Running head: GENERIC INTERPRETATION OF MASCULINE

Generically intended, but specifically interpreted:

When beauticians, musicians and mechanics are all men.

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Abstract

The influence of stereotype and grammatical information (masculine intended as generic) on the representation of gender in language was investigated using a sentence evaluation paradigm. The first sentence introduced a role name (e. g. *The spies came out…*) and the second sentence contained explicit information about the gender of one or more of the characters (e. g. *…one of the women…*). The experiment was conducted in French, German and English. In contrast to English, stereotypicality of role names had no influence on readers' male biased representations in French and German, where interpretations were dominated by the masculinity of the masculine (allegedly) intended as generic.

Key words: Gender stereotypes, Language, Generic Masculine, Gender representation, Language and thought

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When beauticians, musicians and mechanics are all men.

In many gender marked languages, such as German or French, the gender of a character in a text is - in general - explicitly given by the form of the determiner and by the morphological form of the noun. In contrast to English, in which readers of the sentence *The football player had been training very hard* cannot be sure whether it is about a man or a woman, in German or French, the sentence *Die Fussballspielerinnen hatten hart trainiert* or *Les joueuses de football s'étaient entraînées durement* unequivocally signifies that a group of women is referred to. But the situation becomes less obvious if in the German and the French example the feminine form is exchanged for the masculine form. Whereas feminine plural forms refer to women only, masculine plural forms either refer to a group of men (specific use of masculine) or to a group of people of both sexes, to persons of unknown sex, or where the sex is irrelevant (generic use of the masculine)[1]. This is an explicit grammatical rule (Académie Française, 2002; Duden, 2005; Baudino, 2005) and although there exist guidelines on how to avoid the use of the *masculine only* in official announcements, the masculine is still commonly used as a generic in spoken as well as in written language.

As masculine words also have a male-specific meaning, comprehenders have to use contextual information to correctly identify whether a word is used in a specific or generic way. However, proponents of feminist linguistics (e.g., Braun, 1996; Bussmann, 1995; Peyer & Wyss, 1998) express doubt that the masculine form can be used in a way that abstracts from the gender of its referents (i.e., in a generic way) and claim that the ambiguity about whether a word is used as a generic or not is usually resolved to women's disadvantage: The use of the masculine plural biases information processing, resulting in a male oriented representation.

The question of whether the use of the masculine as generic results in a gender-neutral

or male-biased representation relates to the classical psychological question of whether language influences cognition (see Hardin & Banaji, 1993). This issue was influenced by the work of Benjamin Lee Whorf and Edward Sapir in the mid 20th century (i.e., the Sapir-Whorf, or Whorfian hypothesis). The main ideas behind this issue are that (a) the structure of our language influences the way we perceive the world (i.e., *linguistic determinism*), and (b) since there are different languages in the world, there must be different ways to perceive the world (i.e., *linguistic relativism*). Although research on this topic has been declining in the past twenty years, recent experimental studies have reawakened interest in this area (Li & Gleitman, 2002). Most importantly, the strong position that language entirely determines perception has given way to a weaker argument stating that language influences processes that are encoded through language, for example, spatial reasoning (Levinson, Kita, Haun & Rasch, 2002). Although Levinson et al.'s (2002) arguments were questioned by Li and Gleitman (2002), they showed that different ways of verbally describing spatial properties (e.g., using different reference frames) lead to different perceptions of space. In terms of grammatical properties and their influence on representation, Flaherty (2001) introduced the idea that gender systems influence the way language users perceive the world. In her second experiment, Flaherty (2001) asked native-English-speaking and native-Spanish-speaking participants of different ages (5- to 7-year-olds, 8- to 10-year-olds and adults) to assign gender and to put typical male or female names to different objects presented in cartoons. Older Spanish participants (8- to 10-year-olds and adults) were inclined to assign gender and names according to grammatical gender, whereas older English participants assigned gender according to some specific perceived gender attributes as outlined by the participants in the first Experiment. Both 5- to 7-year-old English and Spanish participants assigned gender according to their own sex more than older participants. In the third Experiment, older (8- to 10-year-old and adult) English and Spanish participants had to assign female and male

attributes to animate and inanimate objects. English participants assigned attributes in the same way as they assigned gender in Experiment 2, and Spanish participants' responses were strongly influenced by the grammatical gender of the nouns. Flaherty's (2001) main conclusion was that grammatical gender enabled Spanish participants to assign gender (Experiment 2) and assign attributes (Experiment 3) according to grammatical gender. In Experiment 2, this was the case mainly for older participants (8- year olds and above), as younger participants (5- to 7- year olds) had not yet fully acquired the principles of grammatical gender. In the same vein, the question about the effects of the masculine plural can be stated in terms of whether (a) the use of the masculine plural leads to a *gender-open* representation (i.e. no gender category is activated), (b) to a *gender-spread* (i.e. both gender categories are activated) representation, or whether (c) the use of the masculine plural leads to heightened cognitive accessibility of men only, which would strongly support the view that language influences the way we perceive and represent the world.

