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A star is born? The German gender star and its effects on mental representation

Although generic masculine forms supposedly include everyone, they seem to evoke masculine representations to the exclusion of other genders (Stahlberg & Sczesny, 2001). Gender-inclusive alternatives may yield more inclusive representations, but this has not been investigated extensively. The current study focused on German and contrasts generic masculine forms (*Politiker*, politicians) with the gender star (*Politiker*innen*, politicians [m/f/d]) in order to assess whether they differ in the mental availability of nonmasculine exemplars. The findings suggest that linguistic form matters, as more female exemplars were listed when participants were exposed to the gender star, although very few other nonmasculine exemplars were mentioned. Furthermore, female participants listed more nonmasculine exemplars than male participants, but, as the sample was skewed (more female than male participants), this result is tentative. Thus, the gender star leads to more inclusive mental representations, but other factors likely also play a role in determining the prominence of nonmasculine exemplars.

Key words: gender-inclusive language, cognitive bias, generic use of masculine forms, gender star, German

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"No person shall be compelled to be a witness against himself," the Fifth Amendment of the U.S. Constitution states. Although the phrasing suggests that this amendment only applies to men, the use of "himself" here is intended to be generic: applying to all individuals, not just male ones. Those in the US who do not identify as men can thus breathe a sigh of relief: they too are constitutionally protected from self-incrimination.

However, regardless of the intended generic referential denotation of the masculine form, a considerable body of evidence suggests that use of these forms may well have sexist effects, given that masculine forms lead people to visualize men and to disregard other genders even if they are intended generically (Braun et al., 1998; Braun et al., 2005; Ng, 2007; Sczesny et al., 2016; Stahlberg & Sczesny, 2001; Stahlberg et al., 2007). Indeed, this effect seems to be rather robust, given that it has been demonstrated for various languages (e.g., English and Swedish, Lindqvist et al., 2018, Norwegian, Gabriel & Gygax, 2008, Russian, Garnham & Yakovlev, 2015, French, Gygax et al., 2021, and Spanish, Anaya-Ramírez et al., 2022). However, it is likely to be most evident in grammatical gender languages, such as German, French, and Spanish, where all nouns and most pronouns are assigned to a gender and the feminine form is frequently a deviation from the masculine form (Friedrich et al., 2021). Furthermore, Friedrich et al. (2021) pointed out that in grammatical gender languages, it is common to use masculine-only forms in reference to all genders. For example, in German, the language of focus in the current study, a term like *Feuerwehrmann* ("fire fighter") is overtly gender-marked (*Mann*, "man") and thus may lead to other genders feeling less addressed or included when terms like these are used (although note that overtly gender marked, yet generically intended, examples like "chairman" and "policeman" from a natural gender language like English suggest that masculine bias in language use is not limited to languages with grammatical gender). In relation to this, generic use of masculine forms is criticized for perpetuating stereotypes about masculinity, most notably in the context of occupational titles. This connection between gender stereotypes and the use of generic masculine job titles has been confirmed for several languages such as English and Spanish (Carreiras et al., 1996), French (Lorenzi-Cioldi et al., 2010), and Dutch and German (Vervecken & Hannover, 2015). This entails that, for grammatical gender and natural gender languages alike, generic use of the masculine form affects people, potentially working to withhold opportunities from those who do not identify as men (e.g., generic use of the masculine form in job advertisements has been found to discourage women from applying, see Stout and Dasgupta, 2011). Such societal consequences make the generic use of the masculine form worth studying and highlight that alternative linguistic expressions need to be sought.

It is in this light that efforts have been made to provide alternative linguistic forms that aim at a more balanced representation of the genders (so-called gender-inclusive language) and to investigate whether this is indeed the effect they have on people's perceptions. As the current study focused on German, the fol-

lowing sections highlight relevant previous studies that have assessed effects of gender-inclusive language on speakers of German, but we note that other languages have their own linguistic innovations on this front and, as mentioned above, these too have been the topic of investigation.

The Cognitive Impact of the Generic Use of the Masculine Form in German

Previous research has compared the cognitive effect of the generic use of the masculine form to different gender-inclusive alternatives. This body of work clearly demonstrates that generic use of masculine forms evokes masculine representations to the exclusion of those who do not identify as men. For instance, Braun et al. (1998) asked German-speaking participants to read an article about a scientific conference or, in a second experiment, a conference of a sports association. In both experiments, the participants had to estimate the share of women among the participants after reading the text. Each of the two articles existed in three versions, only one of which was read per participant. The different versions used the following linguistic forms to refer to the attendants of the events: (a) the generic masculine (e.g., *die Wissenschaftler*, "the scientists," with the -er suffix denoting the masculine form here), (b) neutral descriptions (e.g., *die wissenschaftlich Tätigen*, "those who do research," which does not grammatically mark the gender of those denoted), and (c) paired forms (e.g., *die Wissenschaftlerinnen und Wissenschaftler*, "the female and male scientists," with the -innen suffix denoting the feminine form and the -er suffix denoting the masculine form). It appears that the estimated number of women was lowest when masculine forms were used in the texts (Braun et al., 1998). Moreover, the results suggest that paired forms are most effective in making women more visible. Neutral linguistic forms that do not indicate gender (e.g., *Studierende*, "those who study," *wissenschaftlich Tätige*, "those who do research") were argued not to be a suitable alternative since these forms did not evoke a higher female representation in the experiment, but, in fact, were associated with even lower levels of mental representation of women than the generic masculine forms (Braun et al., 1998).

