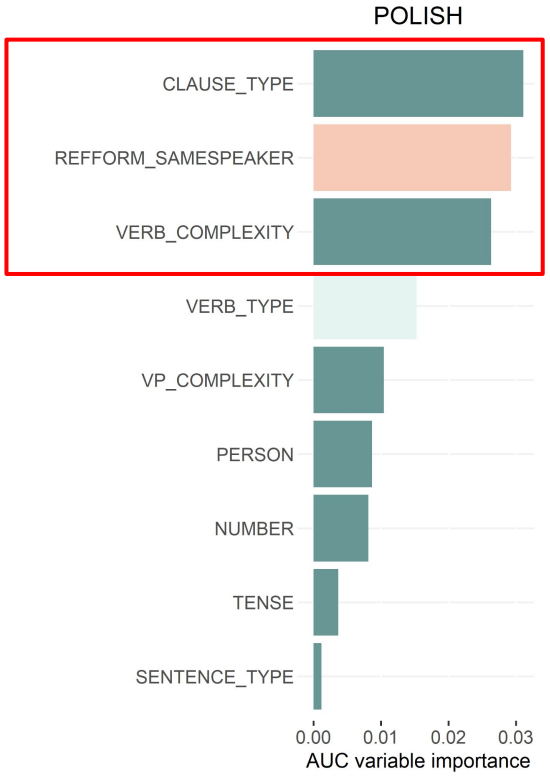

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SENTENCE_TYPE (declarative, interrogative)				
PERSON (1, 2)	***	**		**
NUMBER (SG, PL)	***	**		
VERB_TYPE (comm_ment_perc, other)	***	***	*	
REF_SAMESPEAKER (yes, no)	**	*	**	**
REF_ANYSPEAKER (yes, no)	**	*	**	*
REFFORM_SAMESPEAKER (verb, pronoun, no)	***	***	**	***
REFFORM_ANYSPEAKER (verb, pronoun, no)	***	***	**	***
REFERENT_SWITCH (same, switch)	***	***		NA

Results 2

	EST	RUS	FIN	POL
REFFORM_SAMESPEAKER (verb, pronoun, no)	***	***	**	***
VERB_TYPE (comm_ment_perc, other)	(***)	***	*	
PERSON (1, 2)	***	(**)		(**)
VP_COMPLEXITY (compl, no_compl)	(***)	***		(*)
REFERENT_SWITCH (same, switch)	***	***		NA
CLAUSE_TYPE (main, subord)	***			***
VERB_COMPLEXITY (main, non-main)			**	***
NUMBER (SG, PL)	***	(**)		
TENSE (past, present, future$_{SL}$)		***		
SENTENCE_TYPE (declarative, interrogative)				

Results 2

	EST	RUS	FIN	POL
REFFORM_SAMESPEAKER (verb, pronoun, no)	pronoun ↑ verb ↓	pronoun ↑ verb ↓	pronoun/no ↑ verb ↓	pronoun/no ↑ verb ↓
VERB_TYPE (comm_ment_perc, other)	(***)	comm_ment_perc ↑ other ↓	other ↑ comm_ment_perc ↓	
PERSON (1, 2)	1 ↑ 2 ↓	(**)		(**)
VP_COMPLEXITY (compl, no_compl)	(***)	compl ↑ no_compl ↓		(*)
REFERENT_SWITCH (same, switch)	switch ↑ same ↓	switch ↑ same ↓		NA
CLAUSE_TYPE (main, subord)	subord ↑ main ↓			main ↑ subord ↓
VERB_COMPLEXITY (main, non-main)			main ↑ non-main↓	main ↑ non-main↓
NUMBER (SG, PL)	SG ↑ PL ↓	(**)		
TENSE (past, present, future$_{SL}$)		future ↑ past ↓		
SENTENCE_TYPE (declarative, interrogative)				

Results 2

	EST	RUS	FIN	POL
REFFORM_SAMESPEAKER (verb, pronoun, no)	pronoun ↑ verb ↓	pronoun ↑ verb ↓	pronoun/no ↑ verb ↓	pronoun/no ↑ verb ↓
VERB_TYPE (comm_ment_perc, other)	(comm_ment_perc ↑ other ↓)	comm_ment_perc ↑ other ↓	other ↑ comm_ment_perc ↓	
PERSON (1, 2)	1 ↑ 2 ↓	(1 ↑ 2 ↓)		(2 ↑ 1 ↓)
VP_COMPLEXITY (compl, no_compl)	(compl ↑ no_compl ↓)	compl ↑ no_compl ↓		(compl ↑ no_compl ↓)
REFERENT_SWITCH (same, switch)	switch ↑ same ↓	switch ↑ same ↓		NA
CLAUSE_TYPE (main, subord)	subord ↑ main ↓			main ↑ subord ↓
VERB_COMPLEXITY (main, non-main)			main ↑ non-main↓	main ↑ non-main↓
NUMBER (SG, PL)	SG ↑ PL ↓	(SG ↑ PL ↓)		
TENSE (past, present, future$_{SL}$)		future ↑ past ↓		
SENTENCE_TYPE (declarative, interrogative)				

Answering the research questions

1. How ‘redundant’ is 1st and 2nd person marking in 4 languages originating from 2 different language families: Estonian (Finno-Ugric), Finnish (Finno-Ugric), Russian (Slavic), and Polish (Slavic)?

