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# Form identity and gendered associations: L2 English *-er* facilitates the bias of L1 German *-er*

**Abstract:** This study investigates the transfer of gender biases from L1 German to L2 English, specifically examining whether the male bias associated with German role nouns ending in −er is activated when German speakers encounter English role nouns also ending in −er. We address two primary research questions. First, is the male bias of L1 German role nouns transferred to L2 English role nouns? Second, does the −er suffix in English role nouns facilitate this bias transfer? To explore these questions, we conducted two tasks with 65 participants, all of whom were L1 German speakers of L2 English. The first experiment involved a story continuation task in which participants continued stories initiated by English prompts containing role nouns ending in −er. The second experiment required participants to translate English role nouns, some ending in −er and others not, into German. Results indicate that the male bias present in German role nouns is indeed transferred to English, and that the −er suffix in English role nouns significantly contributes to this bias transfer.

**Keywords:** bias transfer, generic masculine, male bias, role nouns, second language

# 1 Introduction: Gender in English and German

Modern English is a *notional* or *pronominal* gender language (Nevalainen and Raumolin-Brunberg 1993; McConnell-Ginet 2015; Siemund 2008). That is, gender is primarily marked in the English pronominal system and rarely or not at all elsewhere (Huddleston and Pullum 2002: 485). Modern German, on the contrary, is a *grammatical* gender language (Hekanaho 2020). The gender of a given noun influences the grammatical form of articles, attributive adjectives, ordinal numbers,

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participles, adjectival, relative and question pronouns, and third-person singular pronouns (Jarnatowskaja 1968).

Both English and German overwhelmingly follow a *natural gender rule* for non-derived nouns denoting humans (Mills 1986). For example, German *die Tante* 'the aunt' is grammatically feminine, while *der Onkel* 'the uncle' is grammatically male. In English, one will most likely refer to an *aunt* using the grammatically feminine pronouns *she*, *her*, and *hers*, while one will most likely refer to an *uncle* using the grammatically masculine pronouns *he*, *him*, and *his*.

However, this clear mapping between grammatical gender and referent gender is violated in specific cases. In English, for instance, some inanimate objects are referred to using feminine pronouns, e.g., ships (Siemund 2008). In German, grammatically masculine role nouns with grammatically feminine counterparts may be used to refer to referents irrespective of their gender (Diewald 2018), see Examples (1-a) to (1-e) below. This usage is described as generic. Using a grammatically masculine role noun for a referent or group of referents of any gender, the role noun supposedly loses its male semantics. Instead, the role noun is assumed to be gender-neutral.

While this is the traditional grammarian idea of this usage, an array of linguistic studies have shown that generically used masculine role nouns are apparently not gender-neutral. Instead, this type of usage comes with a rather clear male bias (e.g. Braun et al. 1998; Heise 2000; Stahlberg and Sczesny 2001; Stahlberg et al. 2001; Rothmund and Scheele 2004; Gygax et al. 2008; Irmen and Kurovskaja 2010; Misersky et al. 2019; Keith et al. 2022; Schunack and Binanzer 2022; Körner et al. 2022; Zacharski and Ferstl 2023; Schmitz 2024). That is, even though generically used masculine role nouns may be intended as gender-neutral, this intention is not translated by the language user. Studies explained this male bias with the form identity of generically and non-generically used masculine forms (cf. Schmitz et al. 2023).

Form identity is also at issue when it comes to L1 German speakers of L2 English. Both English and German share the −*er* suffix used to derive role nouns. For example, *work + −er = worker* and, analogously, *Arbeit + −er = Arbeiter*. While in English this form is used for referents of any gender and, indeed, there is no competition with a closely related form, in German, there is. The grammatically masculine *Arbeiter* can be used to specifically refer to male referents, see Example (1-a). Its feminine counterpart *Arbeiterin* is used to specifically refer to feminine referents, as illustrated by Example (1-e). *Arbeiter*, however, can also be used generically to refer to referents of any gender, as is shown in Example (1-b), while *Arbeiterin* cannot, as given in Examples (1-c) and (1-d). As there is ample evidence for generic masculines in German to carry a male bias, one may assume that such a male bias is carried over in L2 contexts in which the morphology resembles the morphology of German role nouns. One such case presents itself in the −*er* suffix in English.

