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MASCULINE GENERIC PRONOUNS

Investigating the processing of an unintended gender cue

THERESA REDL

Masculine generic pronouns

Investigating the processing of an unintended gender cue

Theresa Redl

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Chapter 1: General introduction

First sentences of dissertations vary greatly. Many dissertations open with blatant truisms (just like the one in front of you), some provide an example of the phenomenon that has been studied, others provide a definition, yet others ask a deeply meaningful question which may or may not be answered by the dissertation. In contrast, the summary a PhD candidate has to give during the defense does not allow for any variation regarding the first as well as the last sentence that has to be uttered. The Dutch doctorate regulations of Radboud University clearly state:

1. *[De rector] geeft het woord aan de promovendus, die de … openingstekst uitspreekt. … Vervolgens geeft hij een samenvatting van maximaal tien minuten van de inhoud van de dissertatie. Hij sluit de samenvatting af met de woorden: "Na deze samenvatting van mijn proefschrift gegeven te hebben, geef ik het woord terug aan u, rector."*

   '[The Rector] invites the PhD candidate to say the opening words. Afterwards, he presents a summary lasting no more than ten minutes of the contents of the dissertation. He concludes the summary with the words: "Having presented this summary of my thesis, I return the floor to you, Rector."' (Radboud University, n.d.)

The research reported in this dissertation is dedicated to language use as in the example above, which the doctorate regulations of Radboud University abound with. This snippet of the regulations in (1) includes the masculine noun *promovendus* 'PhD candidate' as well as the masculine pronoun *hij* 'he', even though the rules apply to all PhD candidates regardless of their gender. This generic use of masculine words is a highly common practice in Dutch as well as in many other languages. The doctorate regulations also feature a reading instruction stating that "where it says 'he', one can usually also read 'she'" (*waar 'hij' staat, kan in de regel ook 'zij' worden gelezen*, Radboud University, n.d.). This dissertation sets out to test whether what these instructions propose is easily possible. Do readers process these pronouns as they are intended, that is, as referring to persons of any gender? Or is ignoring the pronoun's gender harder than the reading instruction suggests?

The different grammatical genders within a language are often not functionally equivalent and the example in (1) illustrates that. The masculine gender constitutes the unmarked form – a sort of default – in the majority of languages distinguishing between feminine and masculine gender in one way or other (Aikhenvald, 2016; Hellinger & Bußmann, 2001b). Thus, when referring to one or multiple persons of unknown or

unspecified gender or when referring to a group of mixed gender, masculine forms are used (Aikhenvald, 2016; Braun et al., 1998; Gygax et al., 2008; Hamilton, 1988). This phenomenon is usually referred to as *generic masculines* (Gabriel & Mellenberger, 2004; Garnham & Yakovlev, 2015; Irmen & Schumann, 2011) or *masculine generics* (Braun et al., 2005; Hamilton, 1988).

In the second half of the 20th century, criticism of this practice of linguistically encoding men as the prototypical humans emerged in English-speaking countries (Silveira, 1980; Sontag, 1973) and was soon also voiced in the Netherlands (e.g., Romein-Verschoor, 1975) as well as in other non-English language areas (see for example Pusch, 1984, for German). Studies on this phenomenon of encoding men as the prototypical human, particularly in English, soon followed and their results questioned the genericity of masculine generics. These studies made use of various methods, such as story writing (e.g., Moulton et al., 1978), the description of mental imagery (e.g., Gastil, 1990; Hamilton, 1988), the evaluation of sentences featuring masculine generics (e.g., MacKay & Fulkerson, 1979) and picture selection (e.g., Wilson, 1978). Crucially, these early studies on masculine generics made use of *offline* methods and thus uncovered an *offline* male bias. These studies therefore found that a male bias was present after the sentence or text in question was processed and an additional task had to be performed. Conversely, these studies do not tell us whether a male bias emerges already during – and as a consequence of – language processing, that is, online; the male bias in an offline task could also be a consequence of the task itself (e.g., re-evaluating the processed sentence in order to write a story) instead of a consequence of online processing. The question must not only be *if* masculine generics induce a male bias, but also *when* and *how*. Do masculine generics induce an online and automatic male bias during processing – thus when simply interpreting language – or does the male bias only surface afterwards, for example when an additional task has to be done? And if masculine generics can cause a male bias during processing, does this male bias occur across all different circumstances or is the generic reading available in some? The answers to these questions are important from a theoretical perspective in order to fully understand how masculine generics work, but it also has practical implications: we have to understand how masculine generics (and their alternatives) function in order to appropriately counteract a male bias they might cause in people's thinking. Gaining such an understanding is important, as past research on role nouns as masculine generics has shown that their use can have far-reaching effects, for example on children's self-efficacy regarding certain occupations (e.g., Vervecken & Hannover, 2015).

In the past 20 years, the research focus regarding masculine generics has partly moved away from the offline methods mentioned above and shifted towards the processing and the hypothesized automatic bias of masculine generics. So, do masculine

generics automatically evoke a male-dominated interpretation upon their processing, even though they are supposed to cover all genders? The answer seems to be yes (Garnham et al., 2012; Gygax et al., 2008; Irmen, 2007; Irmen & Roßberg, 2004; Misersky et al., 2019). However, research into the *processing* of masculine generics has almost exclusively focused on role nouns, that is, nouns used to denote people based on characteristics such as their hobbies (e.g., *skier*) or their profession (e.g., *director* or *PhD candidate*). For example, Misersky et al. (2019) conducted an EEG experiment during which German native speakers read sentences featuring role nouns. A group of people was introduced by means of a role noun in either the masculine or the feminine form, and then a part of the group was revealed to be male or female (e.g., *Die Studenten/Die Studentinnen gingen zur Mensa, weil manche der Frauen/Männer Hunger hatten*. 'The students (MASC.)/The students (FEM.) went to the canteen, because some of the women/men were hungry'). Misersky et al. (2019) found a gender mismatch to affect processing with both feminine as well as masculine role nouns, suggesting that the often-used masculine generic role nouns are not processed as truly generic. Similar results were found by other researchers, using techniques including sentence evaluation (e.g., Gabriel et al., 2017; Garnham et al., 2012; Gygax et al., 2008), self-paced reading (e.g., Irmen & Roßberg, 2004) and eye-tracking (e.g., Irmen, 2007).

Research into the processing of masculine generics has focused on role nouns, but role nouns constitute only one of many kinds of masculine generics throughout languages. Gender agreement can be found on adjectives, adverbs, determiners, verbs, adpositions, and pronouns, to name a few (Corbett, 1991, pp. 115–116). If a language marks gender on these word classes and masculine gender is the unmarked default, it follows that all these word classes can function as masculine generics.

Pronouns are a particularly interesting case of masculine generic, not the least because gender on pronouns in itself is an interesting and highly complex phenomenon. Audring (2013, p. 32) even calls pronouns "the most problematic of all [gender] agreement targets", as pronouns exhibit much less straightforward gender agreement relations than other agreeing word classes, such as adjectives. For example, while English pronouns can be said not to agree grammatically at all due to the lack of grammatical gender on nouns, Russian pronouns strictly agree with the grammatical gender of the noun, and Dutch pronouns – to name a third option – do not clearly fall into either of those two categories (Audring, 2013). Furthermore, the study of pronouns as masculine generics is important, since languages that have simplified or completely lost gender distinctions on nouns often retain the distinction between feminine and masculine on pronouns (Corbett, 1991, pp. 170–172). This holds true, for example, for English and Dutch. Thus, speakers of languages that lack systemic gender distinctions on the highly studied role nouns – and on other potentially agreeing word forms such as

verbs and adjectives – might still experience a male bias in the processing of masculine generic pronouns. Therefore, in order to fully grasp to what extent masculine generics induce a male bias, one must look at cases other than role nouns – and what better category to pick than the puzzling and omnipresent pronouns.

In the remainder of this General introduction, I will illustrate the different contexts in which masculine generic pronouns can occur. An exemplary overview of languages in which pronouns function as masculine generics and how they are commonly used will ensue.[1] This language overview is intended to show that – even though the focus in this dissertation will be on Dutch – masculine generic pronouns are not a rare phenomenon by any means. The book series *Gender Across Languages*, in which gender and more specifically masculine generics across languages are discussed, served as a starting point for the overview below (Hellinger & Bußmann, 2001a, 2002, 2003; Hellinger & Motschenbacher, 2015). I built and expanded on contributions to the book series that specifically mention masculine generic pronouns. I discuss the West Germanic languages Dutch, English and German, as well as the North Germanic languages Icelandic, Norwegian, and Swedish. Furthermore, the Slavic languages Polish and Russian, the Romance languages French and Italian, and Hebrew and Arabic from the Semitic branch of the Afro-Asiatic languages, are also discussed. This is intended to show how wide-spread the phenomenon is. Having illustrated how pervasive masculine generic pronouns are, I will give an overview of the chapters in this dissertation, which all investigate the use of masculine pronouns for referents who are not male.

Pronouns as masculine generics across languages

When a specific person is referred to with a pronoun, the pronoun's gender is often a reliable indicator of the person's natural gender (e.g., Audring, 2006, for Dutch; Oelkers, 1996, for German). When a pronoun is used as a masculine generic, this is not the case. The following examples are taken from the Dutch SoNaR corpus (Oostdijk et al., 2013) and illustrate the linguistic contexts in which a masculine generic pronoun can be used. All examples feature the possessive pronoun *zijn* 'his', on which the first chapters of this dissertation will focus. First, a masculine generic pronoun can be used in episodic contexts:

[1] A few languages have been described in which the feminine gender is unmarked. For example, Jarawara, a language spoken in Brazil, exhibits feminine agreement when the word *wahati* 'person' is used generically (Aikhenvald, 2016). In Oneida, feminine pronouns can be used generically (Hellinger & Bußmann, 2001b; Michelson, 2015), but languages featuring feminine generics are the rare exception rather than the rule (Hellinger & Bußmann, 2001b).

2. *Dankzij het waarschuwingssysteem van de Bengaalse overheid waren meer dan zeshonderdduizend mensen uit de getroffen regio geëvacueerd, maar niet iedereen had **zijn** huis verlaten.*
   'Thanks to the warning system by the Bengali government, more than 600000 people had been evacuated from the region, but not everyone had left **his** house'
   (SoNaR Corpus, Oostdijk et al., 2013)

There is no indication that it was only men who did not leave their houses. Instead, we can safely assume that the possessive pronoun *zijn* 'his' is intended generically, to refer to all genders.

Second, masculine generic pronouns can be used in generic statements, that is, generalizing over people:

3. *Ik vind dat ik een verantwoordelijkheid heb als mens. Maar ik kan niet voor iedereen zeggen hoe ze het moeten doen, want iedereen heeft **zijn** eigen leven.*
   'I think that I have a responsibility as a human being. But I cannot speak for everyone and say how they have to do it, because everyone has **his** own life'
   (SoNaR Corpus, Oostdijk et al., 2013)

In (3), too, a masculine pronoun is used, while its gender is not intended as an indication of the people's gender.

Third, there are even some cases in which masculine generic pronouns are used even though exclusive reference to women is made:

4. *Iedereen heeft **zijn** plaats in de ploeg en coach Frissen kan uit elke **speelster** het maximum halen, stelt voorzitster Maddy Jans.*
   'Everyone has **his** function on the team and coach Frissen can get the maximum out of every player**.F**, chairwoman Maddy Jans says'
   (SoNaR Corpus, Oostdijk et al., 2013)

Clearly, in (4) the intended referents of *iedereen* 'everyone' and the masculine possessive pronoun *zijn* 'his' are the team of Dutch of female soccer players.

To summarize, as demonstrated by means of examples from Dutch, masculine generic pronouns can be used to refer to people of unknown, unspecified, or mixed gender, both in episodic contexts as in (2), as well as in generic contexts, as in (3). In fact, they can even be used to refer to only women, as in (4). In this General introduction, examples for all these cases of pronominal reference using masculine generics will be provided when discussing masculine generic pronouns in a subset of Indo-European and Afro-Asiatic languages. This is done in order to give a crosslinguistic perspective of this

widespread phenomenon before zooming in on Dutch specifically in the chapters hereafter.

Dutch

Dutch, as spoken in the Netherlands, distinguishes between common and neuter gender on nouns, since formerly feminine and masculine nouns are now subsumed in the category of common gender nouns (Audring, 2006).[2] The original three-way distinction is still reflected in third-person singular pronouns: *hij* 'he', *zij* 'she', and *het* 'it'. In contrast, there is no gender-marking on the third-person plural form *zij* 'they' (or unstressed as *ze*), even though it is formally equivalent to the feminine third-person singular form. Third-person possessive pronouns distinguish between feminine – *haar* 'her' – and one surface form for masculine and neuter – *zijn* 'his/its'. The masculine personal pronoun *hij* 'he', the object form *hem* 'him' and the possessive pronoun *zijn* 'his' are used as masculine generics, as shown in the examples above. I provide another example below, taken from the Dutch newspaper, *De Telegraaf* (2014):

5. *Wat kost een student? En wat*
   what costs a student and what
   *levert **hij** op?*
   generates **he** PART
   'How much does a student cost [society]? And how much does he generate?'

The example in (5) generalizes over students – regardless of their gender – and uses the masculine pronoun *hij* 'he' to this end.

In addition, the etymologically masculine generic pronoun *men* 'one' exists, but it is rather infrequent (Van der Auwera et al., 2012).

English

English does not mark gender on nouns and potentially agreeing word forms anymore, but the original Indo-European three-way distinction is still in place for third-person singular personal, possessive, and reflexive pronouns (Hellinger, 2001). In addition, the pronouns *they*, *their* and *them* have long been used in singular contexts, for example:

[2] The situation is different for Dutch as spoken in Belgium, where the original three-way gender distinction is still more intact. Furthermore, common and neuter gender nouns are usually called *de-woorden* 'de words' and *het-woorden* 'het words' in Dutch, based on the determiner. Following Audring (2006), I will instead use the terms common and neuter, as used to describe the gender system in North Germanic languages such as Swedish.

6. *It's painful for any parent to watch their child mess up, or not achieve their (or their parents') goals.*
   (Miller & Bromwich, 2019)

The example above taken from *The New York Times* features three instances of singular *their* – the first referring to the parent and the second and third referring to the child. However, historically, (male) grammarians have prescribed generic *he*, *him* and *his* in such contexts (Bodine, 1975). Despite this, "singular *they* is alive and well" (Bodine, 1975, p. 131) and has gained popularity in recent years (Baranowski, 2002; see also Earp, 2012, for the decrease of masculine generics such as *mankind*; LaScotte, 2016; Paterson, 2011). Style guides, however, have only recently started to embrace singular *they*. For example, while the 6th edition of the publication manual of the American Psychological Association (2010) endorsed the use of singular *they* for non-binary individuals who do not identify with the pronouns *he* or *she* (e.g., *Did you already meet my cousin? They are visiting from Vienna.*), the use of singular *they* as an alternative for masculine generic pronouns as in the example above was still to be avoided according to the manual. Only the 7th edition of the publication manual (2020) supports the use of singular *they* in generic contexts as in (6).