Most empirical research on the use of the masculine (intended as generic) in German seems to support the second view: Presenting texts that contain either the masculine plural or other linguistic forms, such as gender-balanced forms (i.e., the joint use of the masculine and feminine, e.g., *Zuschauer und Zuschauerinnen*; *des spectateurs et des spectatrices*) or gender-neutral forms (e.g., *Personen*; *des personnes*), in general results in the masculine plural condition being more strongly associated with male persons compared to other linguistic forms (Braun, Gottburgsen, Sczesny & Stahlberg, 1998; Gabriel & Mellenberger, 2004; Heise, 2000, 2003; Irmen & Köhncke 1996; Rothmund & Scheele, 2004; Scheele & Gauler, 1993; Stahlberg & Sczesny, 2001; Stahlberg, Sczesny & Braun, 2001). In this paper, however, we focus on the representation of gender while participants are reading role names written in the masculine plural form.

The strongest *masculine bias* position states that grammatical gender is initially

encoded and thus, the use of the masculine plural always brings about male-biased associations no matter whether the masculine plural is intended in a specific or a generic way. This notion of gender representations being dominated by grammatical features is corroborated by research in French (Colé & Segui, 1994) and in Italian (Bates, Devescovi, Hernandez & Pizzamiglio, 1996) showing that morphological gender plays an inhibitory role when subsequent input is gender incongruent. For example, in Colé and Segui (1994), participants had more trouble (i.e. took longer) in processing (i.e., double lexical decision task) pairs of words when they constituted a plausible semantic structure but were gender incongruent (e.g., *jolie – chat*) then when they were gender congruent (e.g., *joli – chat*). In a similar vein, and as mentioned earlier, Flaherty (2001) found that (except for 5- to 7- year olds) there was a strong correlation in English between assigned gender and assigned attributes, whereas in Spanish, gender was predominantly assigned according to the grammatical gender of the referent noun. But with reference to the generic interpretation of the masculine in German, the empirical results reported in four different publications (Braun et al., 1998; Irmen & Roßberg, 2004; Rothermund, 1998; Rothmund & Scheele, 2004) question the generality of that notion: As will be described in what follows, non-linguistic factors, such as gender-related context-information, might influence the mental representation of the gender of characters in texts, and so might linguistic factors other than masculine morphology, such as pronouns and determiners. In the following sections we first present research on the influence of context information (stereotype information) and then research on the influence of linguistic factors. The experiment reported in this paper builds on these prior findings, exploring the interaction of both linguistic and non-linguistic factors on readers' gender representation.

The Influence of Stereotype Information

Carreiras, Garnham, Oakhill and Cain (1996) conducted a series of experiments in

English and Spanish and found that not only do participants build a representation of gender during reading, but they do so by relying on stereotype information. In their study, English participants (Experiment 1) had more trouble processing sentences with pronouns that mismatched the gender-stereotype introduced by a role name. In Spanish (Experiments 2-4), participants had more trouble processing role names when their morphological marking or their article mismatched the stereotype of the name. Garnham, Oakhill, and Reynolds (2002) found similar evidence. In their studies using a sentence evaluation paradigm, in which participants have to judge whether a sentence is a good continuation of the preceding text, they found that participants had most trouble with, and took longer to respond to, sentences that were incongruent with stereotypical gender of the role names in the preceding text (see also Duffy & Keir, 2004; Kennison & Trofe, 2003; Sturt, 2003). In a later study Oakhill, Garnham, and Reynolds (2005) found that participants were strongly inclined to form a representation that was biased by stereotypic gender information. Indeed, even when the experimenters attempted to suppress participants' use of such information, by encouraging them to respond strategically (as opposed to automatically), the participants' mental representation of gender was still stereotyped.

The proportion of members of a group judged to be male or female is also influenced by stereotypes. Braun et al. (1998) had participants read a German text (about 120 words) that was written like a newspaper report on a scientific congress (Experiment 1) or on a meeting of a sports association (Experiment 2). The task was to judge the proportion of women (or men) attending the event. By using the masculine plural in both experiments, they found that the expected proportion of women was higher if a female context was established (congress of nutritional scientists vs. geo-physicists; meeting of gymnasts vs. hockey players). In a study by Rothmund and Scheele (2004) participants read a German text (900 words) on public baths written like an article from a travel guide. Towards the end, participants had to

complete a sentence about conversations among the bathers, choosing among several given alternatives. The alternatives referred to female related topics, to male related topics or to topics that were not gender associated. In the first experiment the text was on thermal spas in Budapest (male-related context), in the second experiment it was on fun-baths at the isle of Sylt (family-related context). The proportion of male-related completions dropped from 61% in the first experiment to 47% in the second.

Stereotype bias in German was also shown by Irmen and Roßberg (2004, Exp. 1). Participants read sentences about social groups denoted by grammatically masculine nouns with different stereotypicality (Example sentence, containing a stereotypical male noun: *Mechanics have to be able to handle tools*.). A second sentence contained a reference to that social group, identifying the group members as female, male, or neither (Example sentence, referring to women: *That is why they should not have long fingernails*.) Second-sentence reading times were measured and compared to baseline reading times provided by a control group for the main task's second sentences. The experiment revealed that if the first sentence contained a grammatically masculine plural noun referring to a stereotypically feminine group (e.g., telephonists) reading time for the second sentence was not influenced by the gender-related information and did not differ from the baseline reading time. But in the two other conditions (first sentence containing a grammatically masculine plural noun referring to a stereotypically masculine group, e.g., foresters, or a stereotypically neutral group, e.g., artists) male-related and neutral information was read faster than female related information and was read faster than in the baseline condition. Surprisingly, this latter effect was more pronounced in the stereotypically neutral condition than in the stereotypically male condition. The result that the combination of grammatical male gender and stereotypically female gender led to a gender-spread representation (i.e., not facilitating any of the continuation types) suggests either that the grammatical gender (masculine) does not play a dominant role in forming a