(1)  a.  *Alle der Arbeiter sind Männer.*
         'All of the workers [specific masculine] are men.'
     b.  *Viele der Arbeiter sind Frauen.*
         'Many of the workers [generic masculine] are women.'
     c.  *\* Viele der Arbeiterinnen sind Männer.*
         'Many of the workers [specific feminine] are men.'
     d.  *? Viele der Arbeiterinnen sind Frauen.*
         'Many of the workers [specific feminine] are women.'
     e.  *Alle Arbeiterinnen sind Frauen.*
         'All of the workers [specific feminine] are women.'

The transfer of gender biases from an L1 to an L2 does not pose a novel idea. Previous studies have, for example, shown that Russian L1 speakers may struggle with processing English gendered pronouns that do not align with the grammatical gender of the corresponding nouns in Russian (Cook 2018). Koster and Loerts (2020) found that learners of German and Dutch as L2s often confuse the gender classes for nouns. Sabourin et al. (2016) demonstrated that L1 English speakers perform worse in gender assignment in German and Romance languages, which have grammatical gender systems, compared to native speakers. Sato et al. (2013) discovered that stereotypicality affects the gender assignment of English L1 speakers of French as L2. French learners of L2 English tend to transfer a male-dominant bias from the French gender system, and this effect diminishes with higher L2 proficiency. Since French, like German, has a male bias in its gender system, it is reasonable to expect a similar effect with German L1 speakers in gender assignment in L2 English.

The present paper, therefore, sets out to answer the following research questions:

*RQ1*: Is the male bias of L1 German role nouns transferred to L2 English role nouns?
*RQ2*: Does the *−er* suffix in English role nouns facilitate this bias transfer?

We attempt to answer these questions using two types of experimental paradigms. First, participants were asked to continue three short stories in German, with the initial contextualizing sentence being given in English. This initial sentence contained an English role noun ending in *−er*. Role nouns differed by their stereotypicality: They were either stereotypically male, female, or neutral. Second, participants were asked to translate role nouns from English to German. Role nouns were presented without contexts and differed by their endings. Half of them ended in *−er*, while the other half did not. Again, role nouns with male, female, and neutral stereotypicality were used.

Besides grammatically masculine and feminine forms for role nouns, e.g., *Arbeiter* and *Arbeiterin*, participants might have also used more gender-inclusive

forms. To include both binary genders, i.e., male and female, participants may, for example, use the pair form, *Arbeiterin und Arbeiter*, the capital I form, *ArbeiterIn*, or a slash, *Arbeiter/-in*. To include genders beyond the binary, participants might have made use of several special symbols. That is, the asterisk, the column, and the underscore may be used in combination with a following *in* to constitute a new morpheme: *Arbeiter\*in*, *Arbeiter:in*, *Arbeiter_in* (Völkening 2022 and Völkening in this volume). In the singular, the special symbol forms commonly refer to non-binary individuals when used to refer to a specific person as in the story continuation task. For non-specific singulars and in the plural, these forms commonly refer to individuals of any gender. Finally, participants might have also used gender-neutral paraphrases. For example, instead of *Arbeiter*, one could use *arbeitende Person* 'working person'. Both tasks will allow insight into which forms are used by L1 speakers of German when confronted with role nouns in their L2 English.

In the following, first the story continuation task and its results are presented and briefly discussed. Then, the translation task and its results are introduced. Finally, the results of both tasks are discussed, and a conclusion is drawn.

# 2 Experiments

## 2.1 Participants

Overall, 65 participants took part in both experiments. Their mean age was 29.6 years (SD 10.9), their median age was 25 years. The youngest participant was 18 years old, the oldest participant was 59 years old. All participants had German as only or one of their L1s and English as only or one of their L2s. Besides German, 14 other languages were provided as L1s, and besides English, 21 other languages were provided as L2s.

Participants were asked about their *Geschlecht*, without further specifying whether this asked for sex or gender. There were no predefined options given. Instead, participants were allowed to enter whatever information they deemed appropriate. Overall, 54 participants provided *weiblich* 'female' and 9 participants provided *männlich* 'male' as information. Furthermore, 1 participant provided *divers* 'diverse' as information and 1 participant did not provide an answer. Due to the low number of data points for the latter two categories, these participants and their data points were removed from the data set used for the analyses. Where further data points were removed for the respective analyses, this will be mentioned in the relevant sections.