German

German has retained the original Indo-European three-way gender distinction between feminine, masculine, and neuter gender. This distinction is consistently marked on singular determiners, pronouns, and attributive adjectives (see also Bußmann & Hellinger, 2003). Gender is marked on personal pronouns only in the third-person singular: *sie* 'she', *er* 'he', and *es* 'it'. Regarding possessive pronouns, a formal distinction is made between masculine and neuter *sein* 'his/its' on the one hand and *ihr* 'her' on the other hand. The third-person plural personal pronoun *sie* 'they' and possessive pronoun *sein* 'his/its' are formally equivalent to the third-person singular feminine forms. The masculine gender functions as the unmarked, generic form and is frequently used as such (Braun et al., 2005), as seen in this example, taken from Article 5 of the German constitution:[3]

[3] Article 5 of the German constitution (*Grundgesetz für die Bundesrepublik Deutschland*) can be found at http://www.gesetze-im-internet.de/gg/art_5.html.

7. ***Jeder*** *hat* *das* *Recht,* ***seine*** *Meinung […]*
   everyone.M has the right **his** opinion
   frei *zu äußern.*
   freely to express
   'Everyone may freely express his opinion'

In addition to *er* 'he' and *sein* 'his', the anaphorically used demonstrative pronoun *der* 'that' and the masculine pronouns *keiner* 'no one (MASC.)' and *jeder* 'everyone (MASC.)' (as in the example above) are used generically (Bußmann & Hellinger, 2003). A frequently used pronoun that has received much attention in the past is the generic pronoun *man* 'one', which derives from and is homophonous with *Mann* 'man' (Gast, 2015; Van der Auwera et al., 2012) and has been the target of criticism (e.g., Pusch, 1984). The neologism *frau*, after *Frau* 'woman', has been suggested as an alternative. However, it is not used generically, but specifically for women (Storjohann, 2004).

Icelandic

Icelandic distinguishes between feminine, masculine, and neuter grammatical gender on nouns, and this distinction is also maintained for third-person personal pronouns in the singular as well as in the plural. The masculine pronouns *hann* 'he' and *þeir* 'they (MASC.)' are used as generics when referring to a person of unknown gender or a group of mixed gender (Friðriksson, 2017; Gunnarsdotter Grönberg, 2002). The neuter plural personal pronoun *þau* 'they (NEUT.)' can also be used in reference to humans, but only if the referents are known and preferably have already been mentioned (Gunnarsdotter Grönberg, 2002). When it comes to indefinite pronouns, the masculine form is preferred even in those cases. An example of an indefinite masculine generic pronoun is given by Gunnarsdotter Grönberg (2002):

8. ***Allir*** *velkomnir*
   everybody.M.PL welcome.M.PL
   'Everybody welcome'

Interestingly, unlike in other Scandinavian countries such as Sweden, in Iceland the debate regarding a linguistic male bias has been rather small in scale (Friðriksson, 2017; Gunnarsdotter Grönberg, 2002). However, some small developments and changes can be observed. For example, Friðriksson (2017) states that the indefinite pronoun *maður* 'one (MASC.)', which when used as a noun means 'man/human', is often used generically, but in recent years *kona* 'woman' has begun to be used instead. Furthermore, a new gender-neutral third-person pronoun similar to English singular *they* and Swedish *hen* was suggested recently – *hán* – but it is not widely established (Friðriksson, 2017).

Norwegian

Norway has two official written standard languages: *bokmål*, which is derived from Danish and written by the majority, and *nynorsk*. However, there is no spoken standard and people speak in their local dialect across contexts (Bull & Swan, 2002). The gender system shows significant variation in Norwegian depending on the used written standard and the dialect spoken. For example, modern *bokmål* and *nynorsk* can generally be said to distinguish feminine, masculine, and neuter gender, but the Bergen dialect, the Oslo dialect, and conservative *bokmål* only distinguish between neuter and common gender (Bull & Swan, 2002; Lødrup, 2011). Modern *bokmål* and *nynorsk* mark gender on personal and possessive pronouns in the third person singular only, where a four-way gender distinction can be observed. In addition to masculine *han* 'he', feminine *hun* 'she', and neuter *det* 'it', common-gender *den* is available for use in reference to inanimate feminine and masculine nouns. Possessive pronouns exhibit the same four-way distinction: *hans* 'his', *hennes* 'her', *dets* 'its', and *dens* (Bull & Swan, 2002).[4] The masculine pronouns are used for generic reference (Bull & Swan, 2002; Venås, 1992).

Swedish

Swedish distinguishes between common and neuter nouns, but entertains a four-way gender distinction regarding third-person singular pronouns, similar to Norwegian: *han* 'he', *hon* 'she', *det* 'it', and common-gender *den* (Hornscheidt, 2002). Traditionally, masculine pronouns have been used generically, as in this example from Article 2 of the Swedish sales law:[5]

9. *Lagen gäller inte avtal som innebär att den som skall leverera en vara även skall utföra arbete eller någon annan tjänst, om tjänsten utgör den övervägande delen av **hans** förpliktelse.*
   'The law does not apply to agreements which imply that the person who is to deliver a product must also perform work or any other service if the service constitutes the major part of **his** obligation.'

Sweden is widely known for having introduced an additional, gender-neutral pronoun: *hen*. In terms of functionality, it is similar to English singular *they*, but contrary to *they*, *hen* was recently created and introduced to the language (Gustafsson Sendén et al., 2015; Milles, 2011). The origin of *hen* is not entirely clear, but Milles (2011) states that *hen* might be modeled after Finnish *hän*, the third-person singular pronoun that refers to both men and women, as Finnish does not make grammatical gender distinctions. The gender-

[4] The provided pronouns are from the *bokmål* standard variety.

[5] Article 2 of the Swedish sales law (*köplag*) can be found at https://lagen.nu/1990:931.

neutral pronoun *hen* was added to the 2015 *Svenska Akademiens ordlista*, the official glossary of the Swedish Academy (Svenska Akademien, 2015), and attitudes towards the use of this new pronoun have been growing more positive in recent years (Gustafsson Sendén et al., 2015).

Polish

Generally speaking, Polish distinguishes between feminine, masculine, and neuter gender. However, in addition, a distinction is made between animate masculine nouns and inanimate masculine nouns in the singular. In the plural, a two-way distinction is made between masculine personal gender and non-masculine personal gender, the latter containing feminine, neuter, and masculine non-personal words (Brooks, 1975; Koniuszaniec & Błaszkowska, 2003). This system is mirrored in third-person personal pronouns, distinguishing between *on* 'he', *ona* 'she', and *ono* 'it' in the singular, and *oni* 'they' (masculine personal) and *one* 'they' (non-masculine personal) in the plural. The masculine gender is generally the unmarked and generic one (Brooks, 1975; Jaworski, 1989; Koniuszaniec & Błaszkowska, 2003). An example of the generic use of *on* 'he' (in its genitive form *niego*) can be found in an article advertising gifts for men and women in the Polish magazine *Glamour* (2015):

10. *Znasz* *kogoś,* *kto* *często* *przeklina?*
know someone who often swears
Te *prezenty* *są* *dla* ***niego***.
these gifts are for **3SG.M.GEN**
'Do you know someone who swears a lot? These gifts are for him.'

Furthermore, the indefinite pronouns *ktoś* 'someone'*, ktokolwiek* 'anybody'*,* and *nikt* 'no one' and the interrogative pronoun *kto* 'who' require masculine agreement and are used generically (Koniuszaniec & Błaszkowska, 2003).

Russian

Russian distinguishes between feminine, masculine, and neuter gender on nouns, and agreeing word forms are adjectives, particular verb forms, and pronouns (Timberlake, 2004). Regarding pronouns, the three-way gender distinction is upheld in the third-person singular: *óн* 'he', *онá* 'she', and *онó* 'it' (e.g., Timberlake, 2004). The masculine gender constitutes the unmarked default and is used for generic reference (Doleschal & Schmid, 2001). In addition, the pronoun *nikto* 'nobody, no one' also triggers masculine gender agreement (Doleschal & Schmid, 2001; Kapatsinski, 2006), even when referring to women exclusively, as exemplified below:

11. *Nikto* *iz* *ženščin* *ne* ***prišel***.
nobody of women not **came.M**
'None of the women came.'
(Doleschal & Schmid, 2001)

Accounts regarding the extent to which the masculine is used as the default vary sometimes. For example, Aikhenvald (2016) and Doleschal and Schmid (2001) argue that indefinite pronouns such as *kto-nibud'*, *kto-to*, *koe-kto*, *nekto* 'anybody, somebody' and *nikto* 'nobody, no one', as well as the interrogative pronoun *kto* 'who', require masculine singular agreement even when referring to a woman (see also Corbett, 1991, p. 219). However, Kapatsinski (2006) states that "the pronouns *kto* 'who' and *kto-to* 'somebody' … can be used with either masculine or feminine adjectives, although the masculine is preferred." Despite this slight discrepancy, it can be concluded that masculine generic pronouns are common in Russian.

French

French distinguishes between feminine and masculine gender. The original neuter gender category was largely absorbed by the masculine category (Schafroth, 2003). Regarding personal pronouns, the distinction is made in the third person, both singular and plural: *il* 'he', *elle* 'she', *ils* 'they (MASC.)', and *elles* 'they (FEM.)' (Schafroth, 2003).[6] Masculine pronouns are used generically, for example when referring to a mixed group of people:

12. *Un policier et une policière sont accusés d'attouchement qu'**ils** auraient commis pendant le service.*
'A policeman and a policewoman were accused of engaging in sexual activities, which **they.M** allegedly did while on duty.'
(Burr, 2003)

Similarly, singular *il* can be used as a masculine generic, as in this quote by political journalist Alain Duhamel:

[6] Additionally, possessive pronouns are marked for gender in the first and second person. But as agreement occurs with the possessee alone – and not with the possessor – this is not of interest here.

13. *Depuis Bérégovoy et Balladur, quand un ministre est condamné, naturellement **il** doit quitter le gouvernement.*
    'Since Bérégovoy and Balladur, if a minister is sentenced, of course **he** has to quit the government.'
    (Haddad, 2018)

Italian

Italian distinguishes between feminine and masculine grammatical gender. The pronominal system distinguishes between stressed and unstressed personal pronouns, and the stressed pronouns distinguish between feminine and masculine gender only in the third-person singular. Unstressed pronouns are marked for gender in the third-person singular and plural direct-object forms (Marcato & Thüne, 2002). Masculine pronouns function as generics, as can be seen in the following example taken from Article 86 of the Italian constitution:[7]

14. *Le funzioni del Presidente della Repubblica, in ogni caso che **egli** non possa adempierle, sono esercitate dal Presidente del Senato.*
    'The functions of the President of the Republic, in the case that **he** cannot fulfil them, are exercised by the President of the Senate.'

For some pronouns (e.g., the singular indirect object forms *le/gli*), the masculine form is sometimes preferred even when a woman is referred to (Marcato & Thüne, 2002).

Arabic

Modern Standard Arabic includes personal pronouns as well as clitic pronouns. The latter are also used to express possession. Both types distinguish between feminine and masculine gender in the second- and third-person singular and plural, but not in the dual (Schulz, 2004). Masculine pronouns can be used generically (Sadiqi, 2003); for example, the masculine third-person clitic *ya-* is used in such a manner:

15. ***ya**-Dunnu l?insaanu ?annahu xaalidun*
    'A person thinks that **he** is eternal.'

Hachimi (2001) provides an example of generic pronoun use in Moroccan Arabic:

[7] Article 86 of the Italian constitution (*Costituzione della Repubblica Italiana*) can be found at https://www.senato.it/documenti/repository/istituzione/costituzione.pdf.

16. *kul* ***waḥəd*** *lazəm* *y-šri* *ktab-u.*
every **one.M** must 3IPF.M.SG-buy book-his
'Everyone must buy his book.'

According to Sa'ar (2007), in Palestinian Arabic, too, the masculine pronoun *al-wahad* 'one' is used for generic reference. Sa'ar further gives an example of the generic use of the masculine clitic second-person pronoun *ak* even when addressing a woman:

17. *shu ra'y**ak**, ya Samāher, il'akel zāki?*
'What do **you.M** think, ya Samaher, is the food good?'
(Sa'ar, 2007)

Based on her analysis of Arabic speech among women as observed in Israel and Palestine, Sa'ar (2007) concludes that female speakers frequently use masculine pronouns generically even when discussing strictly female topics such as childbirth.

Hebrew

Similar to Arabic, Hebrew nouns are marked for either feminine or masculine gender and agreement is observed on pronouns, adjectives, verbs, and prepositions (Sa'ar, 2007). Personal pronouns and clitic pronouns are marked for gender in the second and third person in both the singular and the plural (e.g., Coffin & Bolozky, 2005), and generic reference through these masculine pronouns is possible. For example, Sa'ar (2007) found that masculine *ata* 'you' is frequently used for generic reference. A particularly interesting example is the use of *ata* (MASC.) even in clearly female contexts, emphasizing its unmarked function:

18. *Yom eḥad **ata** pit'om tofes she'**ata** ima ve-kol ma she'**ata** rotse ze lehisha'er babayit 'im hayladim.*
'One day **you.M** suddenly realize that **you.M** are a mother and all **you.M** wish to do is stay home with the children.'
(Sa'ar, 2007)

Tobin (2001) gives an example of the generic use of masculine *hem* 'they' in reference to a boy and a girl:

19. *Yal* *ve-xaim* ***hem***
yael.F.SG and-haim.M.SG **they.M**.PL
yelad-im *tov-im*
child-M.PL good-M.PL
'Yael and Haim are good children'

Sa'ar's (2007) conclusion for Hebrew is the same as for Arabic: masculine generic pronouns are frequently used, even in exclusive reference to women.

Outline

We have seen that the masculine gender serves as the unmarked default in a variety of different languages. In fact, it serves as the default in the majority of languages in the world that make a gender distinction (Aikhenvald, 2016; Hellinger & Bußmann, 2001b). As a consequence, masculine pronouns are often used for generic reference. This is true even for languages that no longer consistently mark feminine and masculine gender on nouns (e.g., English, Dutch, and some North Germanic languages). The goal of this dissertation is to shed light on how such masculine generic pronouns are processed. **Chapter 2** reports an eye-tracking reading experiment which investigates the Dutch masculine possessive pronoun *zijn* 'his' when used to refer to a group of mixed gender. The masculine pronoun was embedded in stereotypically female, male or neutral contexts to investigate the strength of the pronoun's hypothesized male bias when additional gender information is provided. **Chapter 3** presents two experiments. The first is a conceptual replication of the eye-tracking experiment reported in Chapter 2, while the second uses the same stimuli in a sentence evaluation task in order to shed light on the question whether the surfacing of a male bias is task-dependent. **Chapter 4** presents an eye-tracking experiment in which *zijn* 'his' was used in generic contexts, that is, referring to a hypothetical person. This was done in order to gauge whether a male bias can arise even when there is no specific referent for the pronoun. In **Chapter 5**, we take a final look at the possessive pronoun *zijn* 'his', but from a slightly different perspective. In Limburgian dialects of Dutch, this pronoun can be used in reference to female individuals beyond masculine generic contexts (e.g., *Mary$_i$ washes his$_i$ hair*). The use of non-feminine pronouns to refer to females is more common across languages than one might expect, and Chapter 5 presents the first experimental study into this phenomenon. **Chapter 6** moves on to a different Dutch pronoun, namely the personal pronoun *hij* 'he'. This self-paced reading study investigates the male bias of this commonly used masculine generic. **Chapter 7** provides a Summary and conclusions.