gender representation or that the masculine form may be in certain instances understood in a generic way. This study raised several problematic issues that we address in this paper. First, the surprising result that there was a stronger effect for the stereotypically neutral condition (which has not been found in previous research) could hint at a problem with how they pretested the stereotypicality of the role names. In their pretest they asked 30 participants to rate the gender stereotypicality on a rating-scale. In the present paper, we based our choice of role names on materials normed by Gabriel, Gygax, Sarrasin, Garnham and Oakhill (in press) who asked participants to estimate to what extend the groups are *actually* (and not "typically") made up of women or men. Second, in their study, Irmen and Roßberg measured reading times of sentences that referred to only one gender (e.g. exclusively females: *They then followed their female intuition,* exclusively males*: (…) support from their wives*). The problem with such exclusive target sentences is that they only test whether the participants, when reading the sentences, agree that *the group can be made up only of women or only of men*. In our paper, we were interested in the ability of participants to maintain an open gender representation, i.e., the group (e.g., *politicians*, *authors* or *nurses*) can comprise *both* men and women, which reflects more closely the idea of a generic interpretation of the masculine plural.

<center>The Influence of Determiners and Pronouns</center>

Rothermund (1998) investigated the mental representation of short German texts using a paradigm developed by McKoon and Ratcliff (1986). The texts contained as their subjects a specific male or female designator (e.g., *Herr Almstadt* or *Frau Almstadt*, control condition) or a masculine intended as generic phrase in either the singular or the plural (e.g., *Ein Lehrer* or *Lehrer*). Two test-phrases were constructed for each text, which did not appear in the text but reflected a masculine or feminine understanding of the text. Gender-specific associations were assessed by measuring the time it took participants to reject the masculine (e.g., *shaving*)

or feminine (e.g., *making up one's face*) distractor in a recognition task after reading the text. In this study, the pattern of gender-specific associations for texts containing a masculine intended as generic surprisingly depended on the grammatical number of the texts. Reading a scenario containing a singular masculine intended as generic increased rejection times for the masculine test-phrases, indicating a male bias, while reading a scenario with a masculine intended as generic in the plural increased rejection times for the feminine test-phrases, indicating a female bias.

A plausible explanation for this somewhat puzzling effect is that in German, determiners and pronouns in the plural (e.g., *die Wissenschaftler*, sie, ihre; in English, the scientists, they, their) are identical to the feminine singular determiner and pronoun (e.g., *die Wissenschaftlerin*, sie, ihre; in English, the (female) scientist, she, her). Thus, in German, the determiner *die*, used as a neutral plural determiner, could be read as the feminine singular *die*. This confusion is not possible in French, as the neutral plural determiner *les* is used only in the plural form. In this paper, we addressed this issue of gender-marked versus non gender-marked determiners.

Interplay of Linguistic and Non-Linguistic Factors

Most research supports the notion that the masculine plural in German is strongly associated with representation of male persons, suggesting the grammatical (male) gender to be of central importance in building a mental representation. But so far research has only partly elucidated the interaction between stereotyping and the masculine bias of the generically intended masculine. The experiments by Rothermund (1998) suggested that the occurrence of determiners and pronouns is as important as the gender of the noun, whereas Irmen and Roßberg (2004) and Braun et al. (1998) hinted at the importance of stereotypes in building gender representations (as in English). In this paper, we investigated these issues by directly assessing the interaction between stereotype and masculine biases in German and

French, which we compared with English that should establish a baseline for a stereotype bias only, as it is difficult or impossible to construct a relevant control condition in German and French in which stereotype biases act alone, without the effects of morphological gender marking. There are three possible ways in which stereotype and grammatical information might interact. First, grammatical information might completely override stereotype information. In this case, role names in French or German presented in the masculine plural should result in the construction of a male biased representation of gender whereas role names in English should result in a stereotypical representation of gender, as in Carreiras et al. (1996) and Garnham et al. (2002). Such a result would be considered as a strong support to the Whorfian hypothesis suggesting that language influences cognition. It would provide evidence that although role names are characterised by specific gender stereotypes, the grammatical form in which they appear influences their representation. Second, stereotype information may completely override grammatical information. In this case, there should be no differences in gender representations among the three languages, as they should all reflect stereotype information, which would be inconsistent with the Whorfian hypothesis. Third and finally, both types of information may influence the construction of gender representations. In this case, the only true gender-open representation would be for stereotypical female role names in the masculine plural form in French and German, as the two influences should cancel each other out, and for stereotypically neutral role names in English.

If grammatical information overrides stereotype information, it is also possible, as suggested by Rothermund (1998), that the use of the determiner *die* in German lessens the impact of the masculine plural form of the role name. This assumption reflects the previously discussed issue of the sameness in form in German of the plural and the feminine singular, *die*.

Method

Participants

English sample. Thirty-six students from the University of Sussex took part in this experiment. Each participant was paid 4 pounds. One participant had to be removed from the analysis, as he did not understand the instructions.

French sample. Thirty-six students from the University of Fribourg took part in this experiment for course credits. One participant had to be removed from the analysis, as she did not understand the instructions.