Finally, participants were asked their attitude towards different ways of referring to individuals in German. On a 5-point Likert scale ranging from *sehr gut* 'very good' to *sehr schlecht* 'very bad', they had to indicate their stance towards generic masculines (e.g., *Lehrer*) 'teacher', pair forms (e.g., *Lehrer und Lehrerin* 'teacher (male) and teacher (female)'), neutral forms (e.g., *Lehrperson* lit. 'person who teaches'), participles (e.g., *Lehrende* lit. 'those who are teaching'), and gender star forms (e.g., *Lehrer\*in* 'teacher (of any gender)').[1] The choices were introduced using the same examples as in the present paragraph. Additionally, participants were able to choose *kenne ich nicht / keine Meinung* 'I don't know this / no opinion' for each form. Overall, participants showed a median attitude of 2 towards the generic masculine and a median attitude of 4 towards all other forms. An overview of the responses is given in Figure 1.
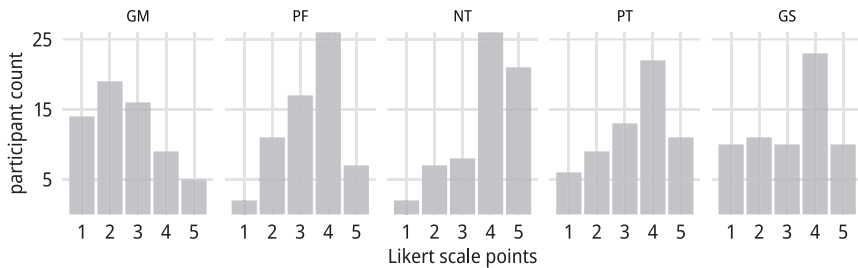


**Fig. 1:** Participant attitudes towards generic masculines (GM), pair forms (PF), neutral alternatives (NT), participles (PT), and gender star forms (GS).

## 2.2 Experiment 1: Story continuation task

### 2.2.1 Method

The first experiment was inspired by the study conducted by Stein and Schneider (same volume). Following their *short story approach*, participants were instructed to write three short stories with at least five sentences. For each short story, participants were prompted with a first sentence. This first sentence was given in English and contained one of three target role nouns. The role nouns were *hairdresser*, *programmer*, and *singer*, whose stereotypicality is female, male, and neutral, re-

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**1** The term *gender star* is used in this chapter and in the chapter by Völkening, while Ochs & Rüdiger in their chapter refer to the same concept as 'asterisk'.

spectively. Stereotypicality was considered as a variable as it commonly included in similar investigations; stereotypicality judgements were adopted from Misersky et al. (2014). The prompts that were used were simple sentences, they are given in Examples (2), (3), and (4).

(2)    The **hairdresser** woke up late today.

(3)    The **programmer** needs a new computer.

(4)    The **singer** works on a new song.

Participants were instructed as follows: *Bitte verfasse eine Fortsetzung aus mindestens 5 Sätzen auf Deutsch für den folgenden Kontext:* 'Please write a continuation for the following context of at least 5 sentences in German'. That is, while the prompt sentences were given in English, i.e., with no gender information in the role noun, participants were asked to continue the story in German and hence had to decide on a grammatical gender (masculine, feminine) or novel form (e.g., with an asterisk) for the respective role noun. There was no time limit for this task.

### 2.2.2  Analysis

The elicited data were annotated for the forms provided by the participants. Possible form categories were `masculine`, `feminine`, `neutral` (i.e., gender-neutral paraphrases), `non-binary` (i.e., the use of a novel non-binary suffix), and `unknown` (i.e., no gendered forms referring to the role noun were used).

In 19 cases (5 for female, 6 for male, and 8 for neutral stereotypicality), participants avoided using the role noun in their sentences. In 1 stereotypically male case, a gender star form was used. In 9 cases (3 per stereotypicality), neutral paraphrases were used. Neutral, non-binary, and unknown forms were removed for the analysis, as they were too infrequent for allowing any generalizations.

The remaining data were analyzed using a generalized linear mixed effects regression model with the *lme4* package (Bates et al. 2015) in *R* (R Core Team 2023). The chosen forms were predicted by the fixed effects STEREOTYPICALITY, participant GENDER, participant AGE, and by the participants' attitude towards the generic masculine ATTGM, the pair form ATTPF, neutral alternatives ATTNT, participles ATTPT, and gender star forms ATTGS. Participant ID, L1s, and L2s were introduced as random effects. Differences between levels of a variable in the fitted model were analyzed using Bonferroni-corrected pairwise comparisons implemented by the *em-*

*means* package (Lenth 2024). Effects were plotted using the packages *visreg* (Breheny and Burchett 2017) and *ggplot2* (Wickham 2016).[2]

### 2.2.3 Results

Overall, masculine forms were used 103 times (29 for female, 51 for male, and 23 for neutral stereotypicality) and feminine forms were used 62 times (27 for female, 4 for male, and 31 for neutral stereotypicality).