Chapter 2: The processing of the Dutch masculine generic *zijn* 'his' across stereotype contexts: An eye-tracking study

Abstract

Language users often infer a person's gender when it is not explicitly mentioned. This information is included in the mental model of the described situation, giving rise to expectations regarding the continuation of the discourse. Such gender inferences can be based on (at least) two types of information: gender stereotypes (e.g., *nurses are female*) and masculine generics, which are grammatically masculine word forms that are used to refer to all genders in certain contexts (e.g., *To each **his** own*). In this eye-tracking experiment (N = 82, 38 male), which is the first to systematically investigate the online processing of masculine generic pronouns, we tested whether the frequently used Dutch masculine generic *zijn* 'his' leads to a male bias. In addition, we tested the effect of context by introducing male, female, and neutral stereotypes. We found no evidence for the hypothesis that the generically-intended masculine pronoun *zijn* 'his' results in a male bias. However, we found an effect of stereotype context. After introducing a female stereotype, reading about a man led to an increase in processing time. However, the reverse did not hold, which parallels the finding in social psychology that men are penalized more for gender-nonconforming behavior. This suggests that language processing is not only affected by the strength of stereotype contexts; the associated disapproval of violating these gender stereotypes affects language processing, too.[8]

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Introduction

Masculine forms are often used when reference to people in general is made. This phenomenon is, for example, apparent in the proverb *To each his own*, which applies to men and women alike, but yet features the masculine pronoun *his*. Many of the world's languages exhibit this phenomenon (Hellinger & Bußmann, 2001a; Pauwels, 1998), one of them being Dutch (Van Dale, 2015). Consider the following example, a headline taken from a column in the Dutch quality newspaper *De Volkskrant* (Vaessen, 2017) further illustrating this practice:

1. *Elke postbezorger zal zich moeten afvragen wat hij kan doen om als geheel sterker te staan.*
   'Every postal worker will have to think about what he can do for all postal workers to gain a better standing as a group.'

Dutch natives will likely assume that the author of this piece intended to refer to all postal workers, not only to the male ones. In other words, *hij* 'he' is used *generically*, as referring to men as well as women, despite carrying masculine grammatical gender. Such word forms, which carry masculine grammatical gender, but are used generically, are usually referred to as *generic masculines* (Gabriel & Mellenberger, 2004; Garnham & Yakovlev, 2015; Irmen & Schumann, 2011) or *masculine generics* (Braun et al., 2005; Hamilton, 1988; Stahlberg et al., 2001). They are more precisely defined as masculine forms that are used to refer to people of unknown or unspecified gender or to groups of mixed gender (Braun et al., 1998; Gygax et al., 2008; Hamilton, 1988).

Crucially, masculine terms that can serve as masculine generics are ambiguous between two readings: a generic reading and a male-specific reading. For example, the headline above allows for the generic reading, including all postal workers regardless of their gender. Alternatively, a male-specific reading, for which it is only the male postal workers who ought to organize themselves, is also available. Context may resolve the ambiguity of masculine generics, but completely unambiguous cases are rare.

In the 1970s, criticism of masculine generics and their ambiguity grew louder, first in the English-speaking countries (Bodine, 1975; Moulton et al., 1978) and later spreading to other countries such as Germany (Pusch, 1984) and the Netherlands (Romein-Verschoor, 1975). The claim that masculine generics can refer to men and women alike was challenged. Opponents of masculine generics, for example Silveira (1980), suggested that the ambiguity of the masculine generic is resolved to women's disadvantage by being interpreted as male-specific, thereby rendering women linguistically invisible. Early research on masculine generics such as *he* and *his* in English soon suggested that, although intended as generic, the use of masculine generics

indeed results in a male bias. For example, Moulton et al. (1978) found that when a sentence about a hypothetical person featured the masculine generic pronoun *his* (e.g., *In a large coeducational institution the average student will feel isolated in his introductory courses*), this hypothetical person was thought of as male rather than female. A comparable male bias by English masculine generic pronouns was found by other researchers between the 1970s and 1990s (Gastil, 1990; Hamilton, 1988; Hyde, 1984; MacKay & Fulkerson, 1979; Switzer, 1990) as well as more recently (M. M. Miller & James, 2009). However, these studies made use of offline methods as a means of tapping into the hypothesized male bias, such as writing a story about a character or describing the images that came to mind when reading. For example, in their aforementioned experiment, Moulton et al. (1978) provided participants with the description of a hypothetical person fitting either of two themes (i.e., *being a student* or *being concerned with looks*), and the masculine generic pronoun *his* was used to describe this person. Moulton et al. (1978) asked their participants to write a story about a fictitious person fitting these themes. The gender which participants chose for their character in the story then served as the dependent variable. Thus, the authors gave participants ample time to decide on their choice of gender for their character by employing this design. Put differently, participants were given time to ponder whether the masculine generic was intended as generic or male-specific. As a result, they might have chosen to write about a male character more often as this is the safe choice; writing about a male character fits with the male-specific as well as with the generic reading of the pronoun. A female character, however, only makes sense in the context of a generic reading of the pronoun. In sum, many of these early studies found that generically-intended masculine pronouns lead to a male bias, but they did so using rather explicit research methods, which reveal little about the actual *processing* of masculine generics. Moreover, one study failed to find an effect of a male bias induced by generic *he* altogether (Cole et al., 1983). Hence, the question remains if generic pronouns lead to a male bias in online processing.

In the last 20 years, the research focus regarding masculine generics has shifted from English pronouns towards other Indo-European languages and so-called role nouns. Role nouns are generally defined as "any names that incorporate features used to describe a person or a group of people, such as hobbies (e.g., soccer fan) or occupations (e.g., dentists, actors, or students)" (Gabriel et al., 2008, p. 206). In languages such as French and German, role nouns are marked for gender and the masculine form is used as the default (e.g., German *der durchschnittliche Student*, 'the average student (MASC.)', or French *un professeur sévère*, 'a strict teacher (MASC.)'). It has been repeatedly shown that generically-intended masculine role nouns are interpreted as referring to men rather than women. Contrary to previous research on masculine generic pronouns, the male

bias of role nouns has been observed using various online methods such as self-paced reading (Irmen & Roßberg, 2004), eye-tracking (Irmen, 2007), the sentence evaluation paradigm (Garnham et al., 2012; Gygax et al., 2008) and EEG (Misersky et al., 2019).

With one exception (Misersky et al., 2019) all listed experiments investigated the potential male bias of role nouns as masculine generics across different stereotype contexts, thus combining the research into these two types of gender cues. Past research has shown that gender stereotypes (e.g., *nurses are typically female*) are a powerful trigger of gender inferences, in the presence as well as in the absence of unambiguous gender cues (Carreiras et al., 1996; Garnham et al., 2002; Oakhill et al., 2005; Osterhout et al., 1997). For example, Carreiras et al. (1996) showed that the referent in sentences such as *The electrician examined the light fitting* is thought of as male rather than female, although no explicit reference to the subject's gender is made. Thus, stereotypes can be used to enrich the mental representation of a referent (Zwaan & Radvansky, 1998). Put differently, a stereotype can trigger a gender inference when a referent's gender is not explicitly stated. Previous research on role nouns as masculine generics suggests that they, too, can give rise to gender inferences. In this latter case, the masculine grammatical gender of a masculine generic is erroneously interpreted as an indication of the referent(s)' gender. Many researchers combined these two different types of gender cues, one grammatical in nature, the other stemming from world knowledge. This allowed researchers to test whether masculine generics cause a male bias at all, and whether they do so in the context of other gender information. This approach takes into account that context strongly affects the interpretation of ambiguous lexical items (Hogeweg, 2009), leading to a better understanding of how masculine generics are processed and how gender inferences are made.

To summarize, research into the processing of masculine generics has been largely restricted to role nouns until now. We do not know whether masculine generic pronouns give rise to gender inferences in a similar online, automatic, and elaborative fashion as stereotypes and masculine generic role nouns, since past research into masculine generic pronouns has made use of offline methods.

To fill this gap, we extended the line of processing research recently applied to stereotypical role nouns to the Dutch masculine generic *zijn* 'his' and conducted an eye-tracking experiment as a means of tapping into language processing directly. By presenting *zijn* in female, male and neutral stereotype contexts (e.g., *Iedereen was zijn tanden aan het poetsen* 'Everyone was brushing his teeth'), we were able to test whether this masculine generic pronoun leads to a male bias in processing, and whether the hypothesized male bias persists across contexts.

There are reasons to believe that masculine generic pronouns work differently from masculine generic role nouns. When a masculine pronoun is used as a generic such as

Dutch *zijn* ‘his’, it is always that very same token that is used in generic contexts. In the case of generically-intended role nouns, an arguably infinite number of tokens is used. Their pattern is of course the same: a grammatically masculine noun is used to refer to people in general, but other than with pronouns there is a vast list of tokens. Being lexical in nature, role nouns give rise to frequency effects. These in turn might make it hard to generalize experimental findings based on a subset of role nouns to the whole set of role nouns in a language if frequency effects are not controlled for. More specifically, if the grammatically feminine form of a role noun is very frequent, we expect the grammatically masculine counterpart to be interpreted as male-specific and having a lower generic potential than would be the case for a masculine role noun of which the feminine counterpart is highly infrequent. Thus, if a masculine role noun is used generically a lot – or even to refer to female individuals – we expect its generic potential to be higher. De Backer and De Cuypere (2012) indeed found evidence that the relative frequency of the masculine and feminine form of a role noun affects whether the masculine form is easily interpreted as generic. This suggests that not all masculine generic role nouns, not even within the same language, work the same way. This might also contribute to why there is no consensus yet as to whether the grammatical gender of generic role nouns overrules stereotype context or not. For example, Gygax et al. (2008) and Garnham et al. (2012), on the one hand, found evidence for a male bias across all contexts. Irmen and Roßberg (2004), on the other hand, found that the two types of gender cues interacted and that context may weaken the masculine generic's male bias. This confounding factor of varied relative frequency per role noun is not an issue when it comes to the processing of masculine generic pronouns. Take the Dutch possessive pronoun *zijn* ‘his’ as a masculine generic: there is only one token, and this token is presumably more frequent than most role noun tokens. Of course, frequency might still affect the processing of *zijn*, too: the relative frequency of generic *zijn* and male-specific *zijn*, and possibly the frequency of the pronoun’s feminine counterpart *haar* ‘her’ might affect the generic potential of the pronoun. If this is indeed the case, then this effect of relative frequency is held constant and therefore controlled for within an experiment. Therefore, the results and the conclusions are not affected by the choice of tokens, as might be the case for role nouns. There are several ways in which relative frequency might affect the reading of a pronoun. A generically-intended pronoun such as *zijn* might lead to a strong male bias if the generic reading of the pronoun is only weakly represented. If, however, the generic reading of *zijn* is relatively frequent and more strongly represented, this pronoun might exhibit a stronger generic potential than has been found for role nouns. Finally, it is also possible that a masculine generic pronoun can never be interpreted as truly generic, even if the generic reading is strongly represented.

Another difference between role nouns and the possessive pronoun specifically lies in the salience of the two. To our knowledge, all experiments on role nouns have made use of stimuli which introduced the role noun in subject position. In these stimuli, the role noun further usually constituted the first mention of the referent(s) denoted by the role noun. Both these things are different for the possessive pronoun, at least in the linguistic structure we chose for our stimulus design. First of all, we used the possessive pronoun anaphorically. Thus, the referent is previously introduced and then referred back to by means of the possessive pronoun. Furthermore, the possessive pronoun is part of a larger noun phrase, as is often the case with possessive pronouns, and this noun phrase occurs in object position. These are all factors that might lower the salience of *zijn* 'his' and might therefore decrease the impact of the grammatical gender on the mental representation of the referent, or in other words boost the generic potential of the pronoun.

In sum, the online processing of masculine generic pronouns has not previously been thoroughly investigated and will be the focus of the present study. We cannot make clear predictions based on research into role nouns, but there is reason to believe that masculine generic pronouns might not work the same. This study is also a first for research into the online processing of any type of masculine generic in Dutch. While criticism of masculine generics in the Dutch language was voiced very early on (Romein-Verschoor, 1975), experimental studies on the online processing of Dutch masculine generics are still non-existent – despite masculine generics still being commonly used in Dutch. The few empirical offline studies on Dutch masculine generics which exist do suggest that they may induce a male bias. A questionnaire by De Backer and De Cuypere (2012) suggests that generically-intended Dutch role nouns are often not interpreted as generic. In addition, two psychological studies by Vervecken and Hannover (2015) and Vervecken et al. (2013) have shown that Dutch masculine role nouns negatively affect the mental accessibility of female jobholders and children's self-efficacy. Again, it is hard to base concrete predictions regarding our eye-tracking reading experiment featuring the Dutch masculine generic *zijn* 'his' across stereotype contexts on role noun research, particularly because the grammatical gender of role nouns has been found to overwrite stereotype context by some (Garnham et al., 2012; Gygax et al., 2008), but the two factors have been found to interact by others (Irmen & Roßberg, 2004). More specifically, Irmen and Roßberg (2004) found that the combination of a masculine role noun and a female stereotype prepares readers equally well for a female and a male referent. Given the evidence that stereotype context can interact with grammatical gender regarding role nouns (Irmen & Roßberg, 2004), and the less salient nature of *zijn* compared to role nouns, we predicted that the masculine generic *zijn* results in a male bias in neutral and male contexts only. Thus, if the context is neutral and *zijn* thus

constitutes the only gender cue, we expected a male bias to emerge. We expected similar results for male stereotype contexts, as both *zijn* and the context suggest a male referent. In female stereotype contexts, however, the two gender cues make contrary predictions and we expected the male bias of the masculine generic *zijn* to be attenuated or even cancelled out.

Materials & Method

Participants

We tested a total of 92 participants (42 male) between the ages of 18 and 51 (M = 22.8), who gave written consent to participating in the experiment. We declare that at present and at the time of the study, the Utrecht Institute of Linguistics, where the research was conducted, endorses the WMA Declaration of Helsinki, as well as The Netherlands Code of Conduct for Scientific Practice by the Association of Universities in the Netherlands (VSNU). Participants were recruited largely through the participant database of the Utrecht Institute of Linguistics Lab at Utrecht University, but separate calls for male participants were placed online. The first language of all 92 participants was Dutch, with five participants being multilingual. A total of 88 participants were students, three were working and one was a stay-at-home parent. All participants had normal or corrected-to-normal vision. They were paid 5€ for their participation. The experiment took approximately 25 minutes.

Two exclusion criteria applied. First, participants were required to answer more than 75% of the comprehension questions correctly in order for their data to be considered in the analysis. This was done to make sure that participants actually read the sentences for comprehension. Second, we excluded participants who correctly guessed the purpose of the experiment on the exit questionnaire. This was defined as either (a) describing a mismatch between the gender stereotype and the gender of a mentioned individual or (b) describing a mismatch between the masculine gender suggested by the masculine generic *zijn* and the gender of a mentioned individual, or both.

Materials

Each participant was presented with 96 Dutch sentence pairs: 48 experimental stimuli, 12 control items and 36 fillers. The experimental stimuli all conformed to the same pattern, with a group of people being introduced in the first sentence and an individual of this group being referred to in the second sentence. The following example stimulus illustrates this pattern:

2. *Iedereen was zijn tanden aan het poetsen. Zo was ook Daphne/Robert zich aan het klaarmaken om naar bed te gaan.*
   'Everyone was brushing his teeth. Daphne/Robert, too, was getting ready to go to bed.'