German sample. Thirty-six students from the University of Bern took part in this experiment for course credits.

Materials and Design

In each language, thirty-six experimental passages were constructed. Each passage comprised two sentences. The first sentence introduced a group of people using a role name in the plural form, and the second sentence specified that there were some (but not exclusively) men or women in the group (i.e., it provided a partial constraint on the sex of the people in the group). An example of a passage is (1a) followed by (1b):

(1a) The social workers were walking through the station.

(1b) Since sunny weather was forecast several of the women weren't wearing a coat.

In all languages, there were twelve stereotypically female role names, twelve stereotypically male and twelve neutral. The roles names were chosen from a norming study conducted by Gabriel, Gygax, Sarrasin, Garnham and Oakhill (in press). In this norming study (conducted in French, German and English), participants were presented with 126 role names, for which they had to indicate the percentage of men and women they thought occupy these roles. We selected the most female stereotyped role names (in French, German and English) and matched them with similarly strong male stereotyped role names and neutral

stereotypes for our study.

The chosen stereotypes are shown in Table 1. In the example above, the first sentence presents a female stereotyped role name (1a) followed by a second sentence mentioning women (1b).

For the French and German experiments, these sentences were translated from English. The only difference in French and German was that the role names were in the *masculine plural* form, which is, as a grammatical rule, not to be interpreted as gender marked but as *generic*. For the above example, the corresponding pairs in French (2a & 2b) and German (3a & 3b) are:

(2a) Les assistants sociaux marchaient dans la gare.

(2b) Du beau temps étant prévu plusieurs femmes n'avaient pas de veste.

(3a) Die Sozialarbeiter liefen durch den Bahnhof.

(3b) Wegen der schönen Wetterprognose trugen mehrere der Frauen keine Jacke.

The detailed content of the first sentences differed, but because it was difficult to completely vary the first sentences, we used six different content types. The first sentence mentioned a group of people either (1) coming out of a place, (2) waiting somewhere, (3) going into a place, (4) being somewhere, (5) walking or (6) going across a place. For each content type, there were six specific contents, and six role names were randomly assigned to each of six content types. There were, for example, six first sentences in which the protagonists were walking, in one of which the protagonists were walking through the station.

The second sentences differed first and most importantly in their mention of *women* or *men*. The second sentences qualified the "men" or the "women" with one of *some of the*, *most of the*, *several of the*, *few of the*, *one of the* or *the majority of the*.

Each participant saw eighteen continuations about *women*, six following sentences with a female stereotyped role name, six following sentences with a neutral stereotyped role

name and six following sentences with a male stereotyped role name, and eighteen about *men*.
Furthermore, there were three types of content, one based on different emotions (angry, sad,
happy, & joyful), one based on different weather conditions (sunny, put some sun cream on,
cloudy, & need an umbrella) and one based on different actions (go, have a break, leave, &
rest).

We conducted a pilot study in French ($N = 47$: 24 male and 23 female) and German ($N = 52$: 21 male and 31 female) to ensure that the passages would be interpreted as intended,
with the women mentioned in the second sentence being taken as a proper subset of the social
workers (or other group) mentioned in the first sentence. If this interpretation is not made, and
the women are taken to be coextensive with the social workers, a negative judgement about
the passage may simply reflect the fact that, if the social workers are all women, they should
be referred to using a feminine plural noun phrase, and if a masculine plural is used the
passage is incoherent. Participants were asked to indicate whether for example in *"The group
(in French Le groupe and in German Die Gruppe) came out of the train. Some of the women
were wearing a coat."* the group (of people) comprises *only men*, both men and women (i.e.,
mixed) or *only women*. Six lists were created to ensure that each block of first sentences
(exchanging the role names by the neutral "the group") was combined with each block of the
continuations. Each participant rated three sentence pairs, resulting in 297 ratings. From these
267 (89.9%) answers were *mixed*, 22 (7.4%) were *only men* (18 in combination with a male
continuation; 4 in combination with a female continuation) and 8 (2.7%) *only women* (6 in
combination with a female continuation, 2 in combination with a male continuation). Taking
together the *only men* and *only women* answers, these were not found to be related to the sex
of respondents (χ^2 ($N = 30$, $df = 1$) = 1.6, $p = .20$) but to the language ($\chi^2(N = 30$, $df = 1$) =
12.7, $p < .001$). Such *exclusive* answers were more often given in German ($f = 25$) than in
French ($f = 5$). Neither the form of the continuation (e.g., *Some of the*) nor the content of the

continuation (e.g., *wearing a coat*) was related to the exclusively male/female answers (all *p*s

> .50). The results of the pilot revealed a low rate of deviations from the intended perception

of the group as being *gender-mixed*. There was a very slight tendency towards a male biased

perception, as the response category *only men* was chosen more often than the category *only*

women. However, as this was merely a very slight tendency, we believe that it was unlikely to

have any subsequent effect. In sum, the vast majority of participants in the pilot study

interpreted the passages as we had intended in that they imposed a non-exclusive

interpretation of the second sentence: i.e. some, but not all, of the people were women, as in

the example above.