A summary of the generalized linear mixed effects regression model fitted to these data is given in Table 1. Type II Wald chi-square tests on the generalized linear mixed effects model revealed a significant effect of STEREOTYPICALITY ($p < 0.001$). The other fixed effects did not reach significance. Taking a closer look at the effect of STEREOTYPICALITY, we found significant differences in chosen forms between stereotypically female and male forms and between stereotypically male and neutral forms. The difference between stereotypically female and neutral forms is not significant. As is shown in Figure 2, for the stereotypically male role noun *programmer*, masculine forms are most probable. For the stereotypically feminine role noun *hairdresser* and the stereotypically neutral role noun *singer*, masculine and feminine forms are more or less equally probable.

**Tab. 1:** Model summary for the generalized linear mixed effects regression model fitted to the story continuation task data.

|  | Estimate | Std. Error | *z*-value | *p*-value |
|---|---|---|---|---|
| Intercept | 2.099 | 1.355 | 1.548 | 0.122 |
| STEREOmale | 2.562 | 0.594 | 4.310 | <0.001 |
| STEREOneutral | -0.384 | 0.395 | -0.973 | 0.331 |
| GENDERfemale | -0.971 | 0.570 | -1.704 | 0.088 |
| AGE | -0.014 | 0.019 | -0.720 | 0.471 |
| ATTGM | 0.141 | 0.181 | 0.777 | 0.437 |
| ATTPF | -0.033 | 0.193 | -0.173 | 0.863 |
| ATTNT | -0.181 | 0.209 | -0.867 | 0.386 |
| ATTPT | -0.134 | 0.158 | -0.846 | 0.398 |
| ATTGS | 0.012 | 0.158 | 0.077 | 0.939 |

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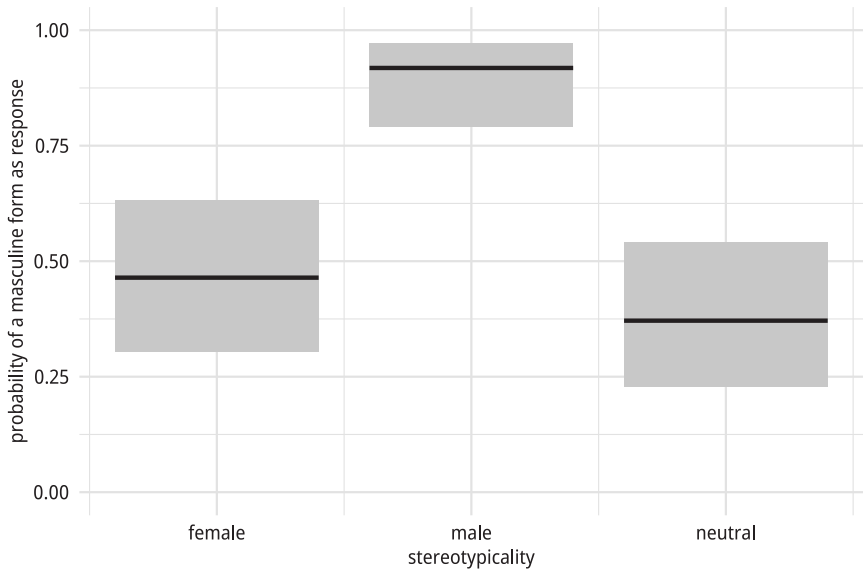**2** The R script and data are available at https://osf.io/96qxr, accessed: 27 February 2025.

**Fig. 2:** The partial effect of stereotypicality as found in the generalized linear mixed effects regression model.

### 2.2.4 Interim Discussion

For the stereotypically male role noun, the present findings are little surprising. A role noun associated with male referents is translated into German using masculine forms. Similarly, the result for the stereotypically neutral role noun is what one would likely expect, similar numbers for masculine and feminine forms. The result for the stereotypically female role noun, however, is rather unexpected. That is, if stereotypicality was the main factor of influence, one would assume that the majority of German forms used to translate *hairdresser* were feminine. Instead, masculine forms were used as often as feminine forms. As *hairdresser* ends in the −*er* suffix, the question arises whether this suffix does indeed overwrite the female stereotypicality to some extent. The following experiment will investigate this idea more closely.