In the first sentence of the experimental stimuli, a group was introduced by means of the indefinite pronoun *iedereen* 'everyone'. All members of this group were engaging in a particular activity (e.g., *brushing teeth*). These activities were always expressed by means of the possessive pronoun and masculine generic *zijn* 'his' introducing a direct object, followed by a progressive verb form. These activities were further intended to introduce a gender stereotype. These stereotypes were either stereotypically female (e.g., *yogaoefeningen doen* 'doing yoga exercises'), male (e.g., *voetbaltrucs oefenen* 'practicing soccer tricks') or neutral (e.g., *tanden poetsen* 'brushing teeth') according to a pre-test (see below for details on this pre-test). In the second sentence of the experimental stimuli, reference was made to either a male or a female individual by means of a proper name. These names were carefully selected from the *Nederlandse Voornamenbank* 'Dutch first name database' by the Meertens Institute (n.d.). We selected 30 male and 30 female proper names (48 for the experimental stimuli, twelve for the controls) from the annual list of the 60 most popular names in the Netherlands from 1990 through 2009. All names count two syllables and are between four and six characters long. We further only chose names which could be identified as either unambiguously male or female, as agreed upon by three native speakers. These three native speakers further also evaluated all sentence pairs regarding the likelihood that the mentioned individual would be interpreted as being part of the group mentioned in the first sentence. This was the case for all items.

Of the 48 experimental items, 16 featured male, female and neutral activities, respectively. Within each stereotype category, half the stimuli (i.e., eight sentence pairs) featured a female name, while the other half featured a male name. Two lists were created to make sure that each sentence pair occurred with both a female and a male continuation and participants were pseudo-randomly assigned to either list.

The purpose of the twelve control items was to assure that any observed effects were indeed due to the experimental manipulation, that is, the occurrence of the masculine generic *zijn* and/or the biasing male and female stereotype context and not due to a more general male bias as has been previously suggested by some researchers (Irmen, 2007; Irmen & Roßberg, 2004; Silveira, 1980). Therefore, the controls differed from the experimental items in two ways. First, the masculine generic *zijn* was omitted. Second, only neutral (and therefore non-biasing) activities were used. The following example illustrates the design of the control items:

3. *Iedereen was een treinkaartje aan het kopen. Zo was ook Amber bij het loket in de rij gaan staan.*
   'Everyone was buying a train ticket. Amber, too, had gotten in line at the counter.'

As with the experimental items, half of the controls featured a male or female proper name, respectively. Again, this was counterbalanced across lists.

The 36 filler items were designed to mask the experiment's purpose and featured neither the masculine generic *zijn* nor female or male individuals:

4. *Iedereen was de toets aan het maken. Ze hadden er bijna twee uur de tijd voor.*
   'Everyone was taking the test. They had almost two hours.'

After half of all 96 sentence pairs, evenly distributed over experimental, control and filler items, a statement about the content was displayed. For example, participants had to respond to the statement in (5) after reading the sentence pair in (4).

5. *De toets duurde een half uur.*
   'The test took half an hour.'

These statements had to be judged as correct or incorrect. The primary purpose of this task was to keep participants engaged and motivated to read the sentence pairs attentively, and to be able to check if they in fact did so. Since the analysis of response times was not of interest for the purpose of this experiment, correct and incorrect statements were evenly distributed over experimental items, controls and fillers.

Pre-test

Stereotype ratings for 123 potentially stereotypical activities were obtained through an online pre-test administered via Qualtrics (2018). Forty participants (20 male) between the ages of 19 and 32 (M = 23.5) completed the online pre-test, none of whom participated in the eye-tracking experiment. They were asked to indicate the probability of each activity being carried out by a man or a woman on a 7-point Likert scale. Scale direction was varied so that the leftmost point corresponded to *female* for one half of the participants and to *male* for the other half. In accordance with previous research (Gabriel et al., 2008; Kennison & Trofe, 2003; Misersky et al., 2014), the mean stereotypicality of each activity (with 1 equaling female and 7 equaling male) was calculated, ranging from 1.2 for *beha rechtdoen* 'adjusting bra' to 6.5 for *snor scheren* 'shaving moustache'. From these 123 activities, 16 activities with SD < 1.0 were chosen for each of the three stereotype categories in the eye-tracking experiment. An additional twelve neutral activities with SD < 1.0 were chosen for the control items. All chosen female activities had scored a rating of 3 or lower, male activities had scored a rating of 5 or higher, and

neutral stereotypes were centered around 4. The chosen female and male stereotypes were similar in strength ($M = 2.23$, $SD = 0.5$ for female stereotypes, reversed $M = 2.45$, $SD = 0.38$ for male stereotypes). See the Appendix for all used activities and their pre-test ratings.

All chosen activities were deemed likely to evoke a distributive rather than a collective reading, the former being associated with exhaustive pairing. This means that *each* individual is paired with *one* unique item, there being as many individuals as items. The collective reading, on the other hand, results in an interpretation in which *all* individuals are related to *one* unique item. Consider the following example for illustration:

6. *Everyone was brushing his teeth.*

While being ambiguous, the sentence will probably be interpreted in the way that each individual who is brushing teeth is brushing *their own* teeth, this distributive reading being necessary in order for the use of the masculine generic to be felicitous. The other available, but unlikely reading is that everyone is brushing the teeth of one male individual (i.e., the collective reading), in which case the masculine generic reading of the pronoun is not available. Three native speakers of Dutch checked the selection of activities for the eye-tracking experiment and deemed it unlikely for the collective reading to be evoked by any of the items.

Apparatus and procedure

The experiment was conducted at the Utrecht Institute of Linguistics Lab at Utrecht University, using the EyeLink 1000 remote desktop eye-tracker and the experiment display software ZEP (Veenker, 2012). The participants' right eye was sampled at 500Hz, but viewing was binocular. The stimuli were presented in a sound-attenuated booth on a 1024×768 monitor, approximately 60cm away from the participant. The stimuli were presented using a medium monospaced font. All participants were tested individually. Upon arrival, participants were informed about the procedure and asked to read the instructions, which were presented on screen. The eye-tracker was fine-tuned to the participant's eyes, and a calibration and a similar validation procedure followed, during which participants had to fixate a random sequence of dots through 12 positions on the screen. After a practice trial featuring three sentence pairs with two of them being followed by a statement that required a response, participants were given the option to ask clarification questions. After another calibration and validation procedure, the main part of the experiment followed. Stimuli were presented pseudo-randomly, with a maximum of three experimental items following each other and a maximum of two experimental items from the same condition following each other. A drift-check was displayed before all 96 sentence pairs. After the eye-tracking experiment, participants

answered the exit question, probing them for the purpose of the experiment. Participants were then paid for their participation.

Analysis

First, the fixation pattern of each item was manually checked for each participant. When a systematic and unambiguous shift of all fixations had occurred, these fixations were reassigned to the corresponding regions in accordance with lab recommendations. Furthermore, if the first fixation did not fall on the first word, but the second fixation did, the first fixation was deleted to be able to calculate reading time measures appropriately. After this initial clean-up phase, four reading time measures were calculated: first fixation duration, first gaze duration, regression path duration and total fixation duration. First fixation duration is the duration of the first fixation in a particular region. First gaze duration comprises all fixations in a region before it is left in a forward or backward direction. Regression path duration is the sum of fixations in a particular region including regressions to earlier parts of the text until the region is left in a forward direction. Total fixation duration comprises all fixations in a particular region, thus including regressions back to that region. An increase in any of these reading time measures is assumed to reflect an increase of the cognitive processing load in a particular region (Rayner, 1998, 2009). The example in (7) illustrates how experimental items were divided into separate regions for the analysis.

7. *[Iedereen]$_1$ [was zijn]$_2$ [tanden aan het poetsen]$_3$. [Zo was]$_4$ [ook Daphne]$_5$ [zich aan het klaarmaken]$_6$ [om naar bed te gaan.]$_7$*
   [Everyone]$_1$ [was his]$_2$ [teeth brushing]$_3$. [So was]$_4$ [also Daphne]$_5$ [getting ready]$_6$ [to go to bed.]$_7$
   'Everyone was brushing his teeth. Daphne, too, was getting ready to go to bed.'

Region 5 was the primary region of interest and consisted of the proper name preceded by *ook* 'too'. The decision to include *ook* in this region was made to reduce the probability of the primary region being skipped. This decision is licensed by previous research showing that semantic information is processed parafoveally six to eight characters to the right of the fixated word (McConkie & Rayner, 1975; Schroyens et al., 1999). Region 6 functioned as a spillover region and varied in length between three and four words, depending on the item. If the total character length of the first three words after the proper name counted less than 13 characters, a fourth word was added in order to reduce variability in the region's length.

For the controls, the division into regions was done the following way, with the primary region of interest being the proper name including the preceding *ook* and the spillover region being defined in the same way as for the experimental items:

8. *[Iedereen was een treinkaartje aan het kopen.]$_1$ [Zo was]$_2$ [ook Amber]$_3$ [bij het loket in]$_4$ [de rij gaan staan.]$_5$*
   [Everyone was buying a train ticket.]$_1$ [So was]$_2$ [also Amber]$_3$ [at the counter]$_4$ [standing in line.]$_5$
   'Everyone was buying a train ticket. Amber, too, was standing in line at the counter.'

For both experimental and control items, skipped regions were treated as missing data, and log transformations were performed to correct for a positive skew in the control and the experimental data. Observations that were at least 2.5 standard deviations above or below both the condition's and the region's mean were excluded.

We modeled the four different reading time measures on the region of interest and the spillover region using linear mixed-effect models. This was done by means of the *lmer* function from the *lme4* package in R (Bates, Mächler, et al., 2015; R Core Team, 2018). Model selection was done as follows. Committing to a hypothesis-driven approach, STEREOTYPE, CONTINUATION and the interaction between the two were included in every model. For control items, CONTINUATION served as the only initial fixed effect. These categorical variables were coded using sum contrasts. *Female continuation* was coded as 1, *male continuation* was coded as -1. As STEREOTYPE is a three-level factor, two different contrasts were defined, one contrasting the *female* level with the overall mean (*female* = 1, *male* = 0, *neutral* = −1), the other contrasting the *male* level with the overall mean (*female* = 0, *male* = 1, *neutral* = −1). The full random structure permitted by the design (Barr, 2013; Barr et al., 2013) was initially included as well. Following Bates et al. (2015), the random structure was then simplified if there were signs of overparameterization (i.e., when the maximal model failed to converge and/or PCA revealed overparameterization). Simplification was done first by suppressing the correlation parameters. When the PCA still pointed towards overparameterization, the smallest and thus least important variance component was dropped from the model and the PCA was repeated. In a final step, insignificant variance components were dropped making use of Likelihood ratio tests as described by Bates et al. (2015). If removing a variance component significantly decreased the model fit, it was included in the final model. This procedure resulted in all models containing random intercepts for items and subjects only. After the appropriate random effects structure was identified, it was tested using Likelihood Ratio tests whether adding PARTICIPANT GENDER as a fixed effect significantly improved the model. PARTICIPANT GENDER was

first added only as a main effect and a Likelihood ratio test was performed. In a second step we added the interactions as well and performed another Likelihood ratio test. Depending on which of these tests was significant, PARTICIPANT GENDER was added to the model either as a main effect or including all possible interactions or not at all. PARTICIPANT GENDER was coded as 1 for *female* and −1 for *male.* Previous studies on role nouns did not find evidence that men and women differ in their processing of masculine generics (Gygax et al., 2008; Irmen, 2007; Irmen & Roßberg, 2004), but we decided to control for the possibility nonetheless as effects of participant gender have previously been reported by some studies into pronouns using offline methods (Moulton et al., 1978; Switzer, 1990). As models lacking random slopes are often criticized for being anticonservative (Barr et al., 2013), the conclusions drawn from the final model were compared against those permitted by the model with the most complex random structure that converged. Any discrepancies between significant betas are reported. Following Wald's criterion, an effect within a model was deemed significant when the absolute *t*-value exceeded 1.96 (Hox, 1995; Quené & Van den Bergh, 2004). *P*-values were obtained using the normal approximation to the *t*-statistic. Significant *t*-values are reported for the best models.

Results

Eight out of 92 participants correctly guessed the purpose of the experiment, and their data were therefore excluded from further analysis. Seven of these participants correctly indicated that the experiment investigated a mismatch between the gender stereotype and the gender of an individual (criterion (a)). One participant correctly guessed that the experiment investigated a mismatch between the gender suggested by the masculine generic and the gender of an individual (criterion (b)). Furthermore, the data from one participant were excluded from analysis due to poor quality, as fixations were shifted in an unsystematic manner and could not unambiguously be assigned. In addition, the data of one participant were excluded, because they indicated after the experiment that they were dyslexic. Data of the remaining 82 participants (38 males, age range 18-51, M = 22.89, SD = 4.87) were analyzed.

Experimental items

The removed outliers constituted the following percentages of the total data points: 2.6% for first fixation duration, 1.5% for first gaze duration, 1.1% for regression path duration and 1.1% for total fixation duration. The mean reading times for the proper names and spillover region can be seen in Table 1.

Table 1. Mean reading times per condition for the proper name region and spillover region.

		Reading time measure							
		FFdur		FGdur		RPdur		TFdur	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Proper name									
stereotype	*continuation*								
neutral	female	180	50	222	107	397	264	405	255
neutral	male	181	51	223	106	389	252	393	250
male	female	187	53	235	116	385	241	427	270
male	male	181	50	243	129	377	231	422	268
female	female	185	55	225	107	362	222	419	291
female	male	185	57	241	130	405	256	456	289
Spillover									
stereotype	*continuation*								
neutral	female	196	57	496	266	580	338	671	378
neutral	male	195	56	475	265	572	350	665	428
male	female	203	67	457	261	601	427	688	424
male	male	207	66	479	284	572	367	688	430
female	female	194	53	466	263	559	346	655	394
female	male	201	59	463	247	559	343	663	397

Means (M) and standard deviations (SD) given in milliseconds for first fixation duration (FFdur), first gaze duration (FGdur), regression path duration (RPdur) and total fixation duration (TFdur).

Primary region of interest: The proper name

The earliest significant effects were found for first gaze duration on the proper name. Adding PARTICIPANT GENDER to the model significantly improved the model fit, and the effect of PARTICIPANT GENDER itself was significant ($\beta = -0.05$, $SE = 0.02$, $t = -2.24$, $p = 0.025$), suggesting that on average the first gaze duration of female participants was significantly shorter. Furthermore, there was a significant effect of STEREOTYPE. First gaze duration was significantly longer after stereotypically male contexts ($\beta = 0.03$, $SE = 0.01$, $t = 2.56$, $p = 0.010$). The comparison between the female contexts and the overall mean, on the other hand, was not significant ($\beta = 0.005$, $SE = 0.01$, $t = 0.32$, $p = 0.750$).

The model for regression path duration revealed a significant interaction effect between STEREOTYPE and CONTINUATION for the female stereotype contexts ($\beta = -0.04$, SE = 0.01, $t = -3.25$, $p = 0.001$). As can be seen in Figure 1, female proper names were read significantly faster compared to male proper names in female stereotype contexts, but no such difference was found in the other stereotype contexts. The interaction effect

between STEREOTYPE and CONTINUATION for the male stereotype contexts, on the other hand, was not significant (β = 0.02, SE = 0.01, t = 1.92, p = 0.055). To summarize, encountering a male proper name (i.e., CONTINUATION = male) in a female stereotype context led to a significant increase in regression path duration, but encountering a female proper name after a male stereotype context did not. Furthermore, no difference between proper names was found for neutral stereotype contexts.

