

Bénédicte Grandon¹ & Esther Ruigendijk²

¹Nantes Université & Laboratoire de Linguistique de Nantes, Benedicte.Grandon@univ-nantes.fr

²Oldenburg university & Cluster of Excellence Hearing4All, Esther.Ruigendijk@uni-oldenburg.de

INTRODUCTION

- German Plural marking: a very complex system** (e.g., Köpcke, 1988; Wunderlich, 1999; Wiese, 2009; Zaretsky et al., 2013)
- Dutch plural marking: a much simpler and predictable system** (e.g., De Haas & Trommelen, 1993; Van Wijk, 2002; Baayen et al., 2002)

- **4 Suffixes:** -∅, -/s/, -/ə/, -/e/, -/n/
- **Umlaut:** optional fronting of the stem-medial vowel: [a]→[ɛ], [o]→[ɔ]→[ø]/[œ] [u]→[y]
- + **resyllabification** of stem with syllabic suffixes -/ə/, -/e/, -/ən/
- + **final devoicing** of /b/, /d/ & /g/ in word-final position
- + fricative **palatalization** after umlaut: /x/ > [ç] & /ɣ/ > [j]
- Possible combination of several markers

⇒ **Low predictability & transparency:** no consistency in **regularity**, **productivity** and **frequency** across plural types

- **2 Suffixes:** -/s/, -/ən/
- ca. 10-15 words with -eren suffix > -[əʁə], -[əʁən] or -[əʁŋ] & a handful of lexicalized items
- + **resyllabification** of stem with syll. suffix -/ən/
- + **final devoicing** of /b/, /d/ & /g/ in word-final position
- **Only a few exceptions to the rules** & a few words accepting both -s and -ən

⇒ **Full predictability & transparency:** almost perfect **complementary distribution**, conditioned mostly by: **Prosody** (i.e., rhythm: unstressed vs. stressed final syllable) & **Phonology** (i.e., segmental end of stem)

RESEARCH QUESTIONS

RQ1: How do **learners of German** process the plural marking system in a language that is not their L1, considering the **variety of plural types** and the **different linguistic levels** involved in their processing?

RQ2: How do **Dutch-speaking learners** process the formal cues that are also used to mark plural in their L1 (i.e., fricative /s/, nasal /n/, trochaic pattern coming from the addition of a vowel suffix), whether:

- 1) they are **exactly the same as in their L1**
- 2) they have a **similar form but are used differently in their L1?**