## 2.3 Experiment 2: Translation task

### 2.3.1 Method

The second experiment consisted of a simple translation task. Role nouns of either male, female, or neutral stereotypicality were given in alphabetical order below each other on one site. Stereotypicality information was again adopted from Misersky et al. (2014). Participants were asked to translate each word from English to German, following their first intuition rather than overthinking their translations. They were told that the experiment was not looking for perfect answers, that errors were not an issue, and that they were allowed to skip words they do not know. For each stereotypicality group, 8 items were used. Within the 8 items per stereotypicality group, 4 ended in −*er* and 4 did not. Table 2 provides an overview of all items.

**Tab. 2:** Items used in the translation task grouped by their stereotypicality.

| male | female | neutral |
|---|---|---|
| programmer | hairdresser | singer |
| publisher | wedding planer | customer |
| killer | primary school teacher | designer |
| football player | fortune teller | piano player |
| magician | assistant | author |
| mechanic | flight attendant | journalist |
| professor | receptionist | astrologist |
| inspector | florist | biologist |

### 2.3.2 Analysis

The elicited data were again annotated for the forms provided by the participants. Possible categories were `masculine`, `feminine`, `binary` (i.e., pair forms), `non-binary` (i.e., the use of a novel non-binary suffix), and `not usable` (i.e., a translation too far away from the actual meaning or no translation). For the following analysis, `not usable` data points were removed. Table 3 and Figure 3 summarize the data.

The remaining 1,463 data points were analyzed using multinomial regression as implemented by the *nnet* package (Venables and Ripley 2002). The translated forms were predicted by the fixed effects STEREOTYPICALITY and the forms' ENDINGS

(-er vs. not -er) in interaction, by participant GENDER, participant AGE, and participants' attitudes towards the different form options, i.e., ATTGM, ATTPF, ATTNT, ATTPT, and ATTGS. Random effects were not introduced, as the current implementations of multinomial regression in R do not support random effect structures. Differences between levels of a variable in the fitted model were analyzed using Bonferroni-corrected pairwise comparisons implemented by the *emmeans* package Lenth (2024). Effects were plotted using the packages *visreg* (Breheny and Burchett 2017) and *ggplot2* (Wickham 2016).[3]

**Tab. 3:** Distribution of forms (rows) by stereotypicality groups (columns) in the translation task data.

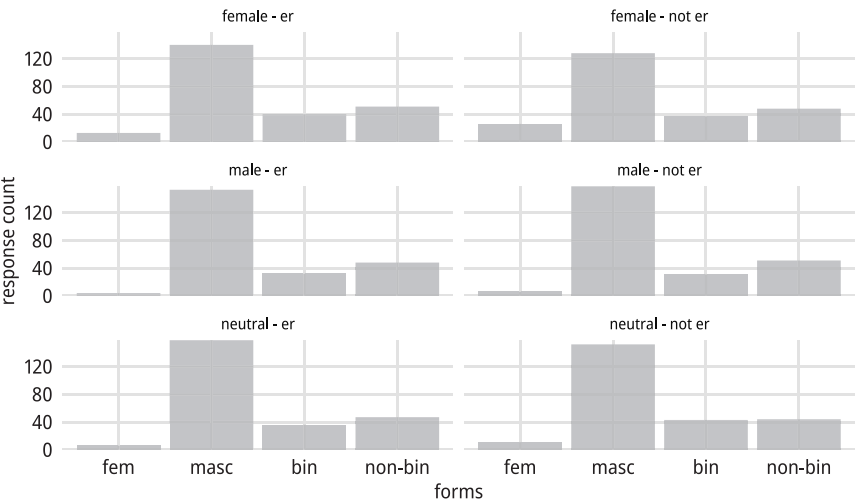|            | male | female | neutral |
|------------|------|--------|---------|
| feminine   | 10   | 39     | 17      |
| masculine  | 311  | 268    | 310     |
| binary     | 63   | 77     | 79      |
| non-binary | 99   | 99     | 91      |



**Fig. 3:** Distribution of forms by stereotypicality groups and endings in the translation task data. 'fem' = feminine, 'masc' = masculine, 'bin' = binary, and 'non-bin' = non-binary.

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3 The R script and data are available at https://osf.io/96qxr, accessed: 27 February 2025.

### 2.3.3 Results

In sum, masculine forms were used 889 times, feminine forms were used 66 times, binary forms were used 219 times, and non-binary forms were used 289 times. Their distribution between items ending in −*er* and not ending in −*er* is given in Table 4.