Answering the research questions

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There are **significant differences between the 4 languages**: highest subject pronoun expression rate in Estonian (74.71%), lowest in Polish (5.23%).

- Mode of communication is important! **Reduction of grammatical redundancy in subtitles.** → Edited, space restrictions, processing of two signals (auditive and visual language) at a time. More contextual (incl. visual) cues help the speaker disambiguate the referent.

Answering the research questions

2. When does redundant marking happen?

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Factors related to (online) **processing, memory, and discourse continuity** show unidirectional effects in all languages.

Recent activation of the same referent in discourse has a decreasing effect on pronoun expression, but less so when the reference is made using a verb form. →

- Potential effects of **narrative vs. dialogic** discourse.

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- Potential effects of **narrative vs. dialogic** discourse.

Explicit signaling of referent switches is important only in spoken spontaneous language. →

- **Processing constraints** in (on-line) spoken language;
- **visual cues** help with referent tracking in subtitles;
- spoken data dialogic, subtitles might include more narrative/monologous sequences;
- different **pragmatic and stylistic considerations** in spoken data and subtitles.

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- Explicit pronoun preferred with complex verb phrases ← **need to disambiguate between participants**.

Diverging effects between spoken and subtitle data include verb type, person, clause type. →

- Spoken language shows preference for explicit pronouns with communicative, perception, and mental verbs, 1st person, and subordinate clauses ← **speaker-inclusive participants more salient**; **stress patterns**; (semi-)**automatized sequences** (e.g., *I don't know*, *I think*, *I believe*...).

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Effects significant only in spoken data include number and tense.

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- Explicit pronoun preferred with finite main verbs ← **shorter verb forms leave more space for pronouns**.

Discussion

Is subject expression redundant?

For producing and processing written language: probably yes.

For producing and processing online spontaneous speech: probably no.

→ **Experimental data needed!**

(Me) täname!

(We) thank you!

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Results of the log-linear models: Estonian

CLAUSE_TYPE:REFFORM_SAMESPEAKER + REFERENT_SWITCH:NUMBER:PERSON

REFFORM_SAMESPEAKER	no	**pronoun**	verb
	0.003	0.32	-0.32
CLAUSE_TYPE		**subord**	main
		0.22	-0.22
REFERENT_SWITCH		**switch**	same
		0.20	-0.20
NUMBER		**SG**	PL
		0.09	-0.09
PERSON		**1**	2
		0.05	-0.05

Results of the log-linear models: Estonian

CLAUSE_TYPE:REFFORM_SAMESPEAKER + REFERENT_SWITCH:NUMBER:PERSON

		REFFORM_SAMESPEAKER		
		no	pronoun	verb
CLAUSE_TYPE	main	0.15	-0.10	-0.05
	subord	-0.15	0.10	0.05