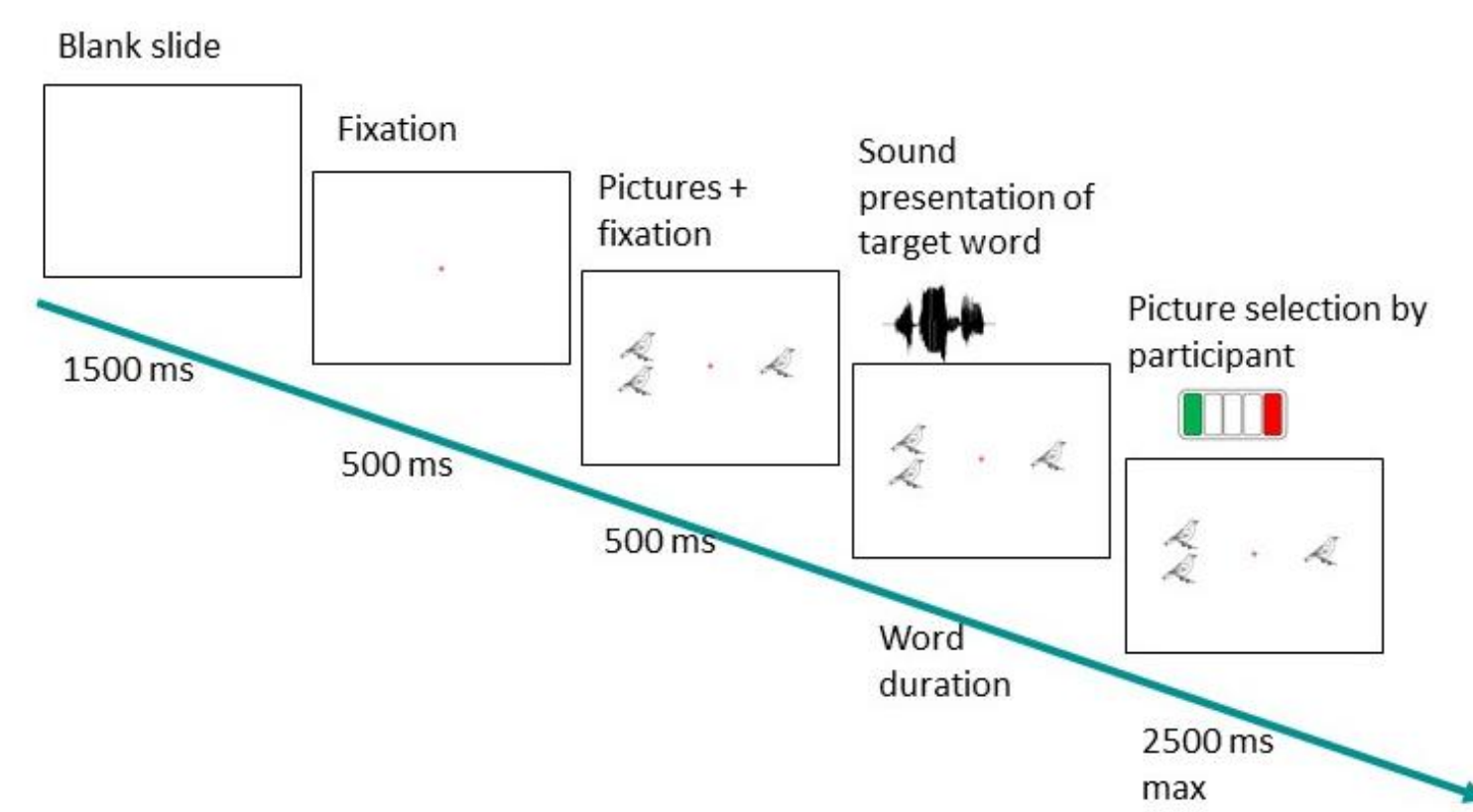
MATERIAL & METHOD

Participants (Adults)

- L1 speakers of German (N=32)
- L2 Learners of German with L1 Dutch (N = 33)
 - L2 English (>C1)
 - L3 German (B1 & lower: n=12; B2: n=17; C1 & C2: n=3; Unknown: n=1)

Design

- Eye-tracking & Behavioral design
 - Oral presentation of a word + 2 pictures:
 - Singular version of the item: 1 token
 - Plural version of the item: 2 tokens
- 1 language assessment test:
 - LexTALE (Lemhöfer, & Broersma, 2012)



Items

- 80 pairs = 160 target words (8 blocks of 20 randomized items), in 2 testing sessions
- 10 categories: combinations of 3 types of cues (stem-vowel change, suffix, voiced stem-final consonant)