In our experiment each participant saw twelve continuations of each type. Across the

experiment, we created six lists to ensure that each role name was equally often followed by

men and *women*, and by sentences portraying different situations. The latter was done to avoid

any *plausibility effect* (i.e., it may be more plausible for *nurses*, for example, to *walk through*

a station than to *put some sun cream on*). Each participant saw one list and hence saw all

possible continuations (3 groups of continuations X 2 gender types), and, across the

experiment, each role name was followed by all possible continuations. The crucial

experimental manipulations were the language in which the study took place (French,

German, English), which varied between participants but within items, the nature of the role

name (female, neutral, male stereotyped), which varied between items, but within

participants, and whether the continuation mentioned men or women (and hence whether it

matched the stereotype, if any, of the role name). This factor varied within both items and

participants.

In all experimental conditions the intended response was *yes* (the second sentence is a

sensible continuation of the first). To ensure that the participants read the passages, 36 filler

texts, requiring *no* answers were constructed. These filler pairs were similar to the

experimental ones (but using different role names), though they were intended to elicit a clear

no answer. An (English) example of such a pair is (4a & 4b):

(4a) The professors were taking a break in the sun.

(4b) Due to the bad weather the majority of the women had an umbrella.

The filler pairs were the same in each list and were randomly interspersed with the

experimental items.

Apparatus

The passages were presented on a Macintosh computer (Power Macintosh 4400 for

German and French, an iMac for English) using the PsyScope Software (Cohen,

MacWhinney, Flatt, & Provost, 1993). Responses were collected using a button box attached

to the computer, which permits millisecond accuracy.

Procedure

The participants were tested individually in a small quiet room. Their task was to read

each passage, presented one sentence at a time, and to decide whether the second sentence

was *a sensible continuation of the first one*. In French and German, we used the terms

continuation possible and *mögliche Fortsetzung,* which we judged as semantically closest to

the English *sensible*. The participants in all languages were asked to make a prompt decision,

based on their first impression and not on a prolonged reflection. A prompt (i.e., **ready?**,

Prêt?, **Bereit?**) appeared on the screen before each passage. The participants pressed

the yes button to make the first sentence appear, and then pressed the yes button again to

make the second sentence (target sentence) appear. They then had to make a prompt decision

by pressing either the *yes* button (i.e., *I think it's a sensible continuation*) or the *no* button

(i.e., *I don't think it's a sensible continuation*). Participants were asked to keep the index

finger of their dominant hand on the *yes* button and the index finger of their non-dominant

hand on the *no* button.

Before the experiment, there was a trial session with twelve passages, to familiarize the participants with the procedure.

Results

We recorded the participants' responses (i.e., *yes* or *no*) and the time it took them to respond. Both measures were intended to evaluate the ease of integration of the information in the target sentence. In essence, if participants have trouble integrating that information, they are more likely to respond *no*. In addition, if they respond *yes*, it should take them longer to respond if they have trouble integrating the information. Results are presented for the English sample first. The rationale behind this is that the English establishes both, a control for the manipulation of the stereotypicality of the role names as well as a baseline for the stereotype bias. Ceteris paribus, variations in the French and German results can be ascribed to influences of the grammar.

Proportion of positive judgements

The proportion of positive judgements for the experimental passages is shown in Table 2. All the data were analysed using ANOVAs considering first participants and then items as random effects.

English experiment. There was neither a main effect of Continuation (men vs. women mentioned) (F_1 (1, 34) < 1; F_2 (1, 33) < 1) nor a main effect of Stereotype (F_1 (2, 68) = 1.44, p>.05; F_2 (2, 33) = 1.11, p>.05), but there was an interaction between the two variables (F_1 (2, 68) = 15.81, p<.05; F_2 (2, 33) = 20.19, p<.05). As shown in Table 2, English participants' responses varied according to the stereotypicality of the role names. After sentences containing female stereotyped role names, there were more positive judgements when the second sentence mentioned *women* (.88) than when it mentioned *men* (.65). Conversely, after sentences containing male stereotyped role names, there were more positive judgements when the second sentence mentioned *men* (.85) than when it mentioned *women* (.66). After

sentences containing neutral role names, there was no difference between second sentences

mentioning *women* (.81) and second sentences mentioning *men* (.81).

French experiment. There was a significant main effect of Continuation, with the *men*

continuations showing a higher proportion of *yes* answers ($M = .78$) than the *women*

continuations ($M = .58$) (F_1 (1, 34) = 40.36, p<.05; F_2 (1, 33) = 42.91, p<.05). There was no

effect of Stereotype (F_1 (2, 68) < 1; F_2 (2, 33) = 1.20, p>.05), nor an interaction (F_1 (2, 68) =

1.18, p>.05; F_2 (2, 33) < 1). These results indicate that, regardless of the role name's

stereotype, participants were biased towards a male representation.

German experiment. As in French, there was a main effect of Continuation, with more

positive judgements when the continuation sentences mentioned *men* ($M = .69$) than when

they mentioned *women* ($M=.40$) (F_1 (1, 35) = 55.4, p<.05; F_2 (1, 33 = 88.20, p<.05). There

was no main effect of Stereotype (F_1 (2, 70) = 2.25, p>.05; F_2 (2, 33) = 1.45, p>.05), nor an

interaction (F_1 (2, 70) < 1; F_2 (2, 33) < 1). As in the French experiment, participants were

strongly biased towards a male representation when presented with role names in the

masculine plural form, even when the role names were stereotypically female. In these results

it is clear that the determiner played no role in establishing a gender representation. This is

further corroborated by the close to significant Continuation (women/men) x Language

(French/German) interaction (F_1 (1, 69) = 3.00, p=.088; F_2 (1, 66) = 4.66, p<.05) when

analyzing the French and the German data together: German speaking participants were even

more likely to produce a male representation when the role names were in the masculine

plural than the French speaking participants, even though the ambiguity of the German article

die might have suggested the opposite effect.

