The acceptability and processing of gender-incongruent possessive pronouns in German: Comparing inanimate to human reference reveals asymmetries.

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Although German, as a grammatical gender language, requires obligatory gender agreement between a noun and its pronoun, incongruent reference with the possessive pronoun (PossPron) *sein* (masculine / neuter) instead of *ihr* (feminine) to feminine antecedents is well documented [2], even though this violates prescriptive grammar rules. For the time being, this violation has been observed primarily with respect to INANIMATE nouns in corpus data [2]. In the present paper, we experimentally investigate gender agreement violations in INANIMATE contrasted with HUMAN possessors. Specifically, we discuss how incongruent PossPron are dealt with in reference to feminine gender-indifferent EPICENE nouns that can refer to referents of any social gender (e.g., *Lehrkraft*$_{FEM}$ 'teaching person') and to gender-specific FEMALE referents (e.g., *Witwe*$_{FEM}$ 'widow').

Method. To investigate whether gender-incongruent possessive reference is accepted and how it is processed, participants (N=96) read German sentences in a self-paced reading task with end-of-trial acceptability judgments (AJ). In a mismatch paradigm, gender-variable reference of possessive pronouns (PossPron) was assessed by means of an online study testing sentences that contained anaphoric relations of the following structure [stimulus examples in Table 1]:

(1) possessor noun (antecedent)   PossPron: congruent / incongruent
     die {**Region** | **Lehrkraft** | **Witwe**}$_{FEM}$ …   *ihr*   / *sein*
     'the$_{FEM}$ region | teaching person | widow'   …   POSS$_{FEM}$ POSS$_{MASC / NEUT}$

Based on previous work [1, 2, 5], we predicted that besides grammatical gender of the PossPron (congruent / incongruent), animacy of the antecedent (inanimate / human) and linear distance (short = 2 words / long = 5 words) between possessor and possessee influence both the acceptability and processing of sentences. Therefore, AJ responses, reaction times (RT) of the responses, and reading times (rt) at the possessive phrase were analysed with logistic and linear regression models, respectively.

Results. As expected, we found deviating acceptability and processing patterns depending mainly on three factors: agreement, animacy, and gender specificity [Fig. 1]. Agreement effect: anaphoric reference with incongruent PossPron led to lower acceptability ratings (reduced by 44.1%, $p<0.001$) and higher processing costs reflected in the mean rt than congruent ones (+61ms in short distance, $p<0.001$; +46ms in long distance, $p=0.007$). Animacy effect: participants accepted incongruent PossPron to feminine INANIMATE possessors to a larger extent (50%, $p=0.002$) than in reference to HUMAN possessors, but this comes with a processing cost when reading, such that mean rt of possessive references to INANIMATE nouns took the longest (687 ms, $p=0.018$) – even for congruent pronouns. Gender specificity effect: incongruent PossPron that refer to EPICENE nouns had higher AJ rates (almost 50%, $p<0.001$) than those referring to FEMALE nouns (25%, $p<0.001$). Mean RTs of participants' sentence AJ showed that EPICENE nouns referred to with the incongruent pronoun prolonged decision times, especially in the long distance (760 ms, $p=0.004$).

Discussion. This study sheds light on differential animacy and gender specificity effects of agreement phenomena. The findings point towards an animacy restriction [2] in possessive reference. We derive the assumption that INANIMATES are a) less prototypical possessors, and b) potentially less sensitive to grammatical gender. Our data further provide evidence that grammatical gender transmits referential gender in the domain of HUMAN reference [3], thus being able to override agreement restrictions in gender-indifferent EPICENES [4], but not in gender-specific FEMALE antecedents, which is in line with the observation that gender-based or stereotype-convergent pronominalisation prevails [5].