Results of the log-linear models: Estonian

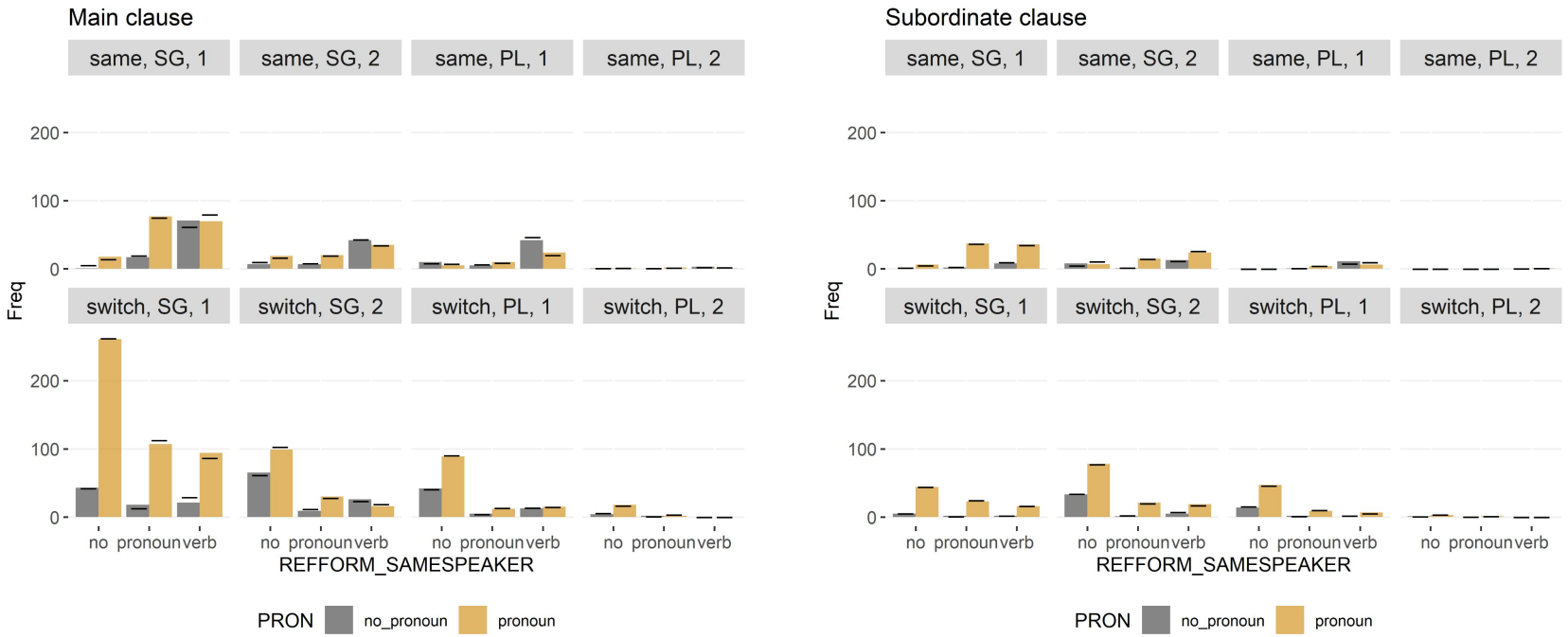
CLAUSE_TYPE:REFFORM_SAMESPEAKER + **REFERENT_SWITCH:NUMBER:PERSON**

		REFFORM_SAMESPEAKER		
		no	pronoun	verb
CLAUSE_TYPE	main	0.15	-0.10	-0.05
	subord	-0.15	0.10	0.05

		PERSON	REFERENT_SWITCH	
			same	switch
NUMBER	SG	1	-0.04	0.04
		2	0.04	-0.04
	PL	1	0.04	-0.04
		2	-0.04	0.04

Results of the log-linear models: Estonian

CLAUSE_TYPE:REFFORM_SAMESPEAKER + REFERENT_SWITCH:NUMBER:PERSON



Results of the log-linear models: Russian

TENSE + REFERENT_SWITCH + VP_COMPLEXITY:VERB_TYPE + REFFORM_SAMESPEAKER

TENSE	present	**past**	future
	-0.03	0.25	-0.22
REFFORM_SAMESPEAKER	no	**pronoun**	verb
	0.04	0.19	-0.23
VP_COMPLEXITY		**compl**	no_compl
		0.17	-0.17
REFERENT_SWITCH		**switch**	same
		0.16	-0.16
VERB_TYPE		**comm_ment_perc**	other
		0.07	-0.07

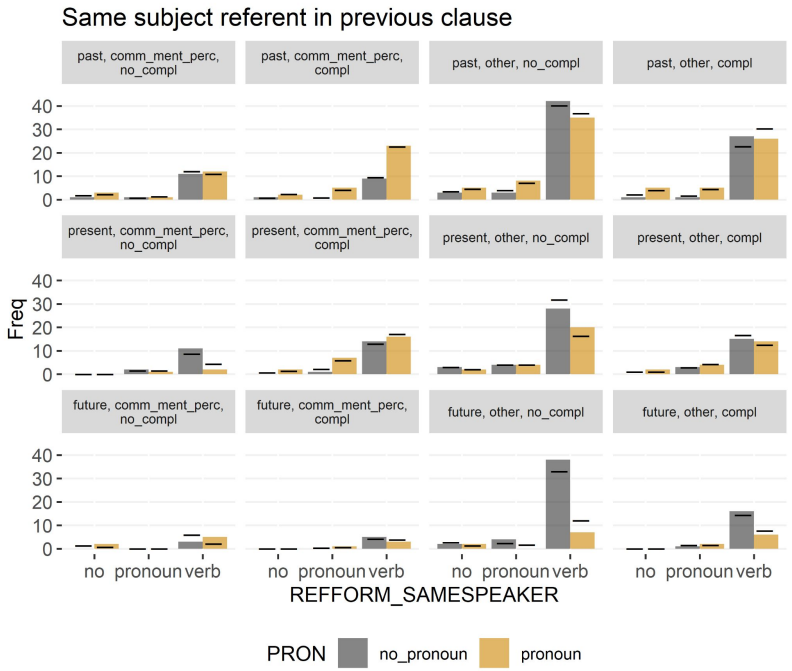
Results of the log-linear models: Russian