Stahlberg and Sczesny (2001) continued this line of research, assessing the mental availability of specific female exemplars. In their first experiment, participants were asked to fill in a questionnaire about personal preferences and opinions about various topics. The critical questions in this survey asked the participant to name their favorite novel hero, painter, musician, athlete, and idol. Three versions of this survey were created: (a) one in which the questions were formulated using the generic masculine, (b) one using a gender-neutral description of the relevant nouns such as *heldenhafte Romanfigur*, "heroic novel character," and (c) one that used paired forms such as *Romenheld/Romanheldin* (viz. the feminine and masculine nouns for English "novel hero"). They found that more female exemplars were named in the versions that used neutral or paired formulations, and this finding was independent of participant gender (Stahlberg & Sczesny, 2001). In their second experiment, participants were asked to name potential candidates for the chancellor

elections. For this experiment, the questions were asked using either the generic masculine or a paired form (*Kandidaten/Kandidatinnen* for English "male candidates/female candidates"). The authors found that women were named more frequently when paired forms were used, but only if potential candidates for the corresponding party were available (Stahlberg & Sczesny, 2001). A third experiment investigated an additional alternative that aimed to combine the masculine and feminine form into one word by capitalizing the *i* that typically marks the beginning of the morpheme that denotes the feminine form, for example, *PolitikerInnen* (to cover both *Politiker*, "male politicians" and *Politikerinnen*, "female politicians," Stahlberg & Sczesny, 2001). The participants were asked to name three personalities from four categories (politicians, athletes, TV hosts, and authors). Again, different versions of the questionnaire were used (the generic masculine, paired forms, or the capital-I). Consistently, the use of generic masculine forms resulted in the smallest number of women being named. In both other versions, more women were named, while the effect of the capital-I form (e.g., *PolitikerInnen*) was most substantial (Stahlberg & Sczesny, 2001). Based on these results, Stahlberg and Sczesny (2001) argued that the generic use of the masculine form leads to a cognitive underrepresentation of women as compared to men. As the result obtained for the capital-I form appears to have been the strongest, based on the outcomes of Stahlberg and Sczesny (2001), Stahlberg et al. (2001) hypothesized that the strength of the effect of alternative forms depends on how explicitly they refer to women.

However, there are two potential issues in assuming that these conclusions from previous work still hold. In the first place, participants could have mistaken the capital-I form (*PolitikerInnen*) for the explicitly feminine form (*Politikerinnen*). Furthermore, it should be noted that these studies are more than 20 years old and that the alternative that was found to be most effective (the capital-I form) is no longer advocated today. Although it does remain in use, it is regarded as outdated given that it implies a binary gender distinction whereas a more current form like the gender star (discussed below) is deemed to be more inclusive of other gender orientations (Kotthoff, 2020).¹ Another problem lies in the fact that alternative forms to the generic masculine (e.g., neutral descriptions, paired forms, or capital-I forms) differ in their effectivity in terms of enhancing the mental representation of nonmasculine genders.

Newer Gender-inclusive Language Forms

In addition to the older alternative forms that have just been discussed, additional ones have been introduced over the past years. The rationale behind this development was to move beyond the binary distinction between men and wo-

1 Other arguments against this form are that screen readers cannot correctly read it which makes it inaccessible to people who are blind. Moreover, in many fonts the capitalised *I* cannot easily be distinguished from the lowercase *i*.

men and include diverse and nonbinary gender identities as well. In this light, in 2003 the German linguist Steffen Hermann proposed a form using an underscore (e.g., *Student_innen*), referred to as the gender gap (note that this form is not just restricted to written language, given that it is produced as a glottal stop in spoken language). The gender gap with the underscore has been criticized because screen readers that are used by people with a visual impairment cannot process it properly. Thus, in 2009, the insertion of an asterisk was proposed instead (e.g., *Student*innen*) leading to the gender star or gender asterisk label. As an alternative, a spelling with a colon (e.g., *Student:innen*) was proposed as well. However, the colon is not only used in this context, but, for instance, also to signal enumerations or direct speech. Thus, the different uses of the colon were thought to lead to confusion, especially for people who are cognitively impaired or learners of German (Genderleicht, n.d.). Even though similar issues have been raised regarding the gender star, it is currently the most widely used gender-inclusive form for German (Körner et al., 2022). Indeed, there are currently various public policies that prescribe its use: public institutions and actors like municipalities, universities, and political parties have guidelines and recommendations that encourage its use. For instance, the *Suggestions for gender-sensitive language use of the University of Freiburg* recommend the use of the gender star in order to overcome the binary gender distinction and the municipality of Freiburg has published guidelines which advocate the same (see Kotthoff, 2020, also for additional examples).