**Tab. 4:** Distribution of forms by stereotypicality groups and endings in the translation task data.

|  | MALE | | FEMALE | | NEUTRAL | |
|---|---|---|---|---|---|---|
|  | -er | not -er | -er | not -er | -er | not -er |
| feminine | 4 | 6 | 13 | 26 | 6 | 11 |
| masculine | 153 | 158 | 140 | 128 | 158 | 152 |
| binary | 48 | 31 | 40 | 37 | 36 | 43 |
| non-binary | 32 | 51 | 51 | 48 | 47 | 44 |

The fitted multinomial regression model revealed significant effects for GENDER, AGE, ATTGM, ATTPF, ATTNT, ATTPT, and ATTGS, and for the interaction of STEREOTYPI-CALITY and items' ENDINGS. An overview of the model is given in Table 5.

**Tab. 5:** Type II Anova table for the multinomial regression model fitted to the translation task data.

|  | LR $\chi^2$ | df | *p*-value |
|---|---|---|---|
| STEREO | 1.35 | 6 | 0.969 |
| ENDING | 6.86 | 3 | 0.076 |
| GENDER | 73.51 | 3 | <0.001 |
| AGE | 28.95 | 3 | <0.001 |
| ATTGM | 51.40 | 3 | <0.001 |
| ATTPF | 259.21 | 3 | <0.001 |
| ATTNT | 11.25 | 3 | 0.010 |
| ATTPT | 128.26 | 3 | <0.001 |
| ATTGS | 320.92 | 3 | <0.001 |
| STEREO:ENDING | 29.59 | 6 | <0.001 |

For participant GENDER, female participants overall use feminine, binary, and non-binary forms more often than male participants, whereas male participants make use of masculine forms more often. This effect is displayed in Figure 4.

As for AGE, the probability of using masculine and binary forms decreases with age, while the probability of using feminine and non-binary forms increases. The effect of AGE is given in Figure 5.
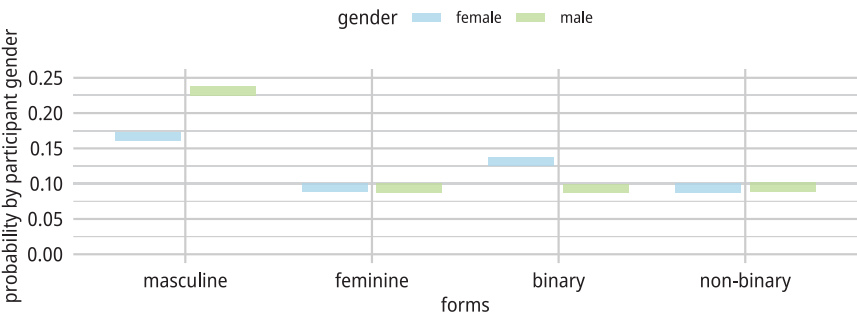
**Fig. 4:** The partial effect of participant GENDER as found in the multinomial regression model.
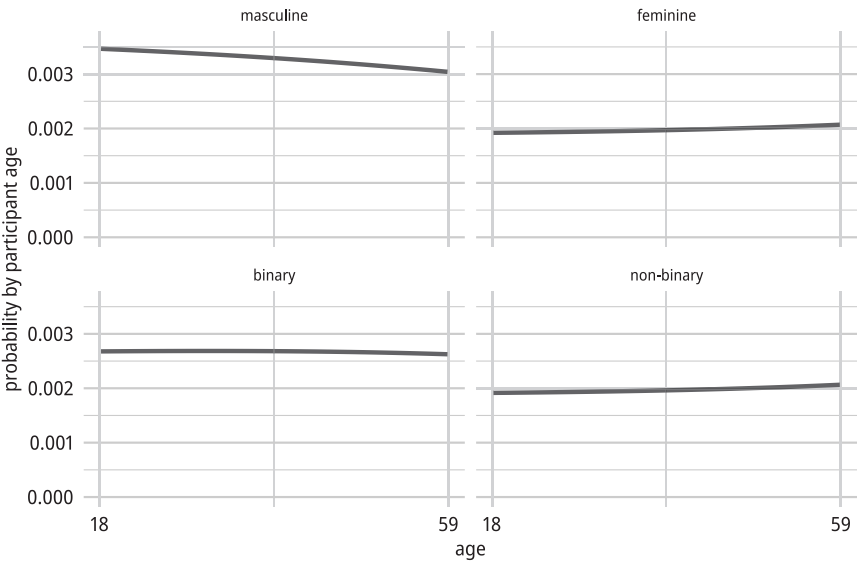


