Gender-mismatching pronouns in context: The interpretation of possessive pronouns in Dutch and Limburgian

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Abstract:

Gender-(mis)matching pronouns have been studied extensively in experiments. However, a phenomenon common to various languages has thus far been overlooked: the systemic use of non-feminine pronouns when referring to female individuals. The present study is the first to provide experimental insights into the interpretation of such a pronoun: Limburgian *zien* 'his/its' and Dutch *zijn* 'his/its' are grammatically ambiguous between masculine and neuter, but while Limburgian *zien* can refer to women, the Dutch equivalent *zijn* cannot. Employing an acceptability judgment task, we presented speakers of Limburgian (N = 51) with recordings of sentences in Limburgian featuring *zien*, and speakers of Dutch (N = 52) with Dutch translations of these sentences featuring *zijn*. All sentences featured a potential male or female antecedent embedded in a stereotypically male or female context. We found that ratings were higher for sentences in which the pronoun could refer back to the antecedent. For Limburgians, this extended to sentences mentioning female individuals. Context further modulated sentence appreciation. Possible mechanisms regarding the interpretation of *zien* as coreferential with a female individual will be discussed.

Keywords: possessive pronoun, gender, stereotypes, Dutch, Limburgian

1. Introduction

Sentences with gender-mismatching pronouns are perfectly grammatical, yet past research has shown that they are often perceived as less acceptable and can even elicit brain responses often seen in the processing of syntactically anomalous sentences. For example, Osterhout and Mobley (1995) found that the majority of participants rated sentences like (1) as unacceptable, because the pronoun cannot be linked to the only explicitly available antecedent.

(1) *The king*$_{i}$ noticed that *she*$_{*i/j}$ had lost the support of the peasants.

They further found that participants who rated these sentences as unacceptable showed a P600 effect on the mismatching pronoun—an event-related potential traditionally linked to problems with syntactic processing. Thus, participants tried to map *she* onto *the king*, resulting in perceived ungrammaticality, instead of linking *she* to an unmentioned referent. Similarly, Nieuwland and van

Berkum (2006) found a P600 effect when the pronoun matched neither of two previously introduced possible antecedents in terms of gender, even in the absence of an explicit judgment task.

Alternatively, other studies (e.g., Nieuwland 2014) found that readers, and particularly skilled readers, may come up with an additional, unmentioned referent if the pronoun gender does not match that of the available candidate. Sentences like (1) are then not perceived as ungrammatical. There are thus two ways in which such gender-mismatching pronouns can be interpreted: as coreferential with the available antecedent and ungrammatical, or as linking to an unmentioned referent and grammatical.

There are, however, *grammatical* cases in which the antecedent and the pronoun are coreferential despite a gender mismatch. A well-known example are hybrid nouns, which exhibit a discrepancy between grammatical and natural gender. For example, the grammatical gender of a German diminutive and the referent's natural gender never match, as diminutives always carry neuter gender (e.g., *das Mädchen* 'the girl(N)'). For these cases, Schmitt, Lamers and Münte (2002) found no difference in acceptability of pronouns agreeing with the referent's natural gender (*sie* 'she') and pronouns agreeing with the diminutive's grammatical gender (*es* 'it'). Only when both grammatical and natural gender were violated (*er* 'he'), a P600 effect was observed (see also Braun & Haig 2010).

In addition to hybrid nouns, there is a lesser known, but more general case of gender-mismatching pronouns being used to establish coreferentiality *without* resulting in ungrammaticality: women can be referred to by non-feminine as well as feminine pronouns in certain languages. This variation is often informed by pragmatic factors (e.g., Nübling 2015). In certain Polish dialects, for example, the feminine gender is used exclusively for married women; unmarried women and young girls are referred to with neuter or masculine gender (Zaręba 1984-5, cited in Corbett 1991:100). In Telugu (South-Central Dravidian), the same pronouns that are used for animals and inanimate objects are also used for young girls, or girls the speaker has a close personal relationship with (Subbarao & Lalitha Murthy 2011), and in Konkani (Indic), neuter agreement can be used for young women as well (Corbett 1991).