Despite its increasing official use, the gender star form is highly debated in Germany and the views about its adequacy and effectiveness vary (see Sarrasin et al., 2012 and Gabriel et al., 2018, for discussion). For instance, its critics argue that using the gender star makes the German language unnecessarily complicated, that it is unnatural, or irrelevant (see, for instance, [the 2019 guidelines for gender inclusive language of the University of Kassel](#)).

Recent Findings Regarding the Gender Star

In light of newer gender-inclusive language forms and higher levels of awareness regarding this kind of language use, more recent studies have been conducted in an attempt to assess whether findings of previous experiments would be replicated. For instance, Schunack and Binanzer (2022) repeated the naming study reported in Stahlberg and Sczesny (2001), adopting the same design, but adding a female plural condition (e.g., *Studentinnen*, "female students"), such that it could be assessed whether or not participants confused the capital-I form with the regular female plural form. With regard to this latter addition, as expected, significantly more female exemplars were listed in response to the feminine plural condition as compared to the other conditions, which suggests that participants did not confuse the capital-I form with the feminine plural form (participants provided almost twice as many female exemplars in response to the feminine

plural condition as compared to the capital-I condition). Furthermore, they found that, overall, the number of women named was higher than in the original study (which was attributed to a likely increase in salience and visibility of women compared to 20 years ago) and even higher when the capital-I and paired forms were used. However, as compared to the generic use of the masculine form, the increase was only significant for the capital-I condition.

In a similar vein, Keith et al. (2022) replicated the same experiment by Stahlberg and Sczesny (2001) and additionally investigated the more modern and inclusive gender star. The results were again in line with the original findings: participants who received one of the gender-inclusive versions named more women than participants who received the masculine-generic version, and women were more likely to name women than men, regardless of the form that they were exposed to. However, in this more recent study, the effect for paired forms was stronger than in the original study. Based on the convergence of recent and older results regarding use of the masculine form as generic, Keith et al. (2022) concluded that the effect of this form is based on highly automatized processes that seem to be independent of societal changes with regards to the public visibility of women, although gender-inclusive forms are effective in terms of enhancing the mental availability of women.

In a related study, Körner et al. (2022) conducted two experiments which investigated gender representations following exposure to the gender star, word pairs, or the generic masculine form. In the experiments, participants had to evaluate sentence pairs. The first sentence combined groups of people (e.g., concert attendees) with an activity (e.g., *Die Konzert-Zuhörer/Konzert-Zuhörer*innen waren schon vor Ort*, "The concert attendees/concert attendees [m/f/d] were already on site"). The second sentence added information about either the female or the male subset of the group (e.g., *Man konnte sehen, dass ein Teil der Männer/Frauen gelangweilt war*, "One could see that some of the men/women were bored"). The participants had to determine whether they considered the second sentence to be a sensible continuation of the first sentence. They observed a masculine bias for the generic masculine form and, for the first time in this line of research, a female bias for the gender star. More specifically, following exposure to the gender star sentence, responses were faster and were more frequently assessed to be compatible when they referred to women compared to men. However, Körner et al. (2022) stressed that the masculine bias found for the generic masculine was more robust and larger than the gender star's feminine bias.

While evidence for a masculine bias in response to use of the masculine form in a generic sense is thus robust, more recent forms that are actively being promoted need to be investigated further in order to assess whether they too would lead to more inclusive representations as compared to generic use of the masculine form. Schunack and Binanzer (2022) also highlighted that especially due to the variety of available options in German, it is necessary to test the strengths and weaknesses of the different gender-inclusive alternatives across different tasks and

in different populations. Even though the gender star is currently the most-used gender-inclusive form in German, it is still unclear whether it equally represents women and men (Körner et al., 2022). Moreover, it is relevant to assess whether it fulfils its purpose of going beyond the binary gender distinction.

An additional issue that is currently unclear is to what extent participant gender influences the responses. Stahlberg and Sczesny (2001) found a main effect for participant gender. Female participants named more female personalities than male participants overall. However, they found no interaction between the linguistic form that was used and participant gender. Although the same effects for participant gender were reported by Keith et al. (2022), Gabriel and Mellenberger (2004) found that men named almost no female exemplars when the generic masculine was used and women were more sensitive to inclusive forms. This finding suggests that there may be an interaction between the linguistic form used and gender, with women being more inclined to provide female exemplars when presented with inclusive forms, whereas the specific form that is used does not seem to affect men.

