Gefördert durch DFG Deutsche Forschungsgemeinschaft
SFB 1287 Limits of Variability in Language
Cognitive, Grammatical, and Social Aspects

Resolving number agreement conflicts with pseudopartitives in L2 German

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Linguistic Background

- **Pseudo-partitive subjects in German** show variable number agreement: *1 kg Linsen kosten/kostet 5 €.* ("1 kg lentils cost/costs 5 €.“)
- Agreement choice is guided by constraints of different types, whose weighting might differ between monolingual and bilingual speakers

Gradient Symbolic Computation (GSC)

- GSC (Smolensky et al., 2014) combines elements from Harmonic Grammar and Optimality Theory
- Builds on a set of violable constraints which can be weighted

Research Questions

1. Which constraints govern German speakers‘ judgements of subject-verb agreement with pseudo-partitives?
2. Are these constraints weighted differently in Turkish-German bilinguals?
3. Can a GSC model based on judgement data reliably predict both speaker groups‘ verb form choices in production?

Design & Procedure

Two experiments:

A. Scalar acceptability rating
- 8 conditions
- Task: rate sentence acceptability from 1 ("highly acceptable") to 5 ("absolutely inacceptable")

B. Speeded forced choice
- 4 conditions
- word-by-word presentation
- Task: choose singular or plural verb as a sentence continuation

Same 24 sentences used in both experiments

Thomas sagt, dass…

PP(P):	… *zwei Gläser*	*Oliven*	*ausreichend*	(*sind*).
PP(S):	…*zwei Gläser*	*Oliven*	*ausreichend*	(*ist*).
PS(P):	…*zwei Gläser*	*Marmelade*	*ausreichend*	(*sind*).
PS(S):	…*zwei Gläser*	*Marmelade*	*ausreichend*	(*ist*).
SP(P):	…*ein Glas*	*Oliven*	*ausreichend*	(*sind*).
SP(S):	…*ein Glas*	*Oliven*	*ausreichend*	(*ist*).
SS(P):	…*ein Glas*	*Marmelade*	*ausreichend*	(*sind*).
SS(S):	…*ein Glas*	*Marmelade*	*ausreichend*	(*ist*).

"Thomas says that one/two glass/es of olives/jam is/are sufficient."

N1 → container, singular or plural
N2 → containee, mass (sg.) noun or count (pl.) noun

Participants

Exp. A: 40 German native speakers (mean age 28.75)
40 Turkish-German bilinguals (mean age 29.4, AoA range 0-27y, 42.2/50 German proficiency)

Exp. B: 47 German native speakers (mean age 23.8)
52 Turkish-German bilinguals (mean age 32.3, AoA range 0-30y, 43.2/50)

Reference

Smolensky, P., Goldrick, M., & Mathis, D. (2014). Optimization and quantization in gradient symbol systems: a framework for integrating the continuous and the discrete in cognition. Cognitive science, 38(6), 1102-1138.

Results Experiment A

condition	BL rating	ML rating	
PPP	1.78 (1.2)	1.43 (0.87)	→ *grammatical baseline*
PPS	4.03 (1.29)	4.49 (1.1)	→ *ungrammatical baseline*
PSP	1.73 (1.07)	1.18 (0.56)	
PSS	4.10 (1.23)	4.66 (0.8)	***conflict conditions***
SPP	3.28 (1.62)	4.14 (1.2)	
SPS	2.58 (1.56)	1.50 (1.03)	
SSP	3.95 (1.3)	4.60 (0.75)	→ *ungrammatical baseline*
SSS	1.82 (1.15)	1.29 (0.62)	→ *grammatical baseline*

Constraints & GSC model

		weights
AgrNP1	verb has to agree with N1	-5
AgrNP2	verb has to agree with N2	-2
NP2-V(SP>PS)	minimally maintain number of N2 and verb (i.e. if change, go from singular to plural but not the other way)	-1

input	NP1&2	*AgrNP1	*AgrNP2	NP2-V(SP>PS)	H	Pr	converted results **rating**	
	(PP)	-5	-2	-1				
candidates							BL	ML
	PPP	0	0	0	0	1,00	0.82	0.93
	PPS	-5	-2	-1	-8	0,00	0.18	0.07
input	NP1&2	*AgrNP1	*AgrNP2	NP2-V(SP>PS)				
	(PS)	-5	-2	-1	H	Pr		
candidates								
	PSP	0	-2	0	-2	0,95	0.86	0.97
	PSS	-5	0	0	-5	0,05	0.14	0.03
input	NP1&2	*AgrNP1	*AgrNP2	NP2-V(SP>PS)				
	(SP)	-5	-2	-1	H	Pr		
candidates								
	SPP	-5	0	0	-5	0,12	0.44	0.11
	SPS	0	-2	-1	-3	0,88	0.56	0.89
input	NP1&2	*AgrNP1	*AgrNP2	NP2-V(SP>PS)				
	(SS)	-5	-2	-1	H	Pr		
candidates								
	SSP	-5	-2	0	-7	0,00	0.20	0.03
	SSS	0	0	0	0	1,00	0.80	0.97

Results Experiment B

condition	BL in %	ML in %	Model prediction
PP	93.4 (24.9)	97.6 (15.4)	1.00
PS	82.6 (38.0)	95.8 (20.0)	0.95
SP	29.2 (45.6)	6.0 (23.8)	0.12
SS	4.5 (20.7)	2.3 (15.3)	0.00

Conclusions

- Both speaker groups prefer agreement with N1
- Plural N2 increases acceptability of plural verbs in mismatching conditions for both groups → stronger effect for bilinguals
- Relative weighting of constraints does not change between groups, but more weight on AgrNP2 and NP2-V(SP>PS) for bilinguals
- AoA does not affect bilinguals‘ ratings, but proficiency does
- Task differences are the same for both groups

Bilinguals are more strongly guided by plural N2 compared to monolinguals → possibly due to closer proximity to the verb

=> N2 influence unlikely due to processing pressure, since fewer plural verbs are chosen in Experiment B compared to their acceptance rate in Experiment A

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