Corpus data suggest that this phenomenon can be found in the Netherlands, too. A feminine pronoun is required to refer to a female individual in standard Dutch (Audring 2006). In Limburgian dialects of Dutch, however, a neuter pronoun can be used as well:

(2) ***ziej/het*** *haet zich pien gedaon* (test sentence 272/location L329p)[1]

[1] All Limburgian examples in this section are taken from the "Dynamic Syntactic Atlas of the Dutch Dialects", and are translations from Standard Dutch to Limburgian given by informants (DynaSAND; Barbiers, Bennis, Vogelaer, Devos & van der Ham 2006).

she/it has REFL pain done
'She hurt herself.'

Note that this use of neuter pronouns as referring to women does not require a grammatically neuter antecedent. By contrast, German *es* 'it' can only be used for a female individual when licensed by a grammatically neuter noun such as *Mädchen* 'girl'. Neuter *het* for female reference in Limburgian, however, is a more widespread and systemic phenomenon (see Bakker 1992 for a description of the phenomenon in the dialect of Venlo). Although the Limburgian dialects are by no means homogeneous (see Cornips 2013), the use of neuter pronouns for women can be found in varieties all across Limburg (see e.g., van der Sijs 2011:238-9).

The neuter possessive pronoun *zien* is used in a similar way.[2] *Zien* is particularly interesting, as the neuter form happens to be morphologically identical to the masculine form—that is, *zien* 'his/its' can be coreferential with a male as well as a female individual, denoted by a proper noun. For Dutch *zijn* 'his/its', coreferentiality with a female individual is not possible (see (3)).

(3) *Piet*$_i$/*Marie*$_j$ ***ziene*$_{i/j}$** *auto* *is* *kepot* (Limburgian: 163,164/L329p)
Piet$_i$/*Marie*$_j$ ***zijn*$_{i/*j}$** *auto* *is* *kapot* (Dutch)
Piet/Marie 3SG.POSS.M/N car is broken
'Pete's/Mary's car is broken.'

Z*ien* is thus inherently ambiguous between masculine grammatical gender referring to men on the one hand, and neuter grammatical gender referring to women on the other hand. Crucially, the use of *zien* in reference to a woman is not obligatory as a feminine pronoun is always available, too:

(4) *Marie* ***euren*** *auto* *is* *kepot* (163/L270p)
Marie 3SG.POSS.F car is broken
'Mary's car is broken.'

Thus, neuter *zien* is only one of two possessive pronouns available for a female referent. Masculine *zien*, on the other hand, is the sole possessive pronoun available for male reference, meaning that masculine *zien* is more frequent than neuter *zien*.[3]

[2] Added endings (*-e* in (3) and *-en* in (4)) are due to agreement between the possessive pronoun and the possessee *auto* 'car(M)'.

[3] This claim is based on our analysis of the DynaSAND corpus (Barbiers et al. 2006), which shows that *zien* is used in 60% of the cases where a woman is referred to with a possessive pronoun, whereas a man is referred

The use of non-feminine pronouns in reference to women can be commonly found across Limburg (as well as in other dialects of Dutch; e.g., Weijnen 1966; de Vogelaer 2007:200-1; van Oostendorp 2012; van der Sijs 2011), yet this phenomenon has not received much attention in the literature. The present study is the first to provide experimental evidence showing that Limburgian *zien* can indeed refer to a female antecedent. It further adds to a large body of research into gender-(mis)matching pronouns, which has up until now ignored the possibility that non-feminine pronouns may link to female referents in some languages systemically without resulting in ungrammaticality. To this end, we presented an acceptability judgment task to both Dutch and Limburgian speakers.[4] The former rated Dutch sentences, the latter rated Limburgian sentences, which all featured the possessive pronoun *zijn* and *zien*, respectively, a possible female or male antecedent and a stereotypically female or male context. The rationale behind introducing stereotype contexts was twofold. First, the use of stereotypical contexts allowed us to confirm *implicitly* that *zien* is gender-ambiguous; we could test a large number of participants using an easily distributed offline task, without having to ask participants explicitly whether the pronoun and subject are coreferential. Consider stereotypically female contexts featuring a female subject (e.g., 'Emma packed his leggings'); if the pronoun can only be interpreted as referring to a man like Dutch *zijn*, the presence of a female subject and a stereotypically female context must lead to lower acceptability. This is due to a mismatch between the pronoun and the subject as well as between the pronoun and the context. If, on the other hand, the pronoun can refer to a woman, as should be the case with Limburgian *zien*, these sentences should be perfectly acceptable. Second, we sought to test to what extent a gender-biasing context affects pronoun resolution, both in the case of Dutch where *zijn* can only be interpreted as linking to a male referent, and in the case of Limburgian where its equivalent *zien* is ambiguous.[5]