Overall, these results indicate a very strong effect of the masculine (intended as

generic) biasing the participants' gender representation towards a male representation. In the

French and the German speaking samples, stereotypicality had no effect on the representation.

Judgement times

Only response times for positive judgements were analysed. Judgement times that were 2.5 *SD* or more above each participant's mean were replaced by the 2.5 *SD* cut-off (2.44% of French, 1.98% of German, and 1.87% of English times were affected). In addition some participants did not produce any *yes* answers in certain conditions. Such missing values were replaced by condition means (5.45 % of the data). The mean times to make positive judgements are shown in Table 3.

English experiment. There were only small differences in decision times. There was no effect of Continuation (F_1 (1, 34) = 2.33, p>.05; F_2 (1, 33) = 1.89, p>.05), no effect of Stereotype (F_1 (2, 68) < 1; F_2 (2, 33) < 1) and no interaction (F_1 (2, 68) < 1; F_2 (2, 33) = 3.14, p>.05).

French experiment. Although the trends in the results supports the findings for the judgements, there was only a marginally significant main effect of Continuation (with responses to *men* being faster than those to *women*), and only when participants were considered as the random effect (F_1 (1, 34) = 4.01, p = .053, F_2 (1, 33) = 1.16, p>.05). There was no effect of Stereotype (F_1 (2, 68< 1; F_2 (2, 33) < 1) nor any interaction (F_1 (2, 68) = < 1; F_2 (2, 33) < 1).

German experiment. A significant Continuation effect (F_1 (1, 35) = 9.15, p<.05; F_2 (1, 33) = 21.32, p<.05) with responses to *men* being faster than those to *women* fully supported the results found in the judgements. There was neither effect of Stereotype (F_1 (2, 70) < 1; F_2 (2, 33) < 1), nor an interaction (F_1 (2, 70) < 1; F_2 (2, 33) < 1). When the French and the German data were analysed together, there was a main effect of Continuation (F_1 (1, 70) = 12.77, p<.05; F_2 (1, 69) = 12.69, p<.05), further supporting the male biasing effect of the masculine plural form, but no interaction of Continuation and Language, although the judged differences between *women* and *men* continuations in the German sample were numerically

bigger than in the French.

<div align="center">Discussion</div>

In this experiment, conducted in English, French and German, we investigated the interaction between *stereotype* and *masculine* (supposedly *generic*) in the construction of a representation of gender when reading role names (e.g., musicians). In French and German, when a group of people is presented, it is common to use the masculine plural form (e.g., les musicians, die Musiker) but not the feminine form, even if there is a majority of women. This masculine plural form is supposed to result in a gender-open or gender-spread representation. In English, gender marked role names are rare, so gender representations from role names should be influenced mainly by stereotype (i.e., if beauticians are stereotyped as female, reading the role name should lead to a female biased gender representation). As discussed in the Introduction, there are three ways in which stereotype and grammatical information might interact. First, grammatical information may override stereotype information. Second and conversely, stereotype information may override grammatical information. Third and finally, both could influence gender representations.

When no grammatical gender information was available, in English, the mental representation of gender was solely based on stereotype information. But when role names were written in the masculine plural form, the results indicated that grammatical information overrode stereotype information in constructing a mental representation of gender. This override happened both in French and in German. Note that in German, the fact that the determiner *die* is used in both the feminine singular and the plural did not have any impact on the male bias in the representation of the people referred to by the role names.

Three main conclusions can be drawn from this experiment. First, when no mark of gender is provided by role names or their accompanying definite articles, the representation of gender is based on stereotypicality. We can draw this conclusion from our English conditions.

Such a result further supports findings such as those of Carreiras et al. (1996), Garnham et al. (2002) and Oakhill et al. (2005), which suggest that people draw inferences about the gender of people immediately when they encounter a stereotyped role name. Second, when a grammatical mark of gender is provided, the representation of gender is based on that mark of gender, and not on stereotype information. The influence of grammatical features on gender representation has been previously suggested by studies in different languages (e.g., French, Colé & Segui, 1994; Italian, Bates et al., 1996; Spanish, Flaherty, 2001). In a Whorfian framework, such a result provides a strong indication that language influences cognition. Not only for neutral but even for female stereotyped role names, the grammatical form of the role names overrode the stereotypicality. This is not to say that stereotypicality does not influence gender representation, but in the case where grammatical gender is available, such stereotypicality has little influence. As in Flaherty (2001), grammatical gender seemed to provide sufficient information for readers to build their mental representation of gender.

Third, our findings indicate that masculine forms intended as generic are typically not interpreted as such. In this experiment, we demonstrated that the use of the masculine plural does not lead to a gender-open or gender-spread representation, but to a specifically male representation. Put differently, a German phrase such as *die Musiker*, which is ambiguous between a masculine and a generic intended plural is by default interpreted as a masculine plural, and presumably this interpretation would only be changed if there was a specific indication that women were involved and, hence, that the generic interpretation was intended. This finding has critical social implications, especially in relation to the acknowledgement of women in society. We believe that our results show that the so-called generic use of the masculine biases gender representations in a way that is discriminatory to women. This is especially true as French and German newspapers still display some job announcements in the masculine form, therefore, we believe, suggesting that women are not suitable candidates. In

2002, the *Académie Française* deemed it necessary to publish a document stating that the use of the masculine as generic was totally gender-open and that using different grammatical forms was unnecessary[2]. Our findings demonstrate that the *Académie Française* have clearly underestimated the influence of the masculine form in leading readers towards a male representation.