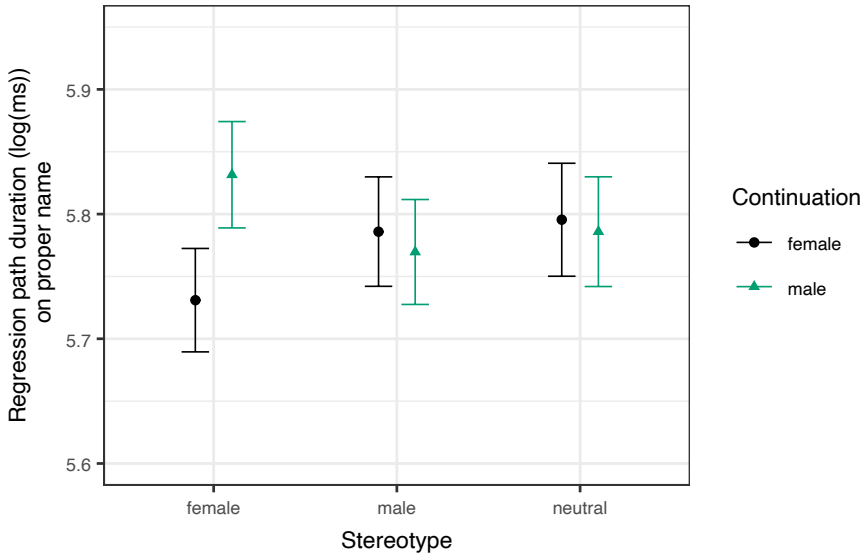

Figure 1. Mean log-transformed regression path duration on the proper name with 95% within-subject confidence intervals based on Morey (2008).

Thus, participants spent more time on the proper name itself and reread previous portions of the text when they read sentence pairs as in (9):

9. *Iedereen was zijn yogaoefeningen aan het doen. Zo was ook Peter goed bezig met een oefening.*
   'Everyone was doing his yoga exercises. Peter, too, was engaged in an exercise.'

However, sentence pairs such as in (10), featuring a woman engaging in a stereotypically male activity, did not lead to a significant increase in regression path duration:

10. *Iedereen was zijn voetbaltrucs aan het oefenen. Zo was ook Laura al urenlang met de bal bezig.*
    'Everyone was practicing his soccer tricks. Laura, too, had been playing with the ball for hours.'

No evidence for a male bias induced by *zijn* was found: There was no significant increase of regression path duration for female proper names compared to male proper names in the neutral stereotype context, where such a male bias should be easily detectable, nor in the female and male stereotype context.

A similar pattern arose for total fixation duration. There was a significant effect of PARTICIPANT GENDER, with female participants' total fixation duration being significantly shorter overall ($\beta = -0.11$, $SE = 0.03$, $t = -3.8$, $p < 0.001$). Furthermore, similar to the results for regression path duration, the interaction effect between STEREOTYPE and CONTINUATION was significant for the female stereotype contexts ($\beta = -0.04$, SE = 0.01, $t = -3.61$, $p < 0.001$), but not when contrasting the male stereotype contexts with the overall mean ($\beta = 0.02$, SE = 0.01, $t = 1.89$, $p = 0.058$), as can be seen in Figure 2.

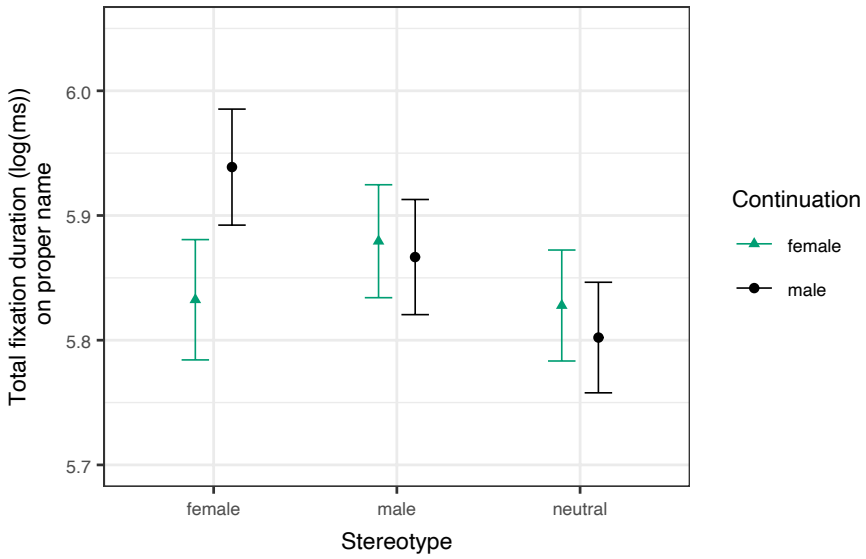

Figure 2. Mean log-transformed total fixation duration on the proper name with 95% within-subject confidence intervals based on Morey (2008).

Thus, as with the results for regression path duration, encountering a male proper name in a female stereotype context led to a significant increase in reading times compared to female proper names, while no such difference between proper names was found for

neutral and male stereotype contexts. No evidence for the presence of a male bias induced by the masculine generic *zijn* was found, as there was no significant increase in total fixation duration for female continuations in any of the contexts.

Spillover region

Two significant main effects emerged for first fixation duration in the spillover region. There was a significant main effect of CONTINUATION, suggesting that first fixations for female continuations ($M = 197.5$, $SD = 59.4$) and male continuations ($M = 201.1$, $SD = 59.4$) differed significantly ($\beta = -0.01$, SE = 0.004, $t = -2.24$, $p = 0.025$). Note, however, that this rather small difference of 3.6 milliseconds is hardly meaningful and mainly driven by the small standard error. We further found a significant main effect of STEREOTYPE, with first fixations being significantly longer after male stereotype contexts ($\beta = 0.02$, SE = 0.01, $t = 2.12$, $p = 0.034$). There were no significant effects for first gaze duration.

For regression path duration, the only significant effect was PARTICIPANT GENDER. Male participants showed a higher regression path duration in the spillover region than female participants ($\beta = -0.07$, SE = 0.03, $t = -2.27$, $p = 0.023$).

For total fixation duration in the spillover region, there was again a significant main effect of PARTICIPANT GENDER ($\beta = -0.07$, SE = 0.03, $t = -2.52$, $p = 0.012$), but more interestingly there was a significant interaction effect between PARTICIPANT GENDER and CONTINUATION ($\beta = 0.02$, $SE = 0.01$, $t = 2.13$, $p = 0.033$). Female participants showed slightly higher reading times in the spillover region after a female proper name ($M = 638.9$, $SD = 379$) than after a male proper name ($M = 615.9$, $SD = 376$) in the case of total fixation duration. The pattern was reversed for male participants, with a slightly higher total fixation duration after male proper names ($M = 736$, $SD = 454.3$) than after female proper names ($M = 709.1$, $SD = 417.9$). As can be seen in Figure 3, this seems to be mainly driven by differences in the neutral stereotype contexts, but the three-way interactions were not significant and therefore do not support this ($\beta = -0.02$, $SE = 0.01$, $t = -1.46$, $p = 0.14$ for the male stereotype contrast, $\beta = -0.02$, $SE = 0.01$, $t = -1.8$, $p = 0.07$ for the female stereotype contrast).

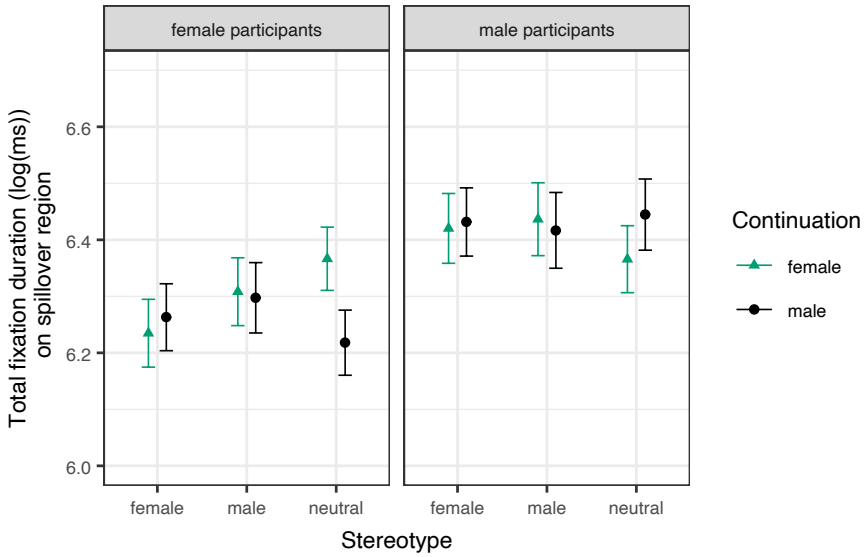

Figure 3. Mean log-transformed total fixation duration on the spillover region split for male and female participants with 95% within-subject confidence intervals based on Morey (2008).

Control items

As with the experimental stimuli, all observations 2.5 standard deviations above or below condition and region mean were removed. Based on this criterion, 2.8% of the observations were removed for first fixation duration, 2% for first gaze duration, 1.2% for regression path duration and 0.8% for total fixation duration.

For all the reported models, the best random structure was identified as featuring random intercepts for both participants and items, but no random slopes for any of the fixed effects. No significant effect of CONTINUATION was observed in any of the models. Similar to the experimental items, a significant effect of PARTICIPANT GENDER was occasionally observed, with male participants taking longer than female participants. On the proper name, this effect of gender was observed for first gaze duration ($\beta = -0.05$, $SE = 0.02$, $t = -2.18$, $p = 0.030$), for regression path duration ($\beta = -0.07$, $SE = 0.04$, $t = 2$, $p = 0.046$) and total fixation duration ($\beta = -0.11$, $SE = 0.03$, $t = -3.75$, $p < 0.001$). In the spillover region, this effect was observed for first gaze duration ($\beta = -0.05$, $SE = 0.03$, $t = -2.12$, $p = 0.034$) and for total fixation duration ($\beta = -0.09$, $SE = 0.03$, $t = -2.86$, $p = 0.004$).

Discussion

We conducted an eye-tracking experiment to test whether the Dutch masculine generic pronoun *zijn* 'his' leads to a male bias despite being generically-intended. By presenting

zijn 'his' in female, male and neutral stereotype contexts, we could further test whether this hypothesized male bias persisted across contexts or – alternatively – was overruled by it.

No evidence of a male bias

Against our expectations, we found no evidence that the grammatical gender of *zijn* 'his' biased participants towards a male interpretation. Thus, in the absence of other gender cues, participants' reading times of male and female proper names did not significantly differ despite the use of a grammatically masculine pronoun. Mostly older offline research on English masculine generic pronouns had previously found evidence for a male bias caused by masculine generic pronouns (Gastil, 1990; Hamilton, 1991; Hyde, 1984; M. M. Miller & James, 2009; Moulton et al., 1978; Switzer, 1990), but the present study is the first to thoroughly investigate the *processing* of masculine generic pronouns. This difference in methodology and consequently a difference in the measured construct could explain this. As outlined earlier, offline methods might not reflect the presence of an automatic gender inference induced by the grammatical gender of the pronoun. Any observed male bias might instead be caused by participants' conscious reasoning. In our eye-tracking experiment, however, we did not give participants the opportunity to ponder on how the masculine generic *zijn* 'his' is intended – generic or male-specific; reading times reflected the *immediate* processing of the masculine generic. It is therefore possible that the male bias of the generically-intended possessive pronouns is amplified – or only comes to light – when allowing for more strategic and explicit responses.

Another reason for not finding a male bias might lie in the lower salience of the possessive pronoun compared to role nouns. In addition to being only a subpart of a larger noun phrase, this noun phrase also appeared as a direct object. The masculine generic was further used anaphorically, thus as referring back to previously introduced referents. Conversely, the online experiments testing the male bias of masculine generic role nouns usually make use of stimuli in which the role noun is introduced as the subject of the sentence and as a noun phrase in its own right (Garnham et al., 2012; Gygax et al., 2008; Irmen, 2007; Irmen & Roßberg, 2004). Thus, the grammatical gender of a possessive pronoun might be more easily overlooked due to its lower salience and anaphoric use.

In a similar vein, it is possible that in Dutch, particularly, the grammatical gender of the generically-used possessive pronoun affects processing only to a limited degree. The Dutch grammatical gender system has recently undergone a process of resemanticization (Audring, 2006). Dutch as spoken in the Netherlands only distinguishes between common and neuter grammatical gender on nouns, but retained the original three-way distinction between masculine, feminine and neuter on pronouns. Thus, there is a

mismatch between the nominal and pronominal gender system. Audring's analysis (2006) shows that this mismatch is resolved by using the masculine grammatical gender as a sort of default when something or someone is highly salient as an individual. The feminine gender, however, is only used when referring to female individuals or to a few female animals (Audring, 2006). Thus, the generic function of the masculine grammatical gender is omnipresent in Dutch and might be more readily available compared to other languages.

Another Dutch peculiarity might have added to the generic potential of the possessive pronoun specifically. At the surface code level, the possessive pronoun *zijn* shows structural overlap with two other pronouns: *zij* 'they' and *zij* 'she'. Past research on visual word recognition has shown that partial words prime their targets (Grainger & Jacobs, 1993; Marslen-Wilson & Zwitserlood, 1989). Thus, it is possible that the activation of female *zij* 'she' and underspecified *zij* 'they' counteracted a male bias induced by masculine *zijn* 'his'. Previous research on German role nouns as masculine generics has shown that subtle morphological relations may attenuate the male bias of masculine generics. More specifically, Garnham et al. (2012) found that the presence of the German pronoun *sie* 'they' can attenuate the male bias of role nouns as masculine generics due to its resemblance with feminine *sie* 'she'. However, we deem it unlikely that this structural overlap overwrote expectations based on grammar, as *zij* 'she' and *zij* 'they' would both be ungrammatical when used instead of the possessive pronoun *zijn* 'his' in our stimuli.

Finally, as we outlined before, we believe that masculine generic pronouns might work inherently differently from masculine generic role nouns, for which a male bias has been found repeatedly (Garnham et al., 2012; Gygax et al., 2008; Irmen, 2007; Irmen & Roßberg, 2004; Misersky et al., 2019). The generic potential of pronouns might be higher overall, as the very same masculine generic token is used generically over and over again. For role nouns, it is only the pattern type that is repeated and differences in the frequency of the feminine compared to the masculine form of an individual role noun might determine to what extent a specific masculine role noun can be interpreted as generic (Backer & Cuypere, 2012). Future research is necessary to replicate the present results both in Dutch and in other languages to determine whether masculine pronouns can truly be interpreted generically, whether this is only true for Dutch or even only for the possessive pronoun in Dutch. We have clearly shown that there is a necessity to expand research into masculine generics to other types than role nouns in order to understand their effect on language processing and beyond.

Gender stereotypes and attitudes towards their violation affect language processing
While the pronoun did not significantly affect sentence processing, gender stereotype violations did. When a male proper name was mentioned after a female context, a significant increase in regression path duration and total fixation duration occurred; when a female proper name was mentioned after a male context, no such increase occurred. Thus, a man engaging in a female activity led to processing difficulties while the reverse was not the case. Theoretically, this could be due to a difference in the strength of the female and male stereotypes used in our experiment. However, these had been carefully pre-tested drawing from the same population, and they were carefully selected based on their mean and standard deviation (see the Materials and method section for details). Further backing up our claim that the asymmetry we found is meaningful is the fact that this asymmetry has been found in two other eye-tracking studies (Reali, Esaulova, & Von Stockhausen, 2015; Reali, Esaulova, Öttl, et al., 2015) and two priming experiments investigating response times (Cacciari & Padovani, 2007) and event-related potentials (Siyanova-Chanturia et al., 2012).