2. Method

to with *zien* 100% of the time. These percentages are based on pronominal references in test sentences 163 (*Marie d'r/se(n) auto is kapot*) and 165 (*Piet z'n/se auto is kapot*). For both sentences we selected translations from the Dutch province of Limburg only, which we then limited to "*z'n*-constructions". This yielded 30 occurrences for *Marie,* 18 of which contained *zien* (and 12 *(h)eur*), and 22 for *Piet,* all of which contained *zien. Zien* referring to *Marie* was used by informants from all over the province of Limburg.

[4] For the sake of simplicity, we refer to our Limburgian-Dutch bilingual participants as 'Limburgian' and to Dutch participants who are not proficient in Limburgian as 'Dutch'.

[5] We are not aware of any studies on the effect of gender stereotypes on ambiguous pronouns. For effects of other types of contexts on ambiguous pronouns see e.g., Nieuwland and van Berkum (2006). For the effect of gender stereotypes on unambiguous pronouns see e.g., Carreiras, Garnham, Oakhill and Cain (1996).

2.1 Participants

A total of 103 participants (34 male) completed the acceptability judgment task. 51 participants were native speakers of Limburgian, who spoke Limburgian on a daily to weekly basis, and rated Limburgian sentences. The other 52 participants rated sentences in their native Dutch. Participant recruitment happened through personal communication, social media and the participant pool of Radboud University. The latter participants received course credit.

Six Limburgian participants were excluded as they correctly guessed the purpose of the experiment, i.e., the use of *zien* for female referents, leaving us with the data of 97 participants (31 male). The 45 Limburgian participants (18 male) ranged in age from 18 to 79 (M = 31, SD = 15). The 52 Dutch participants (13 male) ranged in age from 18 to 70 (M = 26.5, SD = 12.5).

2.2 Materials and design

Each participant was presented with the audio recordings of 48 stimuli and 48 fillers. All stimuli followed the same pattern: a male or female proper name followed by *heeft/hɛt* 'has', the possessive pronoun *zijn* 'his/its' or *zien* 'his/its', a noun, and a past participle:

(5)	*Fleur*	*heeft*	*zijn*	*yogabroek*	*aangedaan.*	(Dutch)
	Fleur	*hɛt*	*zien*	*yogabøks*	*aangedo:n.*	(Limburgian)
	Fleur	has	3SG.POSS.M/N	yoga.pants	put.on	
	'Fleur put on his/its yoga pants.'					

The proper names were common unambiguously male or female Dutch names taken from the Dutch first name database (Nederlandse Voornamenbank n.d.). The 48 stimuli featured pre-tested gender stereotype contexts. 24 of these were stereotypically female (e.g., *yogabroek aandoen* 'putting on yoga pants'), the other 24 stimuli were stereotypically male (e.g., *bokshandschoenen aandoen* 'putting on boxing gloves'). Experimental conditions featuring neutral contexts were not included, as this would render the experiment too long. The stereotypes had been pre-tested using a 7-point Likert scale (e.g., Kennison & Trofe 2003), on which 56 Dutch-speaking participants indicated how likely they thought it was for a man or a woman to engage in a particular activity. We carefully selected stereotypically male and female activities such that they were comparable in strength (M = 2.20, SD = 0.29 for female activities; inverted M = 2.24, SD = 0.28 for male activities) and did not differ significantly ($t(46) = 0.5$, $p = 0.62$). This was to make sure that any difference between conditions would not be due to a difference in strength of the stereotypes. Two lists were created for each language group, so that each stereotype context occurred with a female as well as a male proper name,

but never within the same list. To summarize, three factors were varied: stereotype context, referent gender—denoted by the proper name—and language, resulting in a 2x2x2 design.