**Fig. 5:** The partial effect of participant AGE as found in the multinomial regression model.

The effect of the different notions of attitude is illustrated in Figure 6. Notably, participants chose translations following their attitudes. That is, participants in favor of generic masculines used most masculine forms, participants in favor of pair forms used binary forms, and participants in favor of gender star forms used non-binary forms for their translations. Further, binary forms are predominantly used by par-

ticipants who are not in favor of gender star forms and generic masculines, whereas for feminine forms, attitudes play almost no role at all.
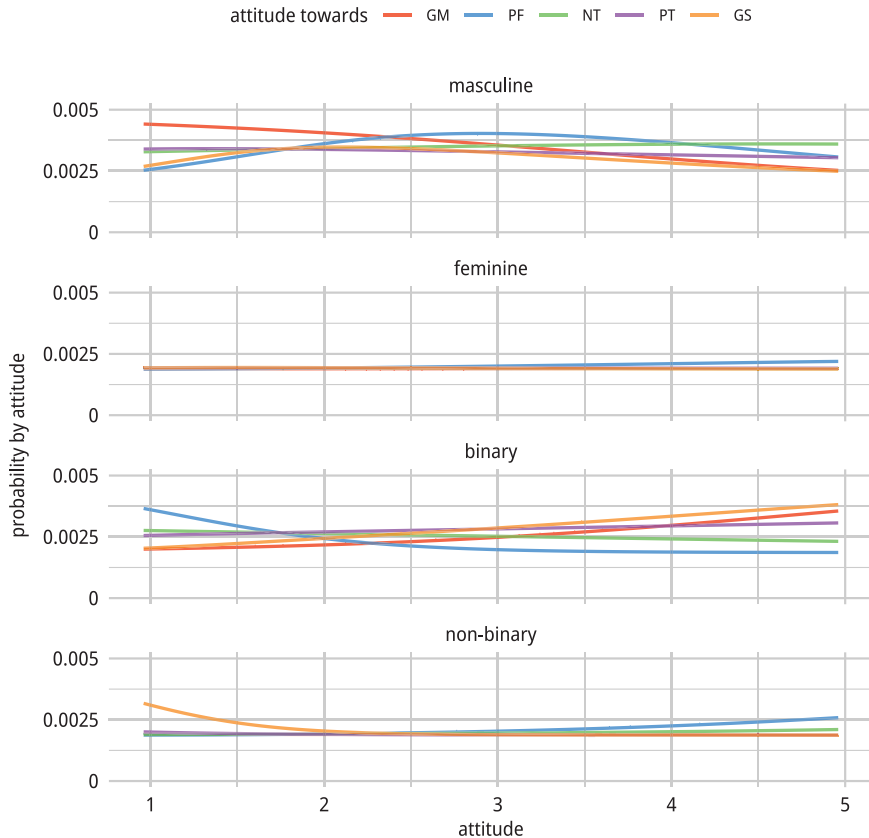


**Fig. 6:** The partial effect of participant ATTITUDE towards generic masculines (GM), pair forms (PF), neutral alternatives (NT), participles (PT), and gender star forms (GS) as found in the multinomial regression model.

Finally, using Bonferroni-corrected pairwise comparisons for the interaction of STEREOTYPICALITY and ENDINGS, it is found that significantly different forms are used for stereotypically female forms not ending in −er in comparison to stereotypically male forms ending in −er, stereotypically neutral forms ending in −er, stereotypically male forms ending not in −er, and stereotypically neutral forms not ending in −er. The partial effects of the interaction are visualized in Figure 7.
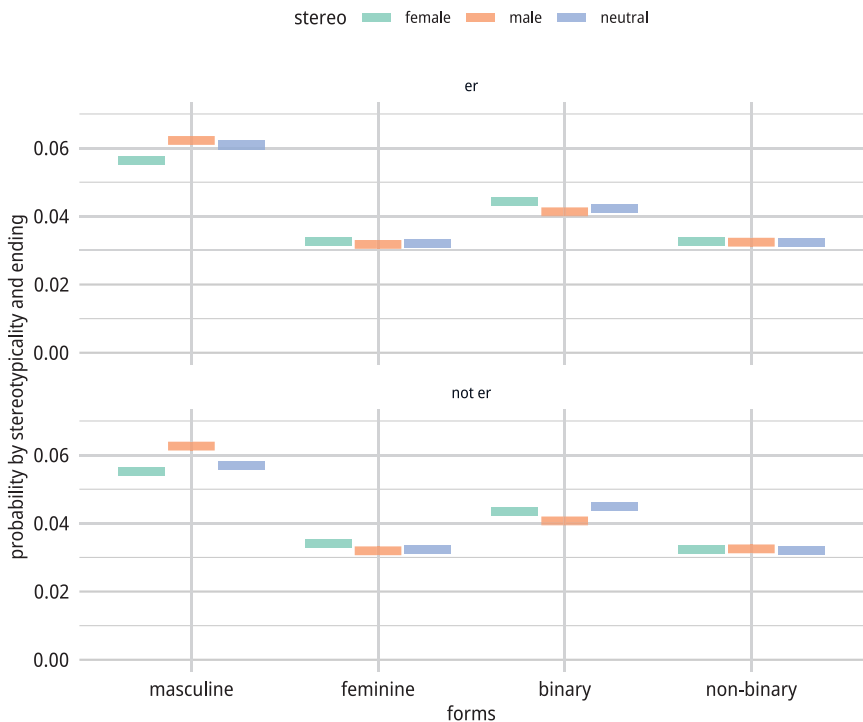
**Fig. 7:** The partial effect of the interaction of STEREOTYPICALITY and ENDING as found in the multinomial regression model.