Cacciari and Padovani (2007) adapted their experiment from the priming experiment by Banaji and Hardin (1996), and provided linguistic evidence for an asymmetrical response to gender stereotype violations. The authors tested Italian role nouns which, when presented in bare form, could refer to either men or women grammatically (e.g., *emigrante* 'emigrant'), but they differed in terms of gender stereotype between male and female. An additional neutral baseline condition was used. The role nouns functioned as primes for the pronouns *lui* 'he' and *lei* 'she', the grammatical gender of which participants had to indicate as fast as possible. Cacciari and Padovani (2007) found that participants generally responded faster when the pronoun gender and the gender stereotype matched. They also found that a mismatch led to an increase in response times compared to the neutral baseline, but *only* for stereotypically female role nouns being followed by a masculine pronoun. When *lei* 'she' was the target, no difference was found for response times after a stereotypically male and neutral prime. Siyanova-Chanturia et al. (2012) employed a similar design, additionally measuring event-related potentials. They found an N400-like effect when a masculine pronoun was presented after a stereotypically female prime, but not when a feminine pronoun was presented after a stereotypically male prime. Reali, Esaulova, and Von Stockhausen (2015), in an attempt to disentangle the effect of a role noun's grammatical gender and its stereotypicality in German, used descriptions of role nouns in their eye-tracking stimuli instead of the role nouns themselves (e.g., *makes appointments, deals with the correspondence in an office* as a description of *secretary*). They found that following female role noun descriptions, participants had difficulty when the described person (e.g., *the secretary*) was revealed to be a man. However, in the reverse condition, when a woman was revealed to work in

a stereotypically male job, reading times did not increase. One of the possible explanations the authors offered for this lies in the grammatical gender of the described role nouns. Reali, Esaulova, and Von Stockhausen (2015) argue that the role noun descriptions might have activated the role noun itself and therefore its grammatical gender. For stereotypically male role noun descriptions, the grammatically masculine role noun would have been activated. For stereotypically female role nouns, the grammatically feminine role noun would have been activated. Since grammatically masculine role nouns can at least in theory be interpreted as generic in German, participants might not have experienced processing difficulties when reading about a female individual in a male stereotype context. However, grammatically feminine role nouns can only be used to refer to female individuals. Thus, when a male individual is mentioned, processing difficulties occur in a female stereotype context. Reali, Esaulova, and Von Stockhausen (2015) interpreted the fact that this asymmetry had up to that point only been found in languages distinguishing between masculine and feminine grammatical gender as support for this explanation. However, this idea is not compatible with our own results as we did not use descriptions of role nouns, which could have activated the role nouns' grammatical gender, but instead we used a myriad of activities, most of which cannot be captured by a specific role noun. Furthermore, in a follow-up experiment applying the same method to English role nouns, Reali, Esaulova, Öttl, et al. (2015) found the same asymmetry. As English does not mark grammatical gender on nouns (with a few potential exceptions such as *waitress* carrying the suffix *–ess* for female agents), the explanation of the grammatical gender of described role nouns being automatically activated can definitely be ruled out.

Instead, we propose that discourse expectations about upcoming referents are not only guided by the typicality of role nouns or activities, but also by the acceptability of violating these stereotypes. This is in line with research in social psychology and sociology showing that men violating gender roles are disapproved of more than women violating gender roles (Feinman, 1981; McCreary, 1994; Sirin et al., 2004; Zucker et al., 1997). The first of the two main competing explanations roots this asymmetry in a difference between men and women's social status. For example, Feinman (1981) argued that the male role enjoys higher status than the female role. Therefore, men engaging in stereotypically female behavior are seen as seeking downward mobility and decreasing in status, whereas women engaging in stereotypically male behavior seek upward mobility, which constitutes an increase in status. As Feinman (1981, p. 297) put it: “it is worse to be a sissy than a tomboy”. Alternatively, the sexual orientation hypothesis suggests that men who exhibit feminine behavior are more likely to be thought of as homosexual than women behaving in a masculine manner, this, too, being a group with lower social status (McCreary, 1994). Whatever the exact cause of the phenomenon that

men's gender roles are more rigid, it is reflected in online processing. This adds to previous research showing that social stereotypes are rapidly used in language processing (Van Berkum et al., 2008; Van den Brink et al., 2012).

We did not, however, find evidence of any discrepancy in social status between men and women being reflected in language processing. While it was not the focus of our study to test whether a more general male bias in language processing exists even in the absence of masculine generics (i.e., the people=male bias), we had to control for the possibility that men are in fact seen as the prototypical humans, as has been suggested by some studies (Irmen, 2007; Irmen & Roßberg, 2004; Silveira, 1980). This could have possibly led to the generally faster processing of contexts featuring male individuals, but we did not find evidence for this.

Participant gender and other puzzles

An interaction effect including participant gender emerged in the spillover region: whether a male or female proper name was presented had a differential effect on male and female participants. Female participants' total fixation duration slightly increased when a female proper name had been mentioned. For men, the pattern was reversed. Thus, participants seemed to pay more attention to the spillover region when the protagonist shared their gender. Due to careful counterbalancing, this interaction effect cannot be due to differences in the stimuli. Surprisingly, this effect was not found for the maximally similar control items. Future research will have to determine whether participants' interest in stimuli featuring protagonists of their own gender was a statistical fluke or rather constitutes a robust pattern.

Participant gender affected our results in yet another way. On many reading measures both on the proper names and spillover regions for experimental items and controls, we found that male participants showed increased reading times overall. A similar effect was found in an eye-tracking experiment by Reali, Esaulova, Öttl, et al. (2015). Furthermore, Osterhout et al. (1997) and Siyanova-Chanturia et al. (2012) found that women's electrophysiological responses to gender stereotype violations can be stronger as reflected in larger ERP deflections. However, the effect in our experiment seems to be of a more general nature as it was found not only in response to gender stereotype violations, but also in their absence. This suggests that the effect we found is likely due to a more general difference: Women are often found to be better and faster readers than men (Camarata & Woodcock, 2006; Roivainen, 2011).

We further found that first gaze duration was increased on the proper name – regardless of the gender of the referent – after male stereotype contexts compared to neutral stereotype contexts. The same was found for first fixation duration in the spillover region. We interpret these as spillover effects from the stereotype context itself.

This could be due to an elaborative gender inference being made based on the stereotype context (Carreiras et al., 1996; Garnham et al., 2002; Oakhill et al., 2005). However, no significant increase in reading time was found for female stereotype contexts compared to neutral contexts, which renders this explanation unlikely. We therefore believe this increase to be due to item-inherent frequency effects: The combined nouns and verbs used for neutral stereotype contexts are presumably more frequent than the male stereotypes.

Conclusion

To conclude, we found no evidence for a male bias induced by the generically-intended masculine pronoun *zijn* 'his'. This emphasizes the importance of considering different types of masculine generics cross-linguistically in order to understand how they affect language processing. We showed that gender inferencing in language goes beyond the mostly occupational and social stereotypes carried by role nouns, but pertains to stereotypical activities, too. Furthermore, our results indicate that discourse expectations are not only guided by the strength of gender stereotypes themselves, but also by the severity of flouting them.

Chapter 3: The male bias of a masculine generic pronoun: Evidence from eye-tracking and sentence evaluation

Abstract

Two experiments tested whether the Dutch possessive pronoun *zijn* 'his' gives rise to a gender inference and thus causes a male bias when used generically in sentences such as *Everyone was putting on his shoes*. Redl, Eerland and Sanders (2018, Chapter 2) previously found no evidence for such a male bias. Experiment 1 (N = 120, 48 male) was a conceptual replication of their eye-tracking study. The results showed the masculine generic pronoun to trigger a gender inference and cause a male bias, but for male participants and in neutral stereotype contexts only. No evidence for a male bias was thus found in stereotypically female and male contexts and for female participants altogether. Experiment 2 (N = 80, 40 male) used the same stimuli as Experiment 1, but employed the sentence evaluation paradigm. No evidence of a male bias was found in Experiment 2. Taken together, the results suggest that the masculine generic pronoun *zijn* 'his' can cause a male bias for male participants when no other gender information is provided, but only surfaces with a method such as eye-tracking, which taps directly into automatic language processing. Furthermore, the results suggest that the intended generic reading of the masculine possessive pronoun *zijn* 'his' is readily available for women.[9]

[9] This chapter has been submitted as: Redl, T., Frank, S.L., De Swart, P. & De Hoop, H. The male bias of a masculine generic pronoun: Evidence from eye-tracking and sentence evaluation.

Introduction

Words with masculine grammatical gender enjoy a special status in many languages. They can be used in a generically-intended way when referring to people whose gender is unknown, unspecified, or when referring to groups of mixed gender. For example, the Dutch tabloid *De Telegraaf* published an article with the following headline about the cost and merits of higher education:

1. *Wat kost een student? En wat levert hij op?*
   'How much does a student (MASC.) cost? And how much does he generate?'
   (De Telegraaf, 2014)

We see two instances of these so-called masculine generics in the example above: the masculine role noun *student* 'student' and the pronoun *hij* 'he'. Clearly, the newspaper article is intended to refer to students regardless of their gender. A question which has occupied linguists for decades is whether such generically-intended masculine word forms trigger a gender inference and make language users think of the referents as male despite their generic intention. Such a male bias has been consistently found for grammatically gender-marked role nouns in languages such as German, French and Norwegian (Gabriel & Gygax, 2008; Gygax et al., 2008; Irmen, 2007; Misersky et al., 2019). This has been shown using various methods such as sentence evaluation (Gygax et al., 2008), self-paced reading (Irmen & Roßberg, 2004), eye-tracking (Irmen, 2007) and EEG (Misersky et al., 2019). All these studies made use of a variation of the following design: A group of people is introduced by means of a role noun in the masculine generic form, and then (a subpart of) the group is revealed to be male or female (e.g., *Die Studenten gingen zur Mensa, weil manche der Frauen/Männer Hunger hatten*. 'The students (MASC.) went to the canteen, because some of the women/men were hungry', Misersky et al., 2019). Usually, reading times or ERPs on the anaphor are compared (in this case *Frauen* 'women' versus *Männer* 'men'), with a longer reading time or larger deflection in the ERP component on the female continuation compared to the male continuation taken as evidence for a male bias. In the case of sentence evaluation experiments, participants are asked to indicate whether the second part of the sentence is a good continuation to the first part, with a higher number of no-responses and longer response times to female continuations – even when they are deemed good continuations – seen as an indication for a male bias. Compared to self-paced reading, eye-tracking and ERP studies, sentence evaluation requires conscious reasoning on the participants' part and therefore taps less into online processing. Nonetheless, taken together, these studies provide overwhelming evidence that masculine generic role

nouns indeed lead to an immediate male bias in online processing, at least for the languages that have been tested so far.

For pronouns, the available literature is of a different nature. As criticism of the use of English masculine generics such as *he* increased starting in the 1970s, linguists put the pronoun to the test and overwhelmingly found that it resulted in a male bias despite being generically-intended (Gastil, 1990; Hamilton, 1988; Hyde, 1984; Moulton, Robinson, & Elias, 1978; Switzer, 1990, but see Cole, Hill, & Dayley, 1983). However, these studies used offline methods almost exclusively and therefore did not tap into online processing. For example, some researchers asked participants to write a story about a person based on a prompt featuring a masculine generic (Hyde, 1984; Moulton et al., 1978; Switzer, 1990) while others asked participants to describe their mental imagery after reading or listening to prompts (Gastil, 1990; Hamilton, 1988). The more recent research trend of testing masculine generic role nouns with online methods such as eye-tracking and EEG has not been extended to the previously heavily researched English pronouns. This can be in part explained by the fact that the use of masculine generic pronouns in English has declined over the years due to conscious changes, and so has the research into this phenomenon (Earp, 2012; Miller & James, 2009). However, in other languages such as Dutch, masculine generic pronouns are still very commonly used and little is known about how they are processed. In an effort to answer whether masculine generic pronouns lead to an online and immediate male bias in processing in Dutch, Redl, Eerland, and Sanders (2018, Chapter 2) conducted an eye-tracking experiment. They constructed sentences featuring the possessive pronoun *zijn* 'his' in generically-intended contexts similar to the studies on role nouns, and measured reading times on a male or female proper noun later on, for example:

2. *Iedereen was **zijn** veters aan het strikken. Zo was ook **Maaike/Stefan** zich aan het klaarmaken om naar buiten te gaan.*
   'Everyone was tying **his** shoelaces. **Maaike (f)/Stefan (m)** was also getting ready to go outside.'

They varied the activity in the first sentence, which was expressed by a verb and a direct object, between neutral contexts (e.g., *tying shoelaces*), as well as stereotypically female (e.g., *doing yoga exercises*) and male contexts (e.g., *practicing soccer tricks*). This was done to test whether a male bias surfaced at all, which would be most clearly seen in neutral contexts, and whether this male bias persisted in contexts that provided additional gender information in the form of stereotypes. Contrary to their hypotheses, they found no evidence for a male bias of *zijn* 'his'. Put differently, they did not find an increase in reading times on female proper nouns in any of the contexts. They did, however, find that the violation of a gender stereotype led to an increase in reading time, but for male

protagonists transgressing expectations based on stereotypes only. Redl et al. (2018, Chapter 2) offered various possible explanations for why no evidence of a male bias of *zijn* 'his' was found. First, it could be that the masculine generic pronoun *zijn* 'his' simply does not trigger a gender inference. The masculine generic pronoun would then function as intended, namely as a true generic, since it does not make it more likely for referents to be mentally represented as male than female. Second, the masculine generic pronoun might lead to a male bias, but it was not detected in the eye-tracking experiment. According to Redl et al., one possibility for why the hypothesized male bias might not have surfaced lies in the method. The participants' only task during an eye-tracking experiment such as Redl et al.'s is reading; processing difficulties can be inferred from looking patterns and reading times, and the method therefore directly taps into automatic language processing. As explained above, studies on English *he* and *his* have found that these pronouns do lead to a male bias, but they have done so using methods that required more conscious processing and evaluation of what is being read than in the eye-tracking experiment by Redl et al. In a similar vein, using the sentence evaluation paradigm, Garnham, Gabriel, Sarrasin, Gygax and Oakhill (2012) and Gygax et al. (2008) found that the grammatical gender of role nouns overrode stereotype information in German. Thus, they found masculine generic role nouns to induce a male bias across neutral, female and male stereotype contexts when participants had to evaluate these sentences. Studies on German using the self-paced reading and eye-tracking methods, however, found gender stereotype information to have a mediating effect (e.g., Irmen, 2007; Irmen & Roßberg, 2004). It is thus possible that a male bias is more likely to surface when employing a task which requires more conscious processing and the evaluation of a stimulus (e.g., sentence evaluation) than a task tapping into automatic language processing (e.g., reading during eye-tracking).