The 48 fillers did not contain a possessive pronoun. 24 of the fillers featured pre-tested neutral contexts. The other 24 fillers were semantically anomalous and were included to encourage the use of the whole scale. As with the stimuli, half of the fillers featured a female and male proper name, respectively. An overview of all items is given in Table 1.

Table 1. Overview of design and items.

Type	**Context**	**Proper name**	**Language**	
			Dutch	*Limburgian*
Stimulus	Female stereotype	Female	12	12
		Male	12	12
	Male stereotype	Female	12	12
		Male	12	12
Filler	Neutral	Female	12	12
		Male	12	12
	Semantically anomalous	Female	12	12
		Male	12	12
Total			*96*	*96*

Since Limburgian lacks a standardized form and spelling, we presented all stimuli auditorily. A female speaker of Standard Dutch and a female speaker of the Limburgian variety spoken in the area of Venlo recorded all 48 fillers and 48 experimental items in a sound-attenuated booth at the Centre for Language Studies lab at Radboud University using *Audacity* (Audacity Team 2017). We opted to use two different speakers to ensure that the Dutch stimuli would not be pronounced with a Limburgian accent, as this could influence the ratings (e.g., Grondelaers, van Hout & Steegs 2010). Each stereotype context occurred in two conditions—once with a female, once with a male proper

name. To ensure that items differed minimally between conditions, we recorded each of the 48 sentences only once in each language and constructed the remaining 48 stimuli using *Praat* (Boersma & Weenink 2017) by cutting out the proper name and the auxiliary, and subsequently inserting a proper name of the opposite gender and an auxiliary from a different item.

2.3 Procedure

The experiment was administered online through Qualtrics (2018). Participants first received information about the experiment and answered questions regarding their gender, age, and language background. In the main part of the experiment, participants were instructed to listen to each sentence recording once, and to indicate on a 7-point scale how natural the sentence sounded. The scale ranged from *Heel onnatuurlijk* 'Very unnatural' to *Heel natuurlijk* 'Very natural'. Participants were encouraged not to base their rating on the speaker's pronunciation, but on the content of the sentence. Finally, participants were probed for the main purpose of the experiment and provided information on their educational background. Limburgian participants were further asked to indicate how often and in which settings they spoke Limburgian.

2.4 Analysis

We converted all obtained scores to z-scores to account for differences in scale use between participants and to render the data more normal (Schütze & Sprouse 2013). The z-scores were modeled in R (R Core Team 2018) using the *lmer* function from the *lme4* package (Bates, Mächler, Bolker & Walker 2015). This allowed us to model individual differences and testing for group effects at the same time. The initial model included the three independent variables *language*, *stereotype* and *proper name,* all possible interactions, as well as random intercepts for participants and items and the full random slope structure permitted by the design (Barr, Levy, Scheepers & Tily 2013). We subsequently removed interaction effects which did not increase the model fit as attested by likelihood ratio tests. Similarly, we tested whether participant gender improved the model fit, which it did not. The final model included *language*, *stereotype* and *proper name* as fixed effects, as well as the interaction between *language* and *proper name* and between *stereotype* and *proper name*. Factors were coded using Treatment contrasts. The full random structure as permitted by the final fixed effect structure was included. An effect within a model was deemed significant when the absolute *t*-value exceeded 1.96 (e.g., Quené & van den Bergh 2004). *P*-values were obtained using the normal approximation to the *t*-statistic. All significant *t*-values are reported.

3. Results

Figure 1 and Figure 2 show the mean raw scores and mean z-scores of Dutch and Limburgian participants per condition. There was a significant effect of *language*, suggesting that Limburgians generally gave higher ratings (β = 0.4, *SE* = 0.11, *t* = 3.67, *p* < 0.001). However, this effect was invalidated by a significant interaction effect between *language* and *proper name* (β = -0.41, *SE* = 0.17, *t* = -2.44, *p* = 0.015). There was a significant effect of *proper name*, showing that sentences featuring male proper names generally scored higher (β = 0.37, *SE* = 0.15, *t* = 2.38, *p* = 0.017). However, as indicated by the interaction between *language* and *proper name* reported above, this advantage for sentences with male proper names was significantly lower for Limburgian participants. We further found a significant effect of *stereotype* (β = -0.28, *SE* = 0.03, *t* = -9.55, *p* < 0.001), which was not meaningful given the significant interaction between *stereotype* and *proper name* (β = 0.19, *SE* = 0.04, *t* = 4.31, *p* < 0.001). Together with the significant effect of *proper name*, this interaction shows that male proper names generally boosted the naturalness of sentences, but even more so in male stereotype contexts.