# 3 Discussion

The present study set out to find answers to two research questions on L1 to L2 bias transfer. The first question, *RQ1*, was concerned with whether the male bias of German role nouns in transferred to English role nouns by L1 German speakers of L2 English. Using a story continuation task, it was found that the stereotypically female role noun *hairdresser* was translated to German using as many grammatically masculine as feminine forms. This finding offers room for speculation, as a very limited set of only three target words was tested. The present findings may be particular to the tested items or a bias found in story-telling as such. To investigate whether a male bias surfaces in a larger set of target words and is influenced by morphological similarities between the L1 and the L2, i.e., in the present study the −*er* suffix, a second experiment was conducted.

For the second experiment, *RQ2* asked whether the −*er* suffix in English role nouns facilitates the transfer of the L1 German male bias. Using a simple translation task, participants were asked to translate English role nouns ending and not ending in −*er* to German. Role nouns were equally distributed between male, female, and neutral stereotypicality. Results showed that, indeed, the −*er* suffix appears to make a difference. Stereotypically male and stereotypically neutral forms ending in −*er* showed significantly more masculine translations than stereotypically female forms not ending in −*er*. Additionally, stereotypically male forms not ending in −*er* also showed significantly more masculine translations than stereotypically female forms not ending in −*er*. The results suggest that stereotypically female role nouns not ending in −*er* are 'least male', while stereotypically male forms, no matter their ending, are 'most male'. Neutral forms ending in −*er* are also significantly 'more male' than the former female forms.

One point that should be mentioned even if a full discussion is outside the scope of the present study is that of markedness. If generic masculines are unmarked, as generic forms supposedly are, participants using them in a simple translation task is a non-surprising finding. However, if this were the case, one should not find differences between role nouns ending in −*er* and those not ending in −*er*. Hence, it appears that markedness may be but one potentially influencing factor in this regard. That is, assumably role nouns ending in −*er* are less marked than those not ending in −*er*.

Taking the results of both tasks together, it appears that the −*er* suffix in English role nouns does lead to a male bias transfer from L1 German to L2 English. These results are in line with previous findings, for example in L1 French and L2 English (cf. Sato et al. 2013). Even stereotypically neutral role nouns ending in −*er* are overwhelmingly translated using masculine forms. Hence, L1 speakers of German transfer the male bias of their L1 to L2 English, even though the English role nouns used in the present tasks are not grammatically gendered.

# 4 Conclusion

Using a story continuation task and a translation task, the present study provided novel insight into the transfer of the male bias in generic masculine role nouns from L1 German to L2 English. This transfer apparently does happen and is facilitated by the suffix −*er*, as this suffix is present in both German and English, while at the same time also subject to modulation by stereotypicality. In other words, form identity does indeed increase gendered associations.

At the same time, this observation raises a potential question for future research: Why does the −*er* suffix show the observed effect, but other suffixes or pseudo-suffixes found in both English and German do not? For instance, both languages know role nouns ending in −*or* and −*ist*. Similar investigations with pertinent items are required to allow answers to this question. Further, the question of the influence of markedness as raised in the discussion should be investigated to shed further light on potential influences on language inherent biases and to inform the concept of markedness in generic forms altogether. Finally, future research should investigate other combinations of L1s and L2s with differing gender systems and differing suffixes or derivational systems.

In sum, the present study brought forward evidence for a male bias transfer from L1 German to L2 English role nouns. A bias caused by variant mappings between grammatical and referent gender in German is transferred to English, a language without such a variant mapping in role nouns. The −*er* suffix facilitates this L1 to L2 bias transfer, as it is present in both languages and closely connected to the male bias in German role nouns.

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