Related to this, Koeser and Sczesny (2014) found that women may be more sensitive to gender-inclusive language in general, as in their experiments, women were found to adopt gender-inclusive language more than men and changed their language use more in favor of gender-inclusive language than men did after exposure to arguments in favor of such language use. This may also entail that exposure to gender-inclusive forms may have a more profound effect on women than men.

The Current Study

Previous studies suggest that there is a solid base of evidence to assume that generic use of masculine forms leads to a masculine representational bias. However, it is less clear whether forms that have been advocated more recently will be effective in reducing bias in the current context. Furthermore, it is currently unclear what role the gender of the participant plays in understanding the kind of cognitive effects that the various forms give rise to, as some studies found main effects of participant gender (Stahlberg & Sczesny, 2001), whereas other studies suggested the presence of an interaction effect (Gabriel & Mellenberger, 2004).

Although the gender star is the form that is currently advocated, various issues still surround its use and effectiveness: it may lead to a more equal representation of genders as compared to the generic use of the masculine form (Keith et al., 2022), but a feminine bias has also been reported (Körner et al., 2022). Furthermore, no studies have investigated whether it fulfils its aims of representing genders other than masculine and feminine.

In order to illuminate these issues, the current study focused on the gender star and sought to assess whether the German gender star would give rise to a more equal mental representation of the genders as compared to generic use of the masculine form. As previous studies generated conflicting outcomes regarding the differences between female and male participants, an additional line of investigation concerned

whether the nature of the responses depends on the gender of the participants.

Based on previous findings, the following two hypotheses were formulated:

Hypothesis 1: Use of the gender star will lead to higher mental availability of nonmasculine exemplars as compared to generic use of the masculine form. Thus, more nonmasculine exemplars will be listed when participants are exposed to the gender star as compared to the generic masculine form (see Braun et al., 1998; Stahlberg & Sczesny, 2001; Keith et al. 2022; Schunack & Binanzer, 2022).

Hypothesis 2: The higher mental availability of nonmasculine exemplars will be particularly pronounced for female participants who are exposed to the gender star. Linguistic form and participant gender are thus thought to interact² (see Gabriel & Mellenberger, 2004; Koeser & Sczesny, 2014).

Method

Research Design

The chosen approach consisted of a modified version of the experiment by Stahlberg and Sczesny (2001). Their study investigated whether the use of generic masculine forms leads to lower mental availability of women than alternative forms (capital-I form or paired forms) by asking participants to name famous exemplars from different categories (politicians, athletes, singers, and TV hosts). The current study utilized an online questionnaire format which required native speakers of German to name three personalities from six different categories (politicians, athletes, singers, TV hosts, actors and authors). In line with Keith et al. (2022), the actor and author categories were added to provide a broader measurement of the dependent variable. Two versions of the questionnaire were created: in the generic masculine condition (GM), all questions were formulated using generic masculine forms of the corresponding nouns (e.g., *Politiker*, *Schauspieler*, "politician, actor"). In the gender star condition (GS), all questions were formulated using the gender star (e.g., *Politiker*innen*, *Schauspieler*innen*). The two conditions were randomly and equally spread over the participants. Note that the participant briefing was the same in both versions and used a nominalized participle form to address the participants (*liebe Teilnehmende*, lit. "dear those who participate"), such that neither of the two linguistic forms that were under investigation were used in the instructions. Both conditions presented the same selection and order of questions, and the formulation of the questions only varied with respect to the linguistic form of the noun. The order in which the categories were presented was not randomized, following the procedure of the previous work

² Upon completion of the data collection phase of the study, we noted that the sample was skewed in terms of participant gender (more female than male participants completed the survey, see the Participants section below). This entails that we were not able to test this hypothesis sufficiently and the results we present on this matter are thus tentative (see also the Results and Discussion sections).

that the current study follows. However, one difference with respect to the original study by Stahlberg and Sczesny (2001) was that the current study did not use any filler questions, so that the survey would be no longer than it needed to be and would thus not tax the participants more than necessary. The instructions as well as the complete set of questions for both conditions can be found in the Appendix.

Experimental Procedure

The introduction of the survey stated that the topic of investigation regarded the popularity of public figures from different domains. At this stage, the actual purpose of the investigation was not yet revealed to participants in order to avoid influencing their responses. After giving consent to participate in the study, the participants answered demographic questions regarding their age, native language, and gender (categorizing themselves as female, male, diverse, or other). Participants who indicated they were below 18 years old or did not speak German as their native language were instantly directed to the end of the survey.