To summarize, we found a significant effect of *proper name* and a significant interaction effect between *language* and *proper name*. This suggests that sentences featuring male proper names received higher ratings overall, but that this advantage was less pronounced for Limburgian participants. The significant interaction effect between *stereotype* and *proper name* suggests that the difference in ratings for sentences featuring male and female proper names was significantly larger for sentences featuring male stereotype contexts.

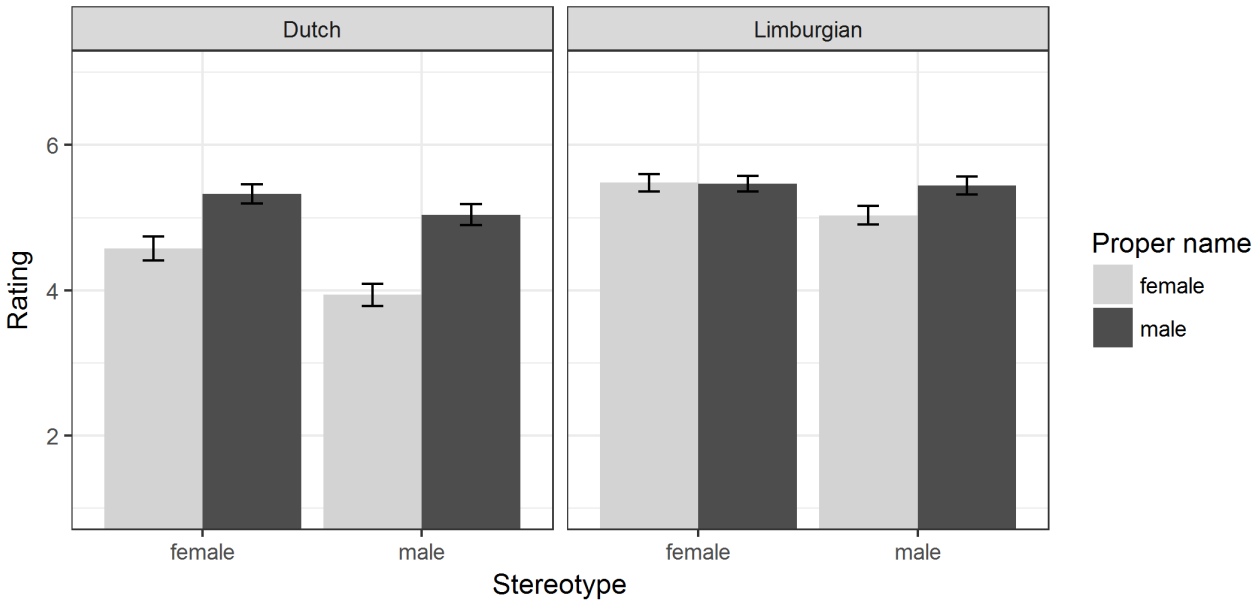

Figure 1 Mean raw scores given by Dutch participants for Dutch stimuli and by Limburgian participants for Limburgian stimuli per condition.