Measurements & statistical analyses

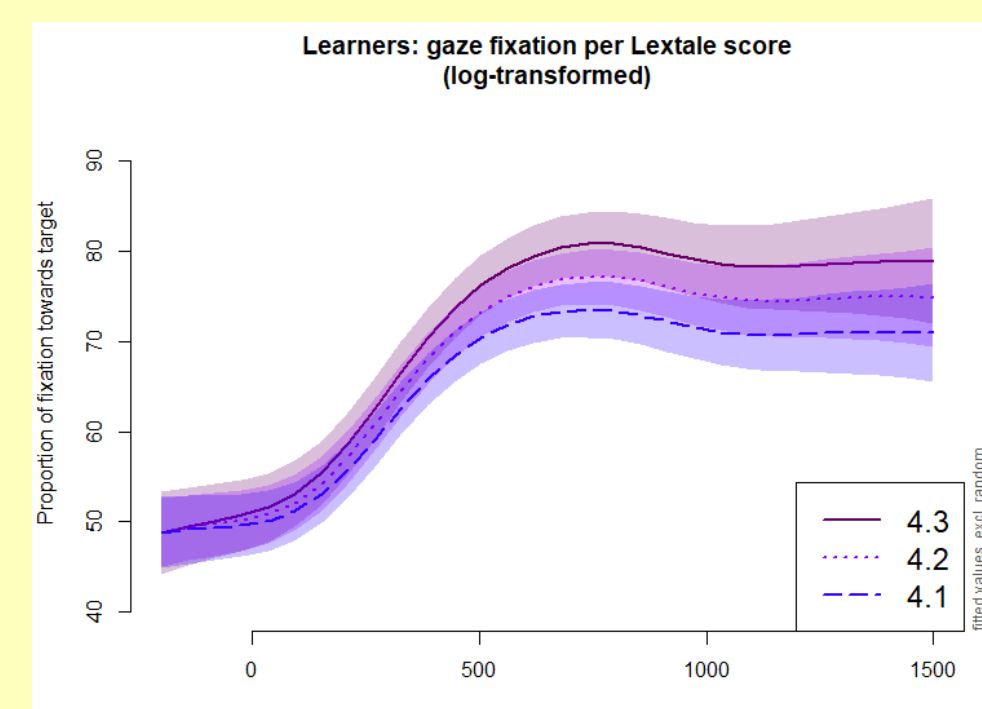
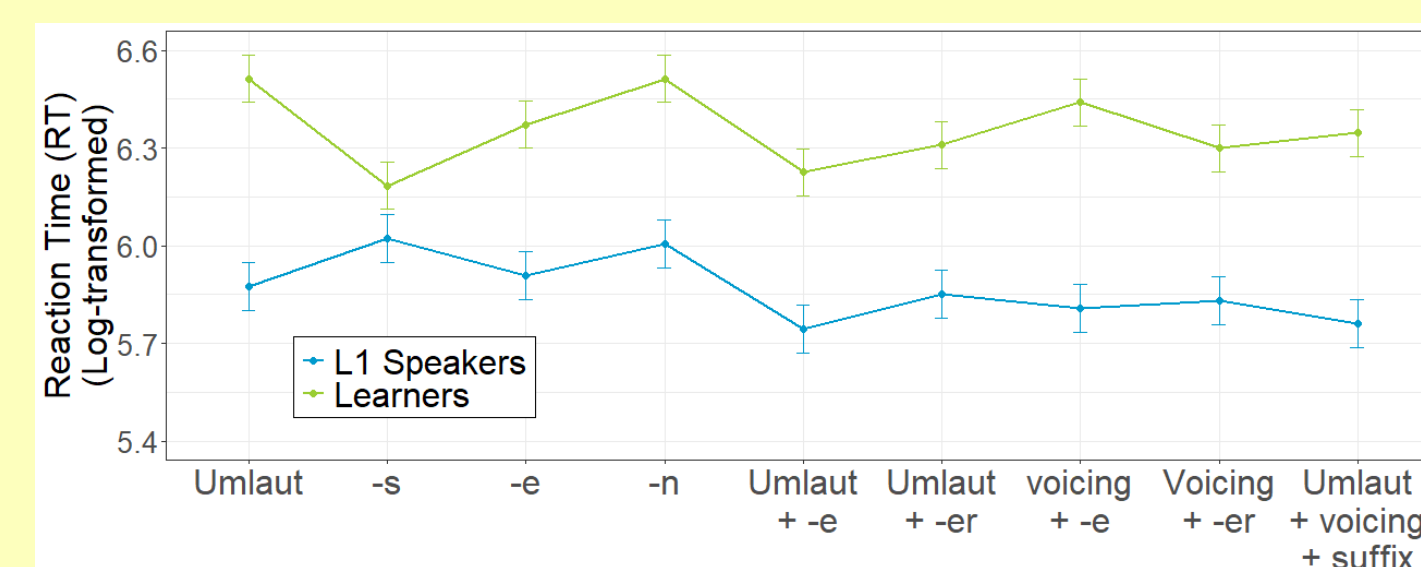
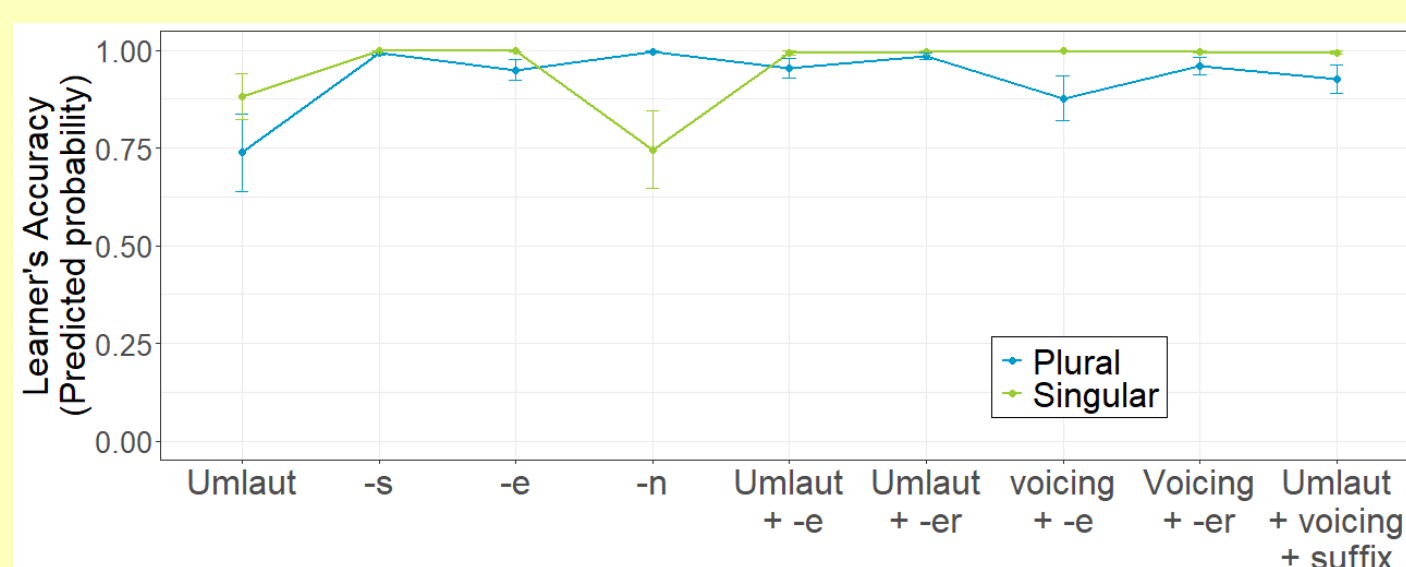
- **Accuracy:** GLM (Generalized Linear Mixed-Effect Models)
- **Reaction times (log):** LMM (Linear Mixed-effect Models)
- **Gaze fixation:** GAMM (Generalized Additive Mixed-effect Models)