Our results differ from those of Rothermund (1998), Braun et al. (1998) and Irmen and Roßberg (2004, Exp. 1). First we did not find any influence of the determiner *die* in German. If anything, our results suggest that the influence of the masculine form of the role name is stronger in German than in French. Rothermund (1998), who used a different methodology, reported that the pattern of gender-specific associations for texts containing a masculine intended as generic depended on the grammatical number of the phrase. Reading a scenario containing a singular masculine intended as generic increased rejection times for the masculine test-phrases, indicating a male bias, while reading a scenario with a masculine intended as generic in the plural increased rejection times for the feminine test-phrases, indicating a female bias. Based on the author's explanation that this effect originates in the German gender neutral plural determiner *die* having the same form as the feminine determiner, we hypothesized a possible male bias to be weaker in German compared to French, as the gender neutral plural determiner in French is different from the feminine determiner. In contrast, our results suggested a stronger male bias in German than in French. This is not to say that the determiner *die* had no influence, but its influence, if any, was definitely weaker than the masculine bias introduced by the use of a role name written in the masculine plural form.

Second, in contrast to the findings of Braun et al. (1998) and Rothmund and Scheele (2004) stereotypicality had no significant effect in our French and German samples. This might be explained by the aforementioned authors using a different research paradigm. First,

participants read longer texts in which various (neutral and stereotypical) role names were repeated. Second, the dependent variable was the participants' explicit estimate of the gender-composition of the group introduced by the texts. In contrast, our stimuli were shorter and we assessed reactions that were less elaborated and less obviously related to the gender-composition which probably meant that the influence of the stereotypes was not sufficiently strong to interact with the grammatical bias under such experimental conditions.

Two issues already mentioned in the Introduction and Methods sections, deserve attention. First, the decrease in positive judgments in the French and German samples may not, as we inferred, be due to the fact that the role names in the masculine form were taken as mainly representing *men*. Instead, it may be that participants interpreted phrases in the *second* sentences, for example "…some of the women…", as constraining the interpretation of the first sentence to mean that the group *must* be exclusively composed of women, i.e. they interpreted "the women" as coreferential and coextensive with the set of individuals (e.g., "the social workers") introduced in the first sentence. This would mean that in French and German participants had trouble in processing the *second* sentence, and considered it a poor continuation of the first sentence, because a group *exclusively* composed of women should be introduced, in the *first* sentence, by a role name in the feminine form. Thus, the negative judgements would be arising because of a perceived grammatical problem with the texts, not because "the social workers" had been interpreted as a group of men, and that the reference to "women" was unexpected.

Although this kind of interpretation might have occurred, our data, as well as the data from the pilot study mentioned in the Method section, render this possibility unlikely. If individuals interpret female continuations in this sense, it is likely that they do so consistently. If so, the acceptance of female continuations should drop to zero (or close to zero) - at least for some participants. But inspection of our data revealed no such case. Furthermore, in our

pilot study female continuations were only taken to indicate that the group comprised exclusively of women in six instances (4%). This effect is not sufficiently strong to explain the entire continuation effect found in the French and the German sample. Nevertheless, future research might benefit from including measures to assess individual differences that may lead to an inclusive or exclusive interpretation of phrases such as "some of the women".

The second issue refers to the use of English as a comparison language for French and German. A possible criticism of our design is that instead of morphological differences among the three languages we studied other aspects either of the languages themselves or of the cultural backgrounds of the speakers, contributed to the effects we observed. One could for example argue that the "people = male" bias (i.e. the effect that neutral terms have a masculine connotation, Silvera, 1980) is more deeply ingrained in the Swiss compared to the English culture and therefore the Swiss participants would in general have difficulties in responding to the female continuations. Although we are not aware of research showing such cultural differences or displaying other language-related differences, e.g. in the use of the role names employed, we cannot definitely exclude such alternative explanations. However, given the general broad similarities in European cultures, we believe it to be rather unlikely. Note that if this was the case, our norming study (i.e., Gabriel et al., in press, in which participants were asked to rate the perceived percentage of men and women in 120 roles), should have demonstrated a large male bias in the French and German samples, as opposed to our English sample. This was, as shown in Table 1, not the case. Furthermore, it would be difficult to empirically rule out such an alternative explanation, as neither German nor French allows for a "true" gender-neutral control condition: all role-names, even those that do not have a feminine specific form such as *people* (German: Personen, French: des personnes) or *human-beings* (German: Menschen, French: des hommes) nevertheless have a grammatical gender.