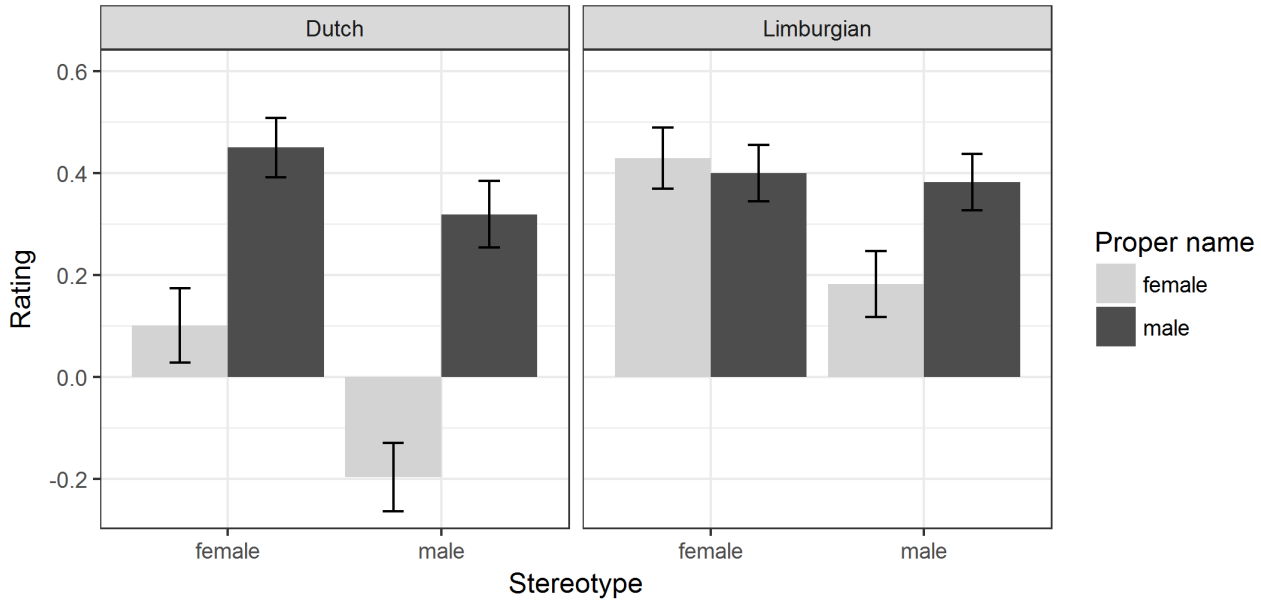

Figure 2 Mean scores given by Dutch participants for Dutch stimuli and by Limburgian participants for Limburgian stimuli per condition, converted to z-scores.

4. Discussion

4.1 Limburgian zien *'his/its' can refer to women*

Past research has shown that sentences featuring gender-mismatching pronouns are often perceived as ungrammatical and therefore dispreferred as reflected in lower acceptability as well as online measures such as EEG (e.g., Osterhout & Mobley 1995, see also Nieuwland & van Berkum 2006). In order to test whether Limburgian *zien* 'his/its' can refer to women as opposed to Dutch *zijn* 'his/its', we conducted an acceptability judgment task and presented Dutch and Limburgian participants with recordings of Dutch and Limburgian sentences, respectively, assuming that sentences in which coreferentiality can be established receive higher ratings in line with previous research. These sentences were stereotypically male or female, featured a male or female subject denoted by a proper name, and the pronoun *zijn* or *zien*, depending on the testing language. In line with our hypothesis, sentences featuring male proper names generally received higher ratings than sentences featuring female proper names due to the presence of the pronoun; sentences in which the pronoun could be linked to the subject were preferred. As expected, we found that this advantage for male proper names was significantly less pronounced for Limburgians as indicated by an interaction effect between the testing language and proper name gender; in female stereotype contexts, no difference between male and female proper names was found for Limburgian at all, confirming that *zien* 'its' can indeed be interpreted as referring to a woman. Furthermore, we found that whether a female or male proper name was presented had a larger effect on the ratings in male stereotype contexts. This held true for both the Limburgian and the Dutch data. In the following, we offer a possible explanation for this seemingly puzzling effect.

4.2 Exploring the effect of stereotype context

We manipulated two within-participant factors (i.e., proper name gender and stereotype context) making up our conditions for both language groups, which are visible in Table 2. There are two factors contributing to sentence appreciation that follow from this design: whether or not a female interpretation of the pronoun is facilitated, and whether or not coreferentiality between the subject of the sentence and the pronoun is established. Let us discuss these latter two in more detail.

First, Limburgian *zien* is only one of two productive pronominal forms available for a female referent, but the sole option available for male reference. Therefore, the masculine reading of *zien* must have a stronger representation in the mental lexicon than neuter (i.e., female-interpreted) *zien*, which guides pronoun interpretation. The interpretation of ambiguous *zien* is further guided by both the gender of the sentence's subject and the context; that is, the female interpretation of *zien* is facilitated and most likely in a stereotypically female context and when a female subject is present. Second, whether or not coreferentiality is established between the subject and the pronoun *zien* depends, in case of a female subject, on whether or not the female interpretation is facilitated. Coreferentiality can always be established in the case of a male subject.