Number of differences Singular vs Plural	Plural type	Example (Singular-Plural pairs)
0	No change	Kissen-Kissen [kɪsən] - [kɪsən], <i>pillow</i>
1	Umlaut	Vogel-Vögel [fɔːgʏl] - [fɔːgʏl], <i>bird</i>
	-/s/ suffix	Auto-Autos [aʊto] - [aʊtoːs], <i>car</i>
	-/ə/ suffix	Tisch-Tische [tɪʃ] - [tɪʃə], <i>table</i>
	-/n/ suffix	Katze-Katzen [katsə] - [katsən], <i>cat</i>
2	Umlaut + -ə/ suffix	Ball-Bälle [bal] - [belə], <i>ball</i>
	Umlaut + -e/ suffix	Schloss-Schlösser [ʃlɔs] - [ʃlɔesə], <i>castle</i>
	Voiced stem-final C + /a/ suffix	Pferd-Pferde [pʰɛʁt] - [pʰɛʁdə], <i>horse</i>
	Voiced stem-final C + /e/ suffix	Kleid-Kleider [klaɪt] - [klaɪdə], <i>dress</i>
3	Umlaut + Voiced stem-final C + /a/ or /e/	Wald-Wälder [vaːlt] - [veːldə], <i>forest</i>

RESULTS

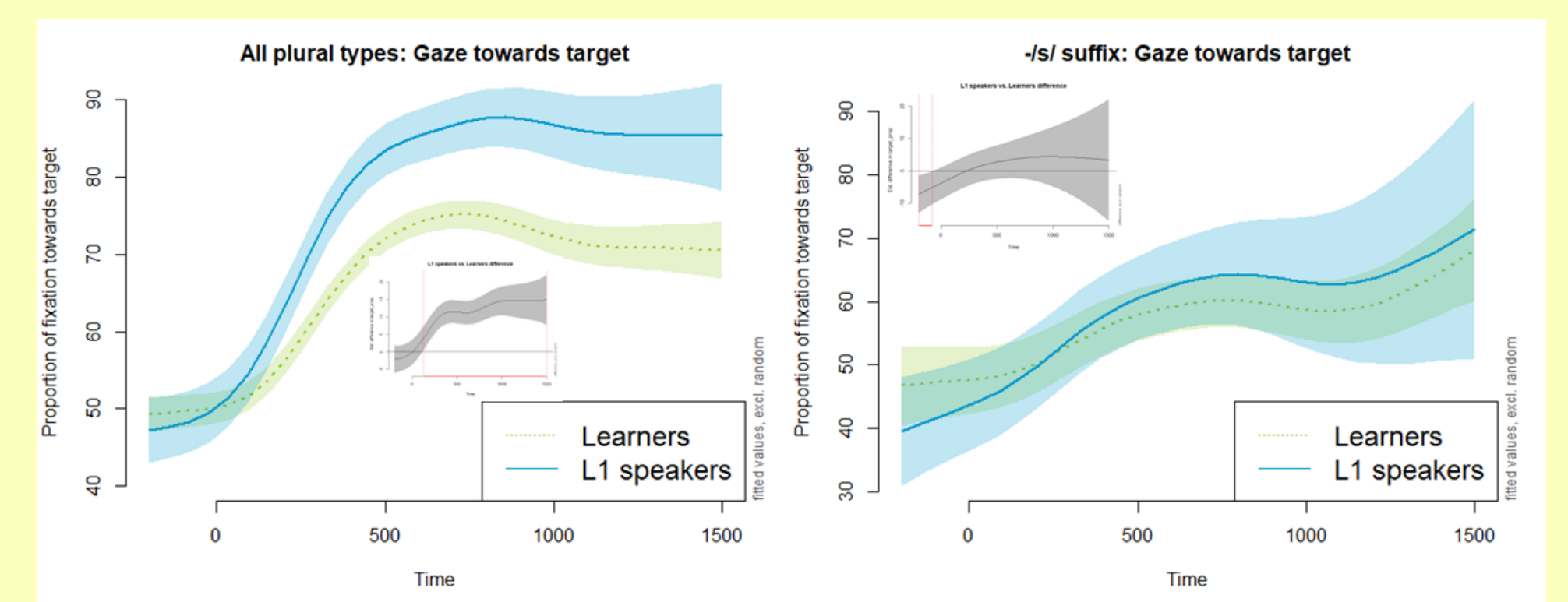
Accuracy

- Very **high accuracy** for both groups (L1: 99;48% & L2: 90;85%), lower for the learners ($p < .001$)
- **Learners:**
 - Lower accuracy for plurals (vs. singulars)
 - Differences across plural types in singular and plural forms
 - No difference for Umlaut, -/s/, umlaut+/-e/
 - Lower accuracy for singular for -/n/
 - Higher accuracy for plurals for the other 5 plural types
 - Better accuracy with a better proficiency (i.e., higher LexTALE score, $p < .001$)



RT (log)

- Shorter RT for the L1 speakers vs. Learners ($p < .001$), except for the -/s/ suffix ($p = .0773$)
- **Learners:**
 - No evidence of an effect of proficiency
 - Differences in RT across plural types in singular and plural forms
 - Longer RT for plural vs. singular for -/ə/ and voicing + -/ə/
 - Shorter RT for plural vs. singular for -/s/ and -/n/
 - No evidence of a difference for other plural types



Gaze fixation toward target

- Overall delayed processing for the learners...
...Except for -/s/ (no evidence of a between-group difference)
- Earlier fixation towards the target for both groups:
 - when plural includes a suffix
 - when it does not include an umlaut
- **Learners:** Earlier fixation with a higher LexTALE score

CONCLUSION

- Learners are **less accurate**, need **more time to make a decision**, and to **process the inflected words**.
- **Cross-linguistic influences** from the L1 in both identification and processing of the plural markers:
 - when they are **exactly similar to a marker in the L1** (i.e., -/s/ suffix), with a **possible reinforcement** of the CLI through **L2 English** (-/s/ suffix)
 - when they follow **the prosodic pattern** of the L1, and when the **ending matches a plural form in the L1** (i.e., -/ən/ ending)

REFERENCES

- Baayen, H., Schreuder, R., De Jong, N., & Krott, A. (2002). Dutch inflection: the rules that prove the exception. *Storage and computation in the language faculty*, 61-92.
- De Haas, Wim & Mieke Trommelen 1993. *Morfologisch Handboek van het Nederlands*. 's Gravenhage: SDU Uitgeverij.
- Köpcke, K. M. (1988). Schemas in German plural formation. *Lingua*, 74(4), 303-335.
- van Wijk, J. (2002). The Dutch plural landscape. *Linguistics in the Netherlands*, 19(1), 211-221.
- Wiese, R. (2009). The grammar and typology of plural noun inflection in varieties of German. *The Journal of Comparative Germanic Linguistics*, 12(2), 137-173.
- Wunderlich, D. (1999). German noun plural reconsidered. *Behavioral and Brain Sciences*, 22(6), 1044-1045.
- Zaretsky, E., Lange, B. P., Euler, H. A., & Neumann, K. (2013). Acquisition of German pluralization rules in monolingual and multilingual children. *Studies in Second Language Learning and Teaching*, 3(4), 551-580.