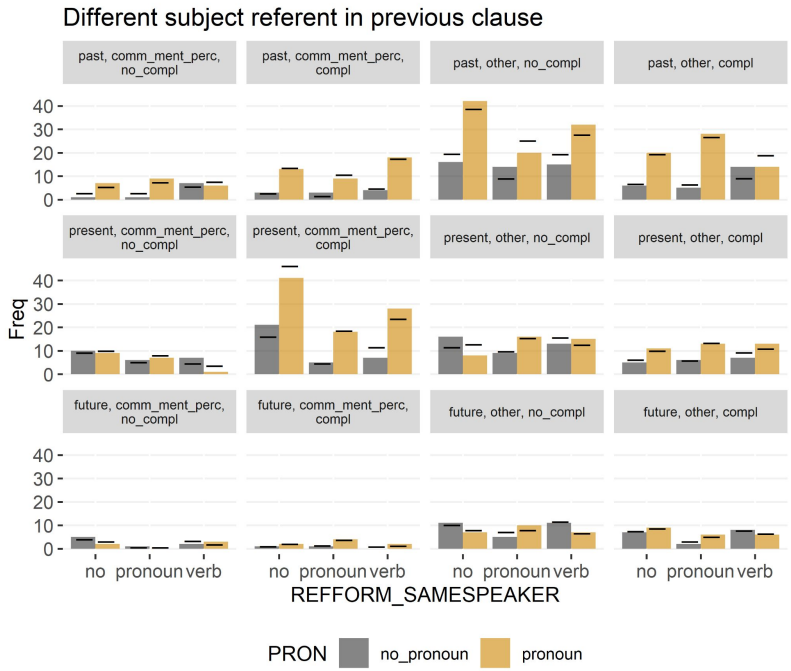
TENSE + REFERENT_SWITCH + **VP_COMPLEXITY:VERB_TYPE** + REFFORM_SAMESPEAKER

		VP_COMPLEXITY	
		compl	no_compl
VERB_TYPE	comm_ment_perc	0.07	-0.07
	other	-0.07	0.07

Results of the log-linear models: Russian

TENSE + REFERENT_SWITCH + VP_COMPLEXITY:VERB_TYPE + REFFORM_SAMESPEAKER

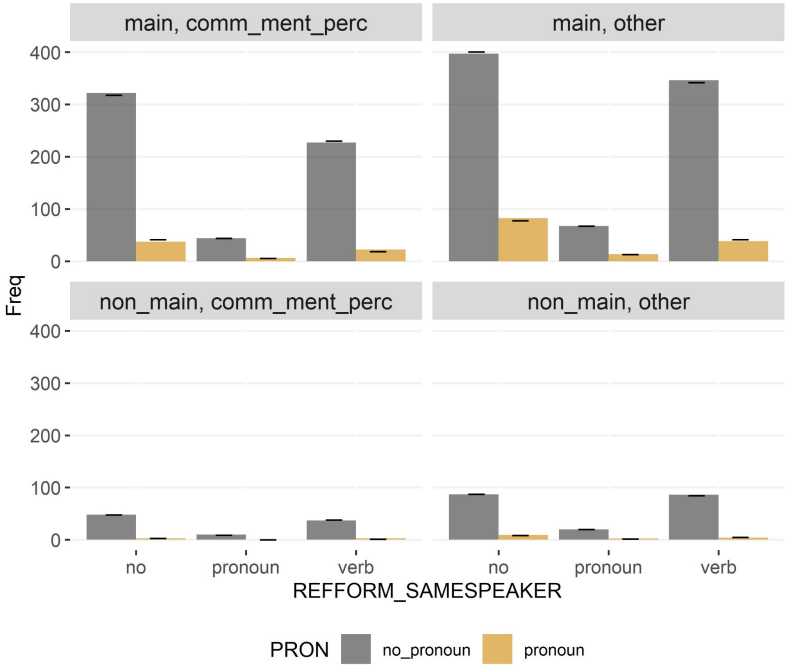




Results of the log-linear models: Finnish

REFFORM_SAMESPEAKER + VERB_COMPLEXITY + VERB_TYPE

VERB_COMPLEXITY		**main**	non-main
		0.17	-0.17
REFFORM_SAMESPEAKER	**no**	**pronoun**	verb
	0.08	0.07	-0.15
VERB_TYPE		**other**	comm_ment_perc
		0.10	-0.10



Results of the log-linear models: Polish

REFFORM_SAMESPEAKER + VERB_COMPLEXITY + CLAUSE_TYPE

VERB_COMPLEXITY		**main**	non-main
		0.39	-0.39
REFFORM_SAMESPEAKER	**no**	**pronoun**	verb
	0.12	0.19	-0.31
CLAUSE_TYPE		**main**	subord
		0.38	-0.38