Although our sentence evaluation paradigm cannot truly distinguish between

automatic and *strategic* processes, previous research has suggested that automatic processes are more appropriate for explaining the construction of representations of gender (e.g., Garnham et al., 2002). Garnham et al. (2002) presented people with sentences that did not contain any morphosyntactic cues to gender. Their sentences comprised elements that could be defined as *pieces of probabilistic information* (Garnham et al., 2002; p.445) about the gender of the characters. Their results indicated that people nevertheless constructed a mental representation of gender. Oakhill et al.'s (2005) results also suggest an automatic element to the representation of stereotyped gender information, since those authors found that such information was difficult to suppress, even when it was detrimental to performance. Our English results corroborated their findings, suggesting that our participants' representation processes were similar. Nevertheless, whether our participants behaved strategically or automatically, our results still provide evidence that people have difficulty in mapping *women* onto role names in the masculine plural form, regardless of the role name's stereotypicality. Therefore, our main point about the biasing influence of the masculine form holds true, whether the processes under investigation were automatic or not.

To conclude, we believe that our results on the overriding effect of grammar over stereotypicality, taken together with previous research on the automatic representation of gender, demonstrate that people construct representations of gender, and that they base their representations on grammar when available, and on stereotype information when grammatical cues are not available. Future research, however, might investigate the influence of other variables (e.g., additional gender-related context information or additional gender-marked grammatical features) that could moderate the strong masculine bias imposed by the masculine form in French and German.

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Author Note

Footnotes

[1]Note that the masculine singular (e.g., *le joueur de football*) does not unequivocally refer to a man either. The masculine singular form *le joueur de football*, for example, refers (supposedly) to *any person who plays football*, as well as to a male player. In this paper, we however only focused on the masculine plural form, as the plural form clearly refers to a *group* of people.

[2]The *Académie Française* also stated that using two grammatical forms for a role name (*les musiciens et musiciennes*) rendered the text difficult to read. Gygax and Gesto (in press) have replied by showing that although the first encounters of such terms does slow down reading (taking into account sentence length), there is a very fast habituation effect, leading to a perfectly normal reading.

Table 1

Role names chosen from Gabriel et al. (in press) along with the proportion of men evaluated

by each language participant group.

English	%	German	%	French	%
		Male Stereotypes			
Spies	73	Spione	67	Espions	74
Golfers	73	Golfspieler	68	Golfeurs	73
Politicians	71	Politiker	69	Politiciens	72
Police officers	63	Polizisten	69	Policiers	70
Statisticians	70	Statistiker	72	Statisticiens	74
Bosses	62	Arbeitgeber	72	Patrons	74
Computer specialists	70	Informatiker	79	Informaticiens	67
Surgeons	62	Chirurgen	75	Chirurgiens	75
Technicians	72	Techniker	78	Techniciens	75
Engineers	78	Ingenieure	78	Ingénieurs	74
Physics students	56	Physikstudenten	81	Etudiants en physique	67
Pilots	70	Flieger	76	Aviateurs	74
Mean	*68*		*74*		*72*
		Neutral Stereotypes			
Singers	53	Sänger	45	Chanteurs	48
Pedestrians	49	Spaziergänger	46	Promeneurs	52
Cinema goers	51	Kinobesucher	49	Spectateurs de cinéma	50
Concert goers	47	Konzert-Zuhörer	47	Auditeurs de concert	51
Schoolchildren	53	Schüler	48	Ecoliers	53
Spectators	55	Zuschauer	41	Spectateurs	51
Neighbours	50	Nachbarn	50	Voisins	50
Swimmers	50	Schwimmer	50	Nageurs	50
Tennis players	53	Tennisspieler	52	Joueurs de tennis	54
Authors	48	Autoren	52	Auteurs	54
Musicians	54	Musiker	50	Musiciens	59
Skiers	55	Skifahrer	53	Skieurs	55
Mean	*52*		*49*		*52*
		Female stereotypes			
Beauticians	29	Kosmetiker	11	Esthéticiens	18
Birth attendants	29	Geburtshelfer	11	Assistants maternels	18
Fortune tellers	32	Wahrsager	24	Diseurs de bonne aventure	28
Cashiers	39	Kassierer	27	Caissiers	24
Nurses	30	Krankenpfleger	24	Infirmiers	30
Hairdressers	48	Coiffeure	21	Coiffeurs	38
Psychology students	38	Psychologiestudenten	25	Etudiants en psychologie	33
Dieticians	39	Diätberater	27	Diététiciens	37
Dressmakers	43	Schneider/Näher	23	Couturiers	40
Dancers	32	Tänzer	33	Danseurs	29

Sales assistants	34	Verkäufer	33	Vendeurs	37
Social workers	29	Sozialarbeiter	41	Assistants sociaux	33
Mean	*35*		*24*		*30*

Table 2

Proportion of positive judgements across languages and conditions.

		Stereotypes		
Language	Continuation	Female	Male	Neutral
French	Men	.77	.83	.73
	Women	.59	.58	.56
German	Men	.65	.69	.72
	Women	.40	.35	.45
English	Men	.65	.85	.81
	Women	.88	.66	.81

Table 3

Mean positive judgement times (and Standard Deviations in brackets) across languages and
conditions.

		Stereotypes		
Language	Continuation	Female	Male	Neutral
French	Men	3665 *(1626)*	3523 *(1380)*	3701 *(1102)*
	Women	3871 *(1486)*	3863 *(1794)*	3873 *(1355)*
German	Men	3149 *(1084)*	3066 *(1207)*	3132 *(1127)*
	Women	3464 *(1098)*	3471 *(1081)*	3479 *(1305)*
English	Men	2749 *(1004)*	2810 *(935)*	2885 *(1476)*
	Women	2913 *(1212)*	2954 *(1164)*	2910 *(961)*