In the main phase of the survey, participants were asked to name the first three personalities that came to mind from the six aforementioned categories. They were allowed to fill in German or international personalities. After completing these questions, the participants reached the end of the survey where they were informed about the actual purpose of the study. The participants then had the possibility to withdraw their consent and to reject the use of their responses if they so desired.

Participants

The participants were native speakers of German who were recruited from international study programs hosting German speakers in The Netherlands, and from universities in Germany. Moreover, the link to the survey was published on different social media platforms to reach a broader audience. Thus, many of the participants were students, but as this information was not requested in the survey, the current occupation and the educational background of participants cannot be further specified. All participants took part voluntarily without any form of compensation. It was possible to withdraw from the experiment at any time, and there was no time limit to completing the survey.

Over a period of five days, a total number of 135 responses were gathered. Thirty-six of these responses could not be included in the analysis for various reasons and have therefore been discarded: (a) one participant did not consent to participate at the beginning, (b) two participants withdrew their consent after filling out the survey, (c) three participants selected another language than German as their native language, (d) seven participants were younger than 18 years old, (e) 22 participants did not finish the questionnaire, and (f) one participant identified as diverse gender (which entailed that there was insufficient data to consider this as a separate category with respect to the role of participant gender). Thus, a total

Table 1. *Participant Demographics and Distribution over Conditions*

	GM (<i>n</i> = 47)	GS (<i>n</i> = 52)	Total (<i>n</i> = 99)
Female	31	36	67
Male	16	16	32
Age range	18 - 70	18 - 65	18 - 79
Mean age	38.06	32.51	35.12

Note. GM = generic masculine, GS = gender star, *n* = sample size

sample size of 99 participants was included in the analysis (see Table 1). However, given that the final sample was skewed regarding participant gender (16 male participants vs. 30+ female participants for each condition), our intended analysis (a two-way analysis of variance, ANOVA, with a gender by linguistic form interaction effect) has to be interpreted very cautiously. Although we do provide this analysis for completeness' sake (see the Results section), here, we note the outcome of the power analysis for the one-way ANOVA (investigating the effect of linguistic form) that we could conduct with the data that was obtained. G*Power (version 3.1.9.7, Faul et al., 2007) demonstrated that a sample size of 96 would be sufficient for detecting a medium-size effect, $f = 0.29$, with 80% power and $\alpha = .05$ for an omnibus one-way ANOVA.

Results

Out of the possible maximum of 1782 responses, 21 were missing (1.18%) because participants named fewer than three personalities or because the personalities could not be identified (e.g., only a last name was provided that could not be related to a specific individual). In the generic masculine condition, seven responses, accounting for 0.83% of responses, were missing. In the gender star condition, 14 responses, accounting for 1.47% of responses, were missing.

Table 2 provides the descriptive statistics for the outcomes of the current study, broken down by linguistic form and participant gender. The "categories combined" row provides information on the percentage of nonmasculine exemplars that are given for all the separate categories (politician, actor, author etc.) combined, the separate rows provide information for the specific categories that were part of the survey. Percentage scores instead of sum scores are used because of the missing data for some participants. Values indicate the percentage of nonmasculine exemplars that were provided in each condition. Given that the gender star was explicitly developed to go beyond the binary gender division, any responses that referred to nonmasculine exemplars were considered to belong to the nonmasculine category, and, if a sufficient number of nonfemale exemplars had been mentioned, it would have been possible to assess them as a separate category. However, in practice, in all but one case (Miley Cyrus, who identifies as nonbinary), participants only provided names of those who identify as either

Table 2. *Descriptive Statistics Demonstrating the Percentage of Nonmasculine Exemplars per Condition*

	GM			GS		
	Female (<i>n</i> = 31)	Male (<i>n</i> = 16)	Overall (<i>n</i> = 47)	Female (<i>n</i> = 36)	Male (<i>n</i> = 16)	Overall (<i>n</i> = 52)
Politician	38.7	27.1	34.8	41.7	33.3	39.1
Actor	34.4	8.3	25.5	38.9	29.2	35.9
Author	50.0	31.3	43.6	50.9	29.2	44.2
Athlete	18.3	4.2	13.5	24.1	3.7	17.8
Singer	27.4	18.8	24.5	66.7	24.5	53.7
TV-host	21.5	19.8	20.9	34.7	16.7	29.2
Categories combined	31.4	18.3	26.9	43.0	22.1	36.5

Note. GM = generic masculine, GS = gender star, Female = female participants, Male = male participants, Overall = male and female participants combined, *n* = sample size.

men or women, at least in terms of publicly available knowledge (as assessed via internet sites that provide information on the gender status of famous people, such as the *Nichtbinär-Wiki*, nonbinary wiki, and targeted internet searches of individuals that were mentioned by participants)³. The full list of names that participants provided, as well as all of the data, is available as supplementary material⁴. In the rest of the analysis, the focus is thus on male and female exemplars.