Table 1. Sample item set. Sentence structure and phrase length was kept constant across items and conditions. The anaphoric **possessive pronoun** mis-/matched the gender of the **antecedent**. Each participant read 60 experimental items (30 inanimate, 30 human nouns, of which 15 were either gender-nonspecific epicenes or gender-specific nouns denoting females), 60 distractors and 60 fillers. (FEM = feminine, MASC / NEUT = masculine / neuter)

Condition	*Sentence* 'Translation'
in-/congruent **HUMAN (epicene)** distance: short	*Sicherheitshalber hat **die Kontaktperson** für Notfälle **ihren / seinen** Namen auf dem Formular angegeben.* 'As a precaution, the emergency contact person$_{FEM}$ has indicated her$_{FEM}$ / his/its$_{MASC / NEUT}$ name on the form.'
in-/congruent **HUMAN (female)** distance: long	*Heutzutage muss **die Witwe** in amtlichen Dokumenten nicht zwingend **ihren / seinen** Status angeben.* 'Nowadays, the widow$_{FEM}$ does not necessarily have to state her$_{FEM}$ / his/its$_{MASC / NEUT}$ status in official documents.'
in-/congruent **INANIMATE** distance: short	*In diesem Jahr will **die Alpenregion** im Juni **ihr / sein** Jubiläum mit großem Programm nachfeiern.* 'This year, the alpine region$_{FEM}$ will celebrate its$_{FEM}$ / its$_{MASC / NEUT}$ anniversary in June with a big program.'

Figure 1. Descriptive means of sentence acceptability judgments. Incongruent conditions led to a grammatical mismatch in INANIMATE nouns, a grammatical and semantic mismatch in HUMAN FEMALE-SPECIFIC nouns, and a grammatical mismatch but a potential referential match in HUMAN EPICENE nouns.
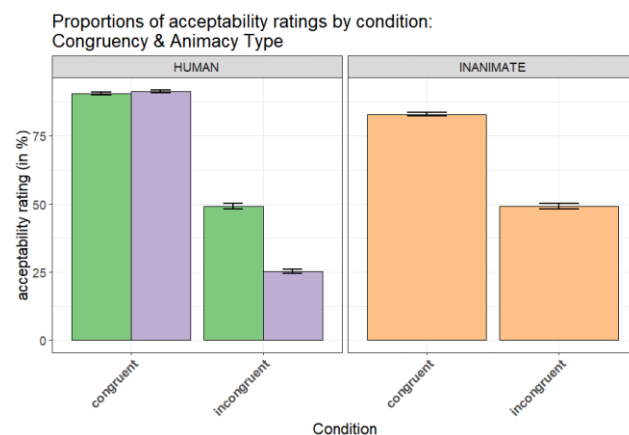
Figure 2. Descriptive means of reading times of the possessive pronoun phrase in short and long distance for INANIMATE nouns, HUMAN FEMALE-SPECIFIC nouns, and HUMAN EPICENE nouns. Points indicate congruent reference, triangles incongruent reference.
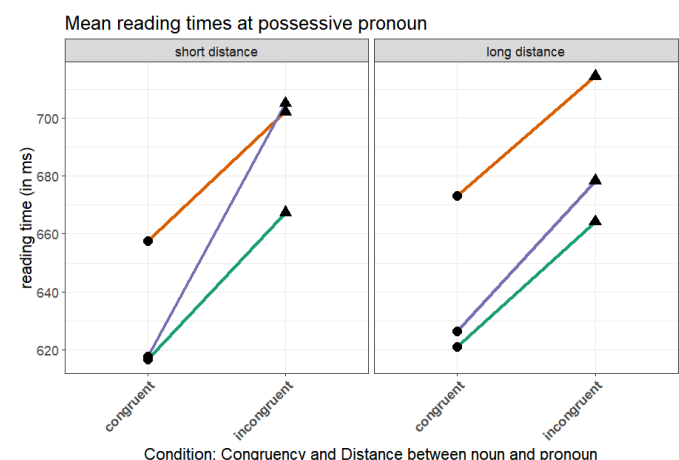
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