The primary goal of the experiments presented in this paper is to test the hypothesis that the possessive pronoun *zijn* 'his' leads to a male bias in language processing. If, however, we were to replicate the null results found by Redl et al. (2018, Chapter 2), this would add to the evidence suggesting that the masculine gender of *zijn* 'his' does not trigger a gender inference and that the pronoun can in fact function as a true generic. The secondary goal of these experiments was to investigate whether the surfacing of a male bias is facilitated by a method requiring more conscious processing of the pronoun. To this end, we conducted two experiments. First, we conducted a conceptual replication of the eye-tracking experiment by Redl et al. to test if we were to find evidence for a male bias of *zijn* 'his' after making several improvements to their eye-tracking design. Second, we conducted a sentence evaluation experiment similar to Gygax et al. (2008) and Garnham et al. (2012) to test whether the male bias of *zijn* 'his' surfaces using a method which requires participants to process the masculine generic more consciously and go

beyond mere automatic processing. The same stimuli were used in both experiments. We further strove to balance our sample between female and male participants and include their gender in the analysis. Redl et al. had found no evidence of a male bias for either gender. However, past research has shown that men are more likely to experience a male bias when confronted with a masculine generic (Henley & Abueg, 2003).

Experiment 1: Eye-tracking during reading

The eye-tracking experiment reported below was a conceptual replication of Redl et al. (2018, Chapter 2). As described above, the goal was to test if evidence of a male bias induced by the possessive pronoun *zijn* 'his' would be found using a highly similar, but improved design, or if again no male bias induced by *zijn* 'his' would be found when repeating the experiment. We made several changes to the initial design. First of all, we selected new activities based on a large-scale rating study, which is detailed below. By doing this, we were able to counterbalance the stereotypically female and male activities even more, and also select neutral activities with a mean even closer to the middle of the scale. Twenty activities were the same as those from Redl et al., and an additional 52 new ones were used, all 72 based on the new rating study. Furthermore, several changes to the continuation of the sentence were made. A direct comparison of two stimuli featuring the same activity in Redl et al. and the current study can be seen in Table 1.

Table 1. Example stimuli for the current eye-tracking experiment and Redl et al. (2018, Chapter 2) with the most important changes in bold.

Study	Example stimulus
Current experiment	*Iedereen was zijn veters aan het strikken,* ***waaronder een paar vrouwen/mannen*** *die al tien minuten geleden hadden moeten vertrekken, maar zich hadden verslapen.* 'Everyone was tying his shoelaces, **among whom a few women/men** who would have had to leave ten minutes ago, but had overslept.'
Redl et al. (2018)	*Iedereen was zijn veters aan het strikken.* ***Zo was ook Maaike/Stefan*** *zich aan het klaarmaken om naar buiten te gaan.* 'Everyone was tying his shoelaces. **Maaike (f)/Stefan (m) was also** getting ready to go outside.'

Instead of using proper nouns to indicate the referents' actual gender, we used the nouns *vrouwen* 'women' and *mannen* 'men' to unambiguously identify the subgroup. This was done to eliminate variance induced by frequency effects of the proper nouns.

Furthermore, the group of people was introduced by the connective *waaronder* 'among whom', thereby more explicitly indicating membership status. A pre-test was conducted to assure that this reading was achieved. The sentences used in the current experiment were also longer than those in Redl et al. (2018, Chapter 2). This was mainly done to distract from the repetitive pattern and make the sentences more informative and engaging. We also decided to present the stimuli on the screen in a way that allowed us to also analyze reading times on the pre-view region of the noun indicating a gender (mis)match with the pronoun. In an eye-tracking experiment on German, Irmen (2007) introduced a group of people by means of a masculine generic role noun (e.g., *Nachbarn* 'neighbors (MASC.)') and then referred back to them by means of the noun phrase *diese Frauen/Männer* 'these women/men'. She treated the whole noun phrase as her main region of interest, but analyzed the determiner and the noun separately. A spillover region was analyzed as well. Irmen found an effect of stereotype on the determiner as well as on the spillover region, while the effect of grammatical gender (i.e., the male bias induced by the masculine generic) was found on the noun itself. This shows that effects of incongruent gender information can already affect reading times on the word preceding the noun identifying (some of) the referents' gender. The decision to include this pre-view region in the analysis was further informed by research into reading patterns, showing that semantic information up to six to eight characters to the right of the current fixation is processed (McConkie & Rayner, 1975; Schroyens et al., 1999). We further included a control condition for each of the six original conditions in Redl et al. The original conditions resulted from the manipulation of the stereotype context between neutral, female and male and manipulating the continuation between female and male. In addition, we now included six control conditions which were very similar to the experimental conditions, but replaced the singular masculine pronoun *zijn* 'his' with the plural neutral pronoun *hun* 'their', for example:

3. *Ze waren allemaal **hun** veters aan het strikken, waaronder een paar vrouwen/mannen die al tien minuten geleden hadden moeten vertrekken, maar zich hadden verslapen.*
   'They were all tying their shoelaces, among whom a few women/men who would have had to leave ten minutes ago, but had overslept.'

This allowed us to more clearly identify a possible effect of the masculine pronoun. We further decided to include participant gender as an independent variable in all models. Many studies on English masculine generic pronouns have found that women and men can differ regarding the effect of masculine generics (Hamilton, 1988; Moulton et al., 1978; Switzer, 1990; Wilson, 1978). More specifically, these experiments revealed that men showed a stronger male bias, and that women were more likely to arrive at the

generic reading. Like Redl et al. (2018, Chapter 2), we hypothesized that the masculine generic pronoun *zijn* 'his' would cause a male bias which would be mediated by the gender stereotype context. We further hypothesized that if men and women were to differ in their processing of the masculine generic pronoun, male participants would show a larger bias.

Materials & Method

Materials

We conducted a large rating study to identify stereotypically neutral, female and male activities to be used in the stimuli. We conceived of 363 potentially stereotypical activities through intensive brain-storming sessions. All activities had to be expressed by a transitive verb and a direct object (e.g., *tanden poetsen* 'brushing teeth'), so that a pairing with the possessive pronoun *zijn* 'his' was syntactically possible. We further tried to test as many activities as possible which would lead to a distributive reading (i.e., everyone brushing their own teeth) instead of a collective reading (i.e., everyone brushing the teeth of the same male individual). The distributive reading is necessary for the use of *zijn* 'his' as a masculine generic to be felicitous. While Redl et al. (2018, Chapter 2) had run a smaller rating study with 123 activities, we decided to find and test a larger number of potential stereotypical activities to be able to balance our stereotype conditions even more with regard to their strength. The rating study's design is also very similar to that of previous studies which tested the stereotypicality of role nouns such as *surgeon* (Beggs & Doolittle, 1993; Gabriel et al., 2008; Kennison & Trofe, 2003; Misersky et al., 2014). As previous studies have found that participant gender as well as scale direction affect stereotype ratings, we controlled for their influence.

A total of 56 native speakers of Dutch (28 male) ranging in age from 18 to 30 (M = 20.5) completed the online questionnaire, which was administered through Qualtrics (2018). Participants who were recruited through the Radboud Research Participation System SONA received course credits. A smaller number of participants was recruited through *Facebook* and did not receive reimbursement. Participants were presented with a list of 363 activities in a fully randomized order. The stereotypicality of these activities had to be rated on a 7-point Likert scale ranging from −3 to +3. Participants were asked to indicate for each activity how likely it was that the activity was carried out by a man or a woman. It was emphasized that they should provide a rating reflecting their perception of reality, and not a rating that reflected their idea of an ideal world. The main part of the questionnaire featuring the activities was divided into two lists, which differed in scale direction. Male and female participants were evenly distributed across lists, with 14 female and 14 male participants being asked to rate all 363 activities with *−3*

corresponding to *female*, and the other 14 male and 14 female participants being asked to rate the activities with *−3* corresponding to *male*.

The ratings ranging from −3 to +3 were automatically coded as values ranging from 1 to 7 by Qualtrics. Furthermore, all ratings were (re)coded so that *1* corresponded to a fully female interpretation. For each of the 363 activities, the mean across all participants and the standard deviation were calculated. All activities, their translation, their mean ratings and standard deviation can be found in the Appendix. The mean ratings for the activities ranged from 1.2 for *meidenavond plannen* 'planning a girls' night out' to 6.8 for *mannenavond plannen* 'planning a guys' night out'.

Based on this rating study, 32 stereotypically neutral, 32 stereotypically female and 32 stereotypically male activities were selected. A total of 96 stimuli were initially designed and subjected to two further pre-tests, based on which we chose 72 stimuli to be used in the experiment. These two pre-tests ensured that our items were perceived as plausible (Pre-test 1) and that the group of women or men was actually perceived as a subpart of the group mentioned in the beginning of the sentence (Pre-test 2). For more information on the pre-tests, see the Appendix. The final selection of 72 activities for the stimuli can also be found in the Appendix. All stereotypically female activities had a mean rating of 3 or lower, stereotypically male activities had a mean rating of 5 or higher, and neutral stereotypes had a rating of approximately 4. We chose stereotypically female and male activities such that their range was similar ([1.71; 2.88] for female stereotypes, [1.95; 2.95] for male stereotypes when reversing the scale), their mean was similar (2.26 versus 2.27) and the distribution within that range was similar (i.e., similar standard deviations: 0.33 versus 0.31). The neutral activities had a mean of 3.99 and a standard deviation of 0.13, ranging from 3.80 to 4.25. All chosen activities had a standard deviation below 1.

All experimental items followed the same pattern as the example in Table 1 above. Just like Redl et al. (2018, Chapter 2), we introduced a group engaging in an activity by means of the indefinite pronoun *iedereen* 'everyone'. Each stereotypical activity consisted of a verb and a direct object. The activities were varied between neutral (e.g., *schoenen aandoen* 'putting on shoes'), female (e.g., *yogaoefeningen doen* 'doing yoga exercises') and male (e.g., *voetbaltrucs oefenen* 'practicing soccer tricks') and occurred in a progressive form. This first part of the sentence included the masculine generic pronoun *zijn* 'his'. A subpart of this group was then explicitly identified as being female or male (*waaronder een paar vrouwen/mannen* 'among whom a few women/men') and more information about them was provided. We varied *enkele vrouwen/mannen* 'some women/men' with *een paar vrouwen/mannen* 'a few women/men'. The two noun phrases are highly similar in meaning and were not expected to affect the results in any way. We also included control items which featured the gender-neutral plural pronoun

hun 'their' rather than masculine *zijn* 'his' (see the example in (3) above). The meaning of the two sentence types was maximally similar while the one featured the masculine generic possessive pronoun and the other did not. Every stereotypical activity was thus embedded in eight different stimulus versions, due to the variation of pronoun (*zijn* 'his' versus *hun* 'their'), continuation (*vrouwen* 'women' versus *mannen* 'men') and the variation between the quantifiers *enkele* 'some' and *een paar* 'a few', the latter variation not being experimentally relevant. Consequently, eight lists to which participants were randomly assigned were created making use of a Latin Square design.

Of the 146 fillers, 18 were stimuli for a different experiment (Experiment 3 in Hubers et al., 2020). The remaining 128 fillers were designed to resemble the experimental stimuli in terms of complexity, but did not feature *iedereen* 'everyone', *zijn* 'his', *hun* 'their', *vrouw/vrouwen* 'woman/women' or *man/mannen* 'man/men' and were as neutral as possible regarding stereotypes. Each participant saw experimental and filler items in a different pseudo-randomized order, which was created by means of the program Mix (Van Casteren & Davis, 2006).

To check whether participants read the stimuli attentively, statements about stimuli were displayed after exactly ⅓ of the stimuli and after approximately ⅓ of the fillers (46 of the 146 fillers received a statement). The statements had to be judged as correct or incorrect. Half of the statements were correct and half were incorrect, equally distributed over fillers and experimental items as well as over conditions.

Participants

121 native speakers of Dutch (48 male) were tested. They ranged in age from 18 to 29 (M = 22.1). The majority of participants were students (N = 107). Participants received a coupon worth €10 or course credit when preferred. Two exclusion criteria applied: data of participants who guessed the purpose of the experiment or who responded incorrectly to more than 20% of the comprehension statements were not considered in the analysis. All participants gave written consent. The research presented in this article was approved by the Ethics Assessment Committee Humanities of the Radboud University (number 4592).

Apparatus

The experiment was conducted at the Centre for Language Studies Lab at Radboud University. We used an EyeLink 1000+ remote desktop eye-tracker with a head stabilizer to minimize head movements. Data were recorded with a sampling rate of 1000Hz. The stimuli were presented using the software Experiment Builder by SR Research (2011), on a BenQ XL 2420T 24" screen, but the used resolution was set to 1024×768. The distance between participant and screen was 108cm. The stimuli were

presented in black letters on a gray background using the font Calibri with a font size of 19.

Procedure

Upon arrival, participants were provided with information regarding the experiment as well as general information regarding the university's research and testing policy. Participants then signed the consent form. We tested for their dominant eye, which would later be tracked. Participants read the instructions after which we performed a 13-point calibration and validation procedure to finetune the eye-tracker to the participant's eyes. They then saw four practice items and were able to ask clarification questions. The main experiment was divided into three blocks, therefore allowing for two breaks. After the experiment, they were asked to fill in a short exit questionnaire, probing them for the purpose of the experiment and answering several demographic questions. They were then given the coupon for reimbursement or received course credit. The whole procedure took approximately 50 minutes.

Analysis

The raw eye-tracking data were pre-processed using EyeLink Data Viewer by SR Research. The fixation pattern of each item was manually checked for each participant. Given a systematic and clear drift in a trial, the fixations were reassigned in accordance with the drift. In addition, if the first fixation of a trial did not fall on the first line of the stimulus, but the subsequent fixations did, the initial fixation was deleted. Using Data Viewer's clean-up procedure, fixations that were smaller than 80ms were merged with another fixation within 0.25 degrees in visual angle on the x-axis if this fixation exceeded 80ms (this translates to approximately 0.47cm on the screen). In a second step, fixations that were larger than 1200ms or smaller than 80ms and could not be merged were deleted. Then, three reading time measures were calculated for the regions of interest: first run dwell time (i.e., the sum of the duration of all fixations in a region when it is entered for the first time), regression path duration (i.e., first run dwell time with the addition of the duration of fixations back to previous regions out of the analyzed region) and dwell time (i.e., the sum of the duration of all fixations in a region, also known as total fixation duration). The regions of interest were defined as indicated by the square brackets:

4. *Iedereen was zijn schoenen aan het aandoen, waaronder [enkele/een paar]$_1$ [vrouwen/mannen]$_2$ [die al]$_3$ bijna klaar waren om de deur uit te gaan, maar een beetje aan het treuzelen waren.*
   'Everyone was putting on his shoes, among whom [some/a few]$_1$ [women/men]$_2$ [who already]$_3$ were almost ready to go out, but were still slacking.'

As explained above, we opted to analyze the quantifier preceding the gendered noun *vrouwen/mannen* 'women/men', since semantic information up to six to eight characters to the right of the current fixation is processed (McConkie & Rayner, 1975; Schroyens et al., 1999). Region 3 functioned as a spillover region.