Table 2 suggests that more female exemplars were provided in the gender star condition than in the generic masculine condition (the values in the generic masculine cells were nearly always lower than the corresponding ones for the gender star condition; the only exceptions to this is regarding authors, athletes, and TV hosts for male participants). Furthermore, female participants seemed to provide more female exemplars than male participants (female participants had a higher percentage of female exemplars for all individual categories and when the categories were combined).

As stated above, although initially, the current study aimed to analyze the role of participant gender as a variable, the final sample that was derived was very skewed (only around a third of each group consisted of participants who identified as male). A two-way ANOVA that assessed the effects of linguistic form (generic masculine vs. gender star) and participant gender (male vs. female) on the percentage of female exemplars that were listed is thus provided for completeness' sake, but the imbalance in the sample makes its interpretation very tentative. Thus, our primary analysis only takes the effect of linguistic form into account. Note that our interest was not to investigate each category separately (and that this kind of investigation would require a much larger sample size), so a combined score was used for both analyses in order to assess to what extent exposure to a specific linguistic

3 Of course, it is possible that individuals were listed who in actual fact would not identify themselves as men or women, but if this knowledge is not publicly available, it is also not likely to have affected participants' responses.

4 https://osf.io/x7sr3/?view_only=1d8e8582ee5948a198bd65bbef466f2a

form would affect the availability of female exemplars in a general sense. This one-way ANOVA demonstrates a significant effect of linguistic form, $F(1, 97) = 10.15$, $p = .002$, $\eta^2 = .10$: participants provided more female exemplars in the gender star condition as compared to the generic masculine condition.

When participant gender was added as a variable (which, due to sample imbalance, can only be interpreted as tentative), no evidence for an interaction effect between participant gender and linguistic form was obtained, $F(1, 95) = 2.09$, $p = .15$, $\eta^2 = .02$), but it does suggest the presence of a main effect of both linguistic form ($p = .006$; $\eta^2 = .08$) and participant gender ($p < .001$, $\eta^2 = .29$). More specifically, more female exemplars were provided for participants in the gender star condition as compared to the generic masculine condition, regardless of participant gender, and female participants mentioned more female exemplars than male participants, regardless of linguistic form.

Discussion

The finding that generic masculine forms lead to a lower mental availability of women as compared to a gender-inclusive alternative such as the gender star is in line with previous findings that investigated older gender-inclusive alternatives (e.g., Braun et al., 1998; Stahlberg & Sczesny, 2001; Gabriel & Mellenberger, 2004) as well as with newer studies that investigated the gender star form (Keith et al., 2022; Schunack & Binanzer, 2022). The current study thus supports the idea that the generic use of the masculine form leads to a masculine cognitive bias. Evidently, when categories are marked for masculine gender, participants are more likely to recall male exemplars than nonmasculine ones. Thus, use of gender-inclusive alternatives seems to reduce the masculine cognitive bias that is evident when the generic masculine form is employed. In line with Gabriel and Mellenberger (2004), this finding suggests that there are processing differences associated with the forms under investigation. Whereas the generic masculine is likely to be processed in a male-biased way (see also Braun et al., 2005 and Keith et al., 2022), alternative linguistic forms with an inclusive meaning (paired forms, capital-I, gender star, etc.) may be associated with more extensive reflection, thereby increasing the salience of nonmasculine exemplars. A related question that derives from newer findings is whether the gender star could actually lead to a feminine bias, as suggested by Körner et al. (2022). However, in the current study, there was no evidence to suggest that this was the case (for most categories, masculine exemplars were still provided in the majority of cases).

Thus, while the gender star form seemed to enhance the mental availability of women, it did not lead to an equal representation of the genders. An ideal generic form (as an alternative to the generic masculine) would not overrepresent one category to the exclusion of others, but, clearly, other factors, such as context, people's knowledge of persons, and the actual availability of personalities also influence the likelihood of participants reporting nonmasculine exemplars. This

is also demonstrated in the present study. Indeed, for some categories, the gender star form yielded an almost equal number of female and male personalities (e.g., singer: 54% female personalities, author: 44% female personalities), while for other categories, such as athletes, there was a large discrepancy between the share of female (18%) and male (82%) exemplars. These differences may stem not from a relative underrepresentation, but from an absolute underrepresentation of those who do not identify as men in the category, that is, the actual availability of nonmasculine exemplars in a category. For instance, even though in quantitative terms, women are not underrepresented in professional sports, they are drastically underrepresented in the media (see, e.g., Dürr, 2021; Fink, 2015). Due to this underrepresentation, female athletes are less well known, and hence, less salient and mentally available. Moreover, sports are traditionally characterized as a male domain (Messner, 2011), which may have an impact on which exemplars are associated with the category athletes. Thus, salience and gender-stereotypes with respect to the categories chosen might explain why even when people are exposed to the gender star, the number of female exemplars is relatively low, especially in certain categories. Likely then, the effect of the gender star varies depending on the degree of representation of nonmasculine genders in a particular category and the gender-stereotypes that are associated with that category. Both are issues that deserve more attention in future research.