Consider the example stimuli from Conditions A-D in Table 2:

Table 2. Example stimuli per condition

Condition	**Subject**	**Stereotype**	**Language**	**Stimulus**
A	F	F	Dutch	Fleur heeft zijn yogabroek aangedaan
			Limburgian	Fleur hɛt zien yogabʊks aangedo:n
B	M	F	Dutch	Lucas heeft zijn yogabroek aangedaan
			Limburgian	Lucas hɛt zien yogabʊks aangedo:n
C	F	M	Dutch	Lotte heeft zijn bokshandschoenen aangedaan
			Limburgian	Lotte hɛt zien bɔkshandschoon aangedo:n
D	M	M	Dutch	Jeroen heeft zijn bokshandschoenen aangedaan
			Limburgian	Jeroen hɛt zien bɔkshandschoon aangedo:n

Gender-mismatching pronouns are dispreferred, which is clearly visible in the results of the Dutch participants (see Figure 1). For speakers of Dutch, coreferentiality with *zijn* can only be established for male but not for female subjects. Conditions B and D feature a male subject and therefore show

congruity with the pronoun, allowing for coreferentiality and boosting sentence appreciation. Conditions A and C, featuring a female subject and masculine *zijn*, however, show incongruity, thus preventing coreferentiality and resulting in lower ratings. Gender stereotypes, then, are adhered to in Conditions A and D but violated in B and C. The interaction effect between *proper name* and *stereotype* shows that the difference in appreciation between Conditions C and D is larger than that between A and B. This suggests that incongruity between subject and pronoun is penalized, and that a mismatching stereotype context further adds to this.[6]

In other words, the Dutch results showed that while sentences featuring both a mismatching pronoun and a mismatching context received lower ratings than sentences that showed a mismatch in one or none of these respects, sentence appreciation was primarily guided by the possibility of coreferentiality. This also held true for Limburgians. In the Dutch sentences, however, the sole factor determining whether coreferentiality could be established was the subject's gender: *zijn* matches a man but not a woman. This was not the case in Limburgian, because *zien* is ambiguous in these contexts, and its interpretation was affected by subject gender and the stereotype context: it is easier to interpret *zien* as referring to a woman if the context favors this reading. Thus, coreferentiality could be established (like in Dutch) in Conditions B and D, where a male antecedent was present, and additionally also in A but not C, which both featured a female subject but embedded in a male context in the case of C. This led to higher appreciation of sentences from conditions A, B and D.

As expected, Limburgians used gender stereotype context when resolving the ambiguous pronoun *zien*. However, it is somewhat surprising that the role of stereotypes was not larger in our experiment. More specifically, sentence ratings were primarily guided by whether coreferentiality could be established; violations of gender stereotypes (e.g., a man putting on yoga pants), however, played a minor role (cf. Carreiras et al. 1996; Sirin, McCreary & Mahalik 2004). This is possibly a result from our experimental design. Since we asked participants to explicitly rate sentences, they might have very well experienced a stereotype bias, but consciously decided against basing their ratings on (violations of) gender stereotypes.

5. Conclusion

As expected, the possibility of coreferentiality between the subject and the pronoun was limited to sentences with male subjects for Dutch *zijn* 'his/its'. For Limburgian *zien* 'his/its', however, it

[6] Note that the two conditions featuring female proper names (i.e., A and C) cannot be directly compared as they featured different items, which might inherently differ in terms of acceptability, independently of our manipulation. The same holds for the two conditions featuring male proper names (B and D). The difference between conditions featuring the same items (i.e., A and B, and C and D) thus constitutes the focus of our analysis and discussion.

extended to sentences with female subjects as well. We further found that gender-biasing contexts affect the interpretation of Limburgian *zien*, as indicated by a difference in appreciation. However, the appreciation of sentences featuring unambiguous Dutch *zijn* was also affected by gender stereotype contexts to some extent, which raises the question as to whether gender-biasing information also affects the resolution of *unambiguous* gender-mismatching pronouns. Put differently, one's preference to either link the pronoun to an unmentioned referent or the mismatching antecedent might depend on gender stereotype context. This question is for future research to answer.

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