Thus, the main effect of linguistic form that was found in the current study suggests that the gender star leads to higher mental availability of female exemplars as compared to the generic masculine form (although there may be differences in the strength of this effect depending on the particular category that is investigated). The data also offer some suggestion that there was a main effect of participant gender, although, as stated above, this outcome is tentative due to the imbalance of the sample in terms of participant gender. Regardless of linguistic form, female exemplars occurred more often in the responses of female participants as compared to male participants. Although this particular finding should be interpreted with caution, it is in line with findings from previous studies (Stahlberg & Sczesny, 2001; Stahlberg et al., 2001; Keith et al., 2022). People may perceive their own gender category to be more salient, which may entail that women are more inclined than men to come up with female exemplars (Stahlberg et al., 2001). A related perspective was voiced by Stahlberg and Sczesny (2001). They suggested that in-group favoritism is relevant in explaining the effect of participant gender: people tend to mentally represent others from an egocentric perspective, thereby including their own gender category as the baseline, a phenomenon they refer to as "gendercentrism." Similarly, Gabriel and Mellenberger (2004) assumed that male participants, driven by gendercentrism, misinterpreted the generic masculine as a specific masculine, and thus first thought of male exemplars. This effect may be further strengthened if we assume that women usually reflect more on masculine forms than men, given that for women, it is more relevant to assess whether a masculine form is used in a specific or a generic way so that they

can determine whether they are addressed by it or not (Gabriel & Mellenberger, 2004; Stahlberg & Sczesny, 2001).

Another aspect that might play a role in this regard is the attitude of women and men towards gender-inclusive language. Previous research has established a link between sexist attitudes, attitudes to gender-inclusive language, and actual language use (e.g., Koeser & Sczesny, 2014; Sczesny et al., 2015). Some studies concluded that more favorable attitudes towards gender-inclusive language are associated with more frequent use of gender-inclusive language (e.g., Sarasin et al., 2012; Prentice, 1994). If people frequently use gender-inclusive language and are familiar with it, this might have an impact on how they process gender-inclusive language when they are exposed to it. In other words, people who frequently use the gender star form themselves might be more inclined to interpret it in a nonmasculine-biased way.

Limitations of the Current Study

Although the findings of the current study support the idea that the gender star is effective in enhancing the mental availability of female exemplars and there is some tentative evidence to suggest that the availability of female exemplars is higher for female participants, there are several limitations that should be taken into consideration. First, the gender of the participants of the experiment was spread unequally, which resulted in a smaller sample of male participants, so the main effect of participant gender that was found in the analysis that was originally intended should be interpreted with caution. It is also possible that a more equal sample would demonstrate the existence of an interaction effect, with use of the gender star proving to be particularly effective in enhancing the availability of female exemplars for female participants.

A second aspect that might have affected the results relates to the readability of the gender star. As mentioned before, some critics claim that it is difficult to process (see Sarasin et al., 2012; Gabriel et al., 2018 for a discussion of this criticism), which might negatively impact participants who are exposed to this form. On the other hand, Friedrich et al. (2021) demonstrated a positive effect on text comprehensibility when plural gender star forms are used. Given that this is the form that participants were exposed to, readability issues likely did not affect the outcomes of the current study, although this issue is in need of further clarification.

Third, how exactly the results from the current study relate to everyday life is not clear. The gender star seems to enhance the availability of female exemplars in a rather contrived experimental context, but whether it has the same effect on people when they encounter these forms in their daily lives is unknown. Moreover, the current study did not investigate participants' own use of gender-inclusive language or assess their attitudes towards this kind of language. Thus, it may be the case that these factors also play a role in determining the mental availability of nonmasculine exemplars. Similarly, generational differences may also play a

role, as younger participants may respond differently to the various forms than older speakers (e.g., Switzer, 1990, suggests that adolescents may demonstrate less masculine bias in response to the generic use of masculine forms than adults). However, as participants were not recruited with this factor in mind (more than half of the participants were 26 years old or younger), an investigation of this factor was beyond the scope of the current study.

Moreover, given that, in all but one case, participants only mentioned exemplars who, as far as publicly available information goes, identify as men or women, the current study cannot provide information on whether the gender star form also enhances the mental availability of those with other gender identifications. Perhaps the fact that hardly any personalities with other genders were mentioned is due to the actual lack of availability of these exemplars, but it is also possible that while the gender star form does enhance the mental availability of female exemplars, it is simply not successful in enhancing the mental availability of other genders as well. In order to get a better understanding of this issue, it is likely that alternative methodologies need to be developed that would allow for a more targeted investigation of this aspect.

Furthermore, it should be noted that the current study only investigated one specific form of gender-inclusive language (the gender star) and only focused on its use in German, so it cannot necessarily be generalized to other gender-inclusive language forms or to other languages (which have their own innovations in terms of gender-inclusive language). Thus, future research could consider whether comparable effects are obtained for other gender-inclusive forms in German and similar gender-inclusive forms in other languages as well as taking into account the effect of age and participants' attitudes towards gender-inclusive language. Furthermore, additional investigation of how the absolute representation of exemplars with female and other nonmasculine gender identifications plays a role in determining their mental availability would also be relevant. Most importantly, given the fact that the gender star is supposed to also address people who do not identify as men or women, its effectiveness in fulfilling this role should receive more attention in future studies.

Despite these limitations, the current study adds to existing research by supporting the notion that generic use of masculine forms predominantly evokes masculine representations and thus leads to a masculine cognitive bias. Use of a relatively recent alternative form, the gender star, seems to enhance the mental availability of female exemplars, although the prominence of other genders did not seem to be affected by exposure to this form. For German, then, the gender star form is a valuable alternative to the generic use of the masculine form. These findings support the position of advocates of gender-inclusive language and show that it is not ineffective, as was claimed by some critics. This debate has certainly not come to an end, and language should be acknowledged as a vehicle for societal change in favor of gender equality, which highlights the relevance of further research in this field.

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Conflict of Interest Disclosure

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Research Ethics Statement

Institutional ethical approval for the study was granted by the Leiden University Centre for Linguistics. The research was conducted in concordance with the APA Ethical Principles and Code of Conduct. All data was obtained via an anonymous online survey; only basic demographic information was collected. Participants were asked to provide their consent at the start of the study and were asked to reaffirm their consent when they had reached the end of the study. Data from participants who did not provide consent at both the beginning and the end of the study was immediately discarded.

Data Availability Statement

The data has been made publicly available via the Open Science Framework: https://osf.io/x7sr3/?view_only=1d8e8582ee5948a198bd65bbef466f2a

Authorship Details

Pia Kurz: research concept and design, collection and/or assembly of data, data analysis and interpretation, writing the article. Hannah De Mulder: data analysis and interpretation, writing the article, critical revision of the article.

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Appendix

Participant Briefing

Liebe Teilnehmende,

Vielen Dank für Ihr Interesse an dieser Studie. Das Thema der Studie ist die Popularität von Persönlichkeiten des öffentlichen Lebens aus verschiedenen Bereichen. Die Studie richtet sich an Teilnehmende deren Muttersprache Deutsch ist. Sie besteht aus einem Fragebogen mit 6 Fragen, deren Beantwortung nicht viel Zeit in Anspruch nimmt.

Dear participants [those who participate],

Thank you for your interest in this study. The topic of investigation is the popularity of public figures from different domains. The study is targeted at participants [those who participate] whose native language is German. It consists of a questionnaire with 6 questions, which do not require much time to be answered.

Instructions

Die folgenden Fragen beziehen sich auf Ihnen bekannte Persönlichkeiten des öffentlichen Lebens. Pro Frage, nennen Sie bitte die ersten 3 Personen, die Ihnen einfallen. Die Personen können innerhalb Deutschlands oder international bekannt sein. Bitte nennen sie pro Frage genau 3 Personen.

The following questions regard public figures that are known to you. For each question, please name the first 3 personalities that come to mind. These people can be known in Germany or internationally. Please name exactly three personalities per question.

Survey Questions

Version GM: Generic masculine

1. Bitte nennen Sie drei Politiker.
2. Bitte nennen Sie drei Schauspieler.
3. Bitte nennen Sie drei Autoren.
4. Bitte nennen Sie drei Sportler.
5. Bitte nennen Sie drei Sänger.
6. Bitte nennen Sie drei TV-Moderatoren.

English: please name three politicians/ actors/ authors/ athletes/ singers/ TV-hosts

Version GG: Gender star

1. Bitte nennen Sie drei Politiker*innen.
2. Bitte nennen Sie drei Schauspieler*innen.

3. Bitte nennen Sie drei Autoren*innen.
4. Bitte nennen Sie drei Sportler*innen.
5. Bitte nennen Sie drei Sänger*innen.
6. Bitte nennen Sie drei TV-Moderator*innen.

English: please name three politicians [m/f/d]/ actors [m/f/d]/ authors [m/f/d]/ athletes [m/f/d]/ singers [m/f/d]/ TV-hosts [m/f/d])