The data were analyzed in R (R Core Team, 2018) using the *lmer* function from the *lme4* package (Bates, Mächler, et al., 2015). All described models were fitted to log-transformed reading times to correct for a right skew in the data. As the primary research question of this experiment was whether the possessive pronoun *zijn* 'his' leads to a male bias, and in order to simplify the analysis and avoid four-way interactions, we first only analyzed the neutral stereotype contexts, as a male bias would be most clearly seen in these contexts if present at all. Thus, in a first step, PARTICIPANT GENDER (*female* versus *male*), PRONOUN (*zijn* 'his' versus *hun* 'their') and CONTINUATION (*vrouwen* 'women' versus *mannen* 'men') served as fixed effects. Only if a male bias was found (i.e., increased reading times for female continuations, but only in the conditions featuring *zijn* 'his' and not in the conditions featuring *hun* 'their') for either or both participant genders (i.e., for all participants, or only for male participants or – though we hypothesized this to be less likely – only for female participants), did we extend the analysis to stereotypically male and female contexts as well. This was done to investigate if the male bias of the pronoun persists in otherwise gendered contexts. If no male bias was found in the neutral context, we did not extend the analysis to female and male stereotype contexts.

The factors were coded using simple contrasts. Simple contrasts are similar to dummy or treatment contrasts in the sense that a reference level can be chosen. However, the intercept represents the mean of means. The reference level is coded as $-1/k$, with k being the number of levels of a factor. The level to be contrasted with the reference level is coded as $(k-1)/k$. This means that the simple contrast coding for two-level factors is the same as for sum or deviation contrasts. For CONTINUATION, *vrouwen* 'women' was coded as ½, *mannen* 'men' was coded as −½. For PARTICIPANT GENDER, the female participants were coded as ½, male participants as −½. For PRONOUN, *hun* 'their' was coded as ½, *zijn* 'his' was coded as −½. With STEREOTYPE being a three-level factor, two different contrasts were defined, one comparing the female and the neutral level (female = ⅔, male = −⅓, neutral = −⅓), the other comparing the male and the neutral

level (female = −⅓, male = ⅔, neutral = −⅓). Initially, the full random structure permitted by the design was fitted. In cases of non-convergence, we first suppressed the correlation parameters. We then checked for overparameterization using Principal Component Analysis from the *RePsychLing* package and removed components which explained little to no variation and were therefore negligible, starting with higher order terms in accordance with Bates, Kliegl, Vasishth, and Baayen (2015). All models included random intercepts for participants and items. The random slope structure of the final models is reported below. *P*-values were obtained using the *lmerTest* package (Kuznetsova et al., 2017). We followed Benjamini and Hochberg (1995) and applied their false discovery rate control in order to correct for multiple comparisons, as we analyzed three reading time measures in three regions, leading to nine models or comparisons. For this method, all *p*-values regarding the same fixed effect from all models are ordered from small to large and indexed accordingly. Then, starting with the largest *p*-value (i.e., the *p*-value with the highest index), it is evaluated whether $p_{(i)} \leq 0.05i/m$, where m is the total number of comparisons (i.e., 9 in our case) and i is the *p*-value's index. This is then done for every *p*-value until the first *p*-value for which the inequality evaluates as true. This *p*-value as well as all *p*-values with a lower index are then regarded as significant. For example, if the *p*-value with the index 2 (i.e., the second smallest *p*-value) out of 9 *p*-values is the first to meet the criterion (i.e., $p_{(2)} \leq 0.05 \times 2/9$ and $p_{(3)} > 0.05 \times 3/9$), then the fixed effects corresponding to the indices $i = 1$ and $i = 2$ are considered statistically significant at the 0.05 level. If only the *p*-value with $i = 1$ (or no *p*-value) meets the criterion and falls below the FDR threshold, then this correction method is equivalent to applying the Bonferroni correction. Only *p*-values smaller than the FDR-corrected threshold are reported below.

Results

None of the participants correctly guessed the purpose of the experiment. One participant had to be excluded, as she responded incorrectly to more than 20% of the comprehension statements, leaving 120 participants (48 male), aged 18 to 29 ($M = 22.2$), for the analysis.

Region 1: Quantifier

We found a significant effect for first run dwell time. The final model included random slopes for PRONOUN for participants, and PARTICIPANT GENDER and the interaction between PARTICIPANT GENDER and CONTINUATION for items. We found a significant three-way interaction between CONTINUATION, PRONOUN and PARTICIPANT GENDER ($\beta = 0.16$, $SE = 0.05$, $t = 3.07$, $p = 0.002$). As can be seen in Figure 1, male participants showed a significant increase for the continuation *women*, but only in the *zijn* 'his' condition. As no other gender information is provided in neutral contexts, this can be seen as an indication that *zijn* 'his', though intended as generic, does indeed lead to a

male bias. This is further supported by the fact that this difference between *women* and *men* as continuations was not found in conditions with the genderless pronoun *hun* 'their'. No significant differences were found for female participants.

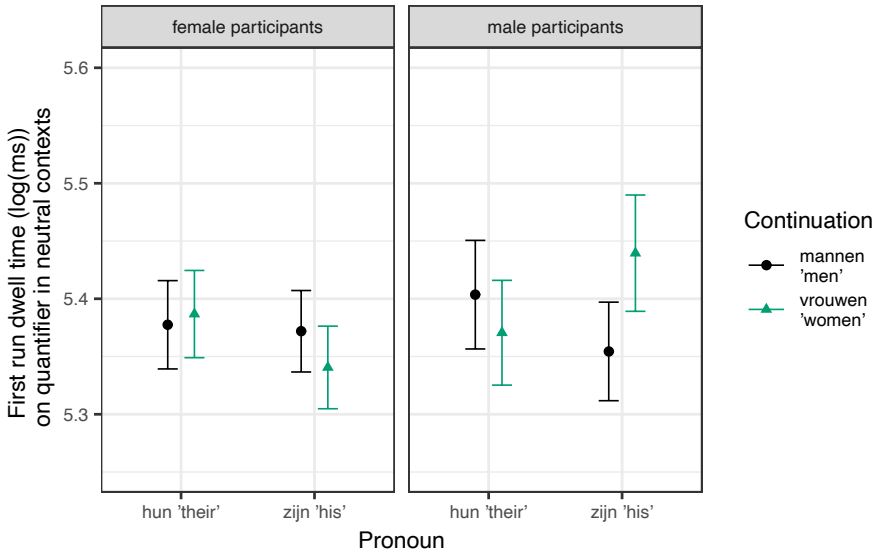

Figure 1. Mean log-transformed first run dwell time on Region 1 (quantifier) with 95% within-subject confidence intervals based on Morey (2008).

We extended the analysis to female and male stereotype contexts to see if the effect of PRONOUN persists in otherwise gendered contexts, but for male participants only. The final model included random slopes for CONTINUATION, PRONOUN, PRONOUN*STEREOTYPE (*male* versus *neutral*) and PRONOUN*CONTINUATION*STEREOTYPE (*male* versus *neutral*) for participants, and random slopes for PRONOUN for items. *P*-values were controlled for multiple comparisons by subjecting the *p*-values of the three effects of interest (i.e., PRONOUN*CONTINUATION and PRONOUN*CONTINUATION*STEREOTYPE (both contrasts)) to Benjamini and Hochberg's (1995) procedure. There were no significant effects after applying this correction. Notably, if the male bias had persisted throughout all stereotype contexts, then we should see higher reading times for the word *women* across all stereotype contexts in the *zijn* 'his' conditions. This is not the case. If the male bias persisted, but the stereotype context had an effect, too, we would see an even bigger difference between the continuations *women* and *men* in male stereotype contexts (due to a "double" male bias), but a smaller difference in female stereotype contexts. This is

not the case either. It rather seems as if *zijn* 'his' does not lead to a male bias in otherwise gendered contexts.

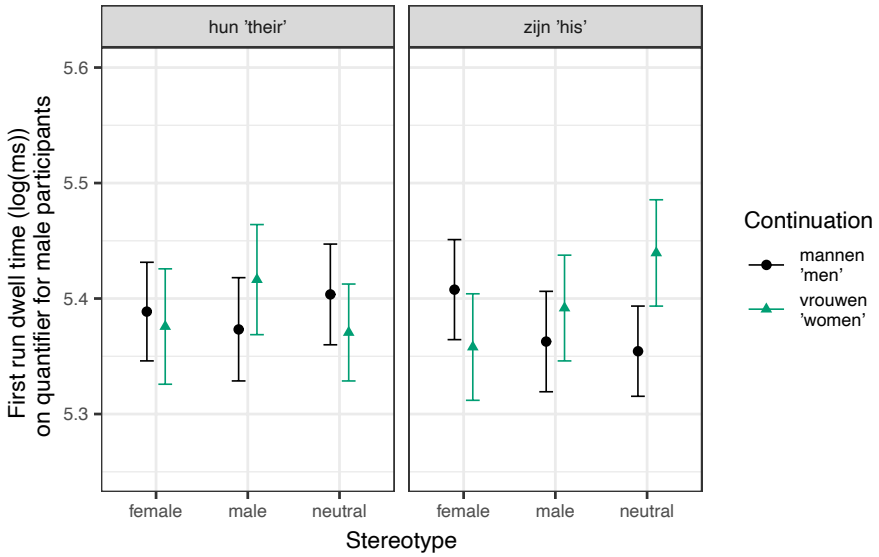

Figure 2. Mean log-transformed first run dwell time on Region 1 (quantifier) extended to all stereotype contexts for male participants with 95% within-subject confidence intervals based on Morey (2008).

No significant results were found for regression path duration and dwell time.

Region 2: Noun

No significant effects were found for any of the reading times on the second region *vrouwen/mannen* 'women/men'.

Region 3: Spillover

No significant effects were found for any of the reading times on the spillover region.

To summarize the results, we found a significant three-way interaction between CONTINUATION, PRONOUN and PARTICIPANT GENDER on the quantifier for first run dwell time. This suggests that men, but not women, experienced a male bias induced by *zijn* 'his' in neutral contexts very early on in the reading process. Extending the analysis to female and male stereotype contexts suggests that the male bias does not persist in otherwise gendered contexts.

Discussion

We conducted a conceptual replication of Redl et al.'s (2018, Chapter 2) eye-tracking experiment, investigating whether the masculine generic pronoun *zijn* 'his' triggers a

gender inference and therefore leads to a male bias in language processing. Redl et al. found no evidence for such a male bias. The results of the current experiment, however, do provide such evidence. More specifically, we found an increase in reading times for the earliest region when a female continuation was presented, but for male participants and in neutral contexts only. This finding is interesting in several regards.

While we found male participants to exhibit a male bias, no such processing cost occurred for female participants. This suggests that women interpreted the masculine pronoun generically while men did not. This is not the first time such an asymmetry between men and women has been found. For example, Wilson (1978) presented participants with statements featuring masculine generic role nouns ending in *-men* (e.g., *salesmen* and *cavemen*). Participants further saw six drawings for each of the role nouns, out of which all drawings that fit the role noun had to be chosen. Three out of the six drawings matched the generic reading of the role nouns, as they either showed a man and a woman, two women or two men, while only the latter drawing matched the non-generic male-specific reading of the role nouns. Wilson found that the male-male drawing was selected in 96% of the cases. The female-male and female-female drawings were only chosen in 75% and 71% of the cases, respectively, indicating that the masculine generic role nouns were more likely to be interpreted as referring to men only. However, Wilson found that female participants selected the female-male and female-female drawings significantly more often than male participants. Other researchers have found similar patterns (e.g., Hamilton, 1988; Moulton et al., 1978; Switzer, 1990). Whenever a difference between the two genders was found, it was always the men who showed a biasing effect and the women who interpreted the masculine generics as they were intended more often. Henley and Abueg (2003) explain this asymmetry in terms of differential language acquisition. This is conceptually similar to postulating a frequency difference between the generic and the male-specific reading for men and women; women have to access the generic reading more often in order to be included and therefore they do so with more ease. This is because women, or rather girls, necessarily have to learn from an early age that masculine forms can be used to refer to them too, despite the grammatical gender not matching their own gender. Otherwise they would not be included whenever a masculine generic is used in reference to them. Boys, on the other hand, will be included as a referent irrespective of whether they interpret the masculine generic as male-specific or generic. Therefore, women are more likely to interpret masculine generics the way they are intended, because they have accessed this meaning more frequently in order to be included. Conversely, boys or men will have had to access the generic reading of masculine generics less often and this reading will therefore not be as readily available to them. This idea could explain why men showed a processing disadvantage in our experiment while women seem to have immediately

processed the masculine generic pronoun as it was intended, namely as referring to all genders.

Let us now examine the interplay of pronoun gender and stereotypical gender information in our experiment. Much research has been devoted to the question how and when grammatical cues, semantic cues and other contextual cues are used in anaphor resolution. Translated to our eye-tracking study, the question thus is whether the pronoun's gender is interfering with the processing of the subsequent noun phrase *vrouwen/mannen* 'women/men', and whether gender stereotype information regarding the predicate also plays a role – and at what stage in processing. For example, Esaulova, Reali and Von Stockhausen (2014) conducted two experiments on German role nouns, which were varied between female, male and neutral stereotypes. The role nouns served as antecedents for a pronominal anaphor (*er/sie* 'he/she', Experiment 1) or for the anaphoric expression *diese Männer/diese Frauen* 'these men/these women' (Experiment 2). Esaulova et al. found that the grammatical gender of the role nouns affected early reading times, while an effect of stereotype information was visible in reading times indicative of later processing. They explained these findings in the light of the two-stage reference resolution model by Garrod and Terras (2000), which states that anaphors are first linked based on lexical information, with other contextual information only being taken into account later on. Irmen (2007) also found that the grammatical gender and the stereotype of the role noun as an antecedent affected reading times at different stages. However, in her experiment, the effect of stereotype actually appeared earlier: stereotype information showed an effect before and after the anaphor, while the grammatical gender of the antecedent had an effect on the anaphor itself. Conversely, Gygax et al. (2008) found the masculine grammatical gender of German and French role nouns to override any stereotype information that was additionally provided. In other words, they observed a male bias across all stereotype contexts, the strength of which was not affected by the additional gender stereotype information. Thus, while the evidence is mixed, it is clear that different types of gender information can affect the processing of an anaphor early on.

Similarly, in our experiment, we found evidence for a male bias due to pronoun gender early on, namely for first run dwell time on the pre-view region. We found this effect in neutral contexts, but it did not extend to stereotypically male and female contexts. So, the question arises whether both the grammatical gender information and gender stereotype information affected the processing of the noun phrase at the same time, leading to a male bias in neutral, but not in stereotypically female and male contexts. The result pattern suggests that this is unlikely, because we would then expect an even larger increase in reading time for female continuations in stereotypically male contexts, since both the stereotype and the pronoun favor a male referent. In

stereotypically female contexts, on the other hand, the masculine gender of the pronoun and the female stereotype information could even balance each other out. This is not the pattern we see in our experiment. Instead, we only found a difference in reading time in neutral contexts, and no differences in gender-stereotyped contexts; the pronoun thus had an effect in neutral contexts, but no other effects – neither of pronoun gender nor of stereotypical gender – were observed in stereotypically female and male contexts at this point in processing. This rather suggests the stereotype information overrode the pronoun's gender already early on, possibly right when the gender stereotype information was encountered. This is facilitated in our experiment because of one crucial difference between role nouns and pronouns in their relation to gender stereotypes. In experiments on role nouns, like those by Esaulova et al. (2014) and Irmen (2007), the grammatical gender and the stereotypical gender are carried by the very same word. The two types of information are therefore provided at approximately the same time (e.g., *Ingenieure* 'engineers (MASC./MALE)'). In our experiment, however, the stereotype information follows the masculine possessive pronoun (e.g., *zijn voetbaltrucs aan het oefenen* 'his soccer tricks practicing'). It is thus possible the stereotype overrode the unreliable gender of the pronoun right when the gender stereotype was encountered. This could explain why no effect of the pronoun was visible in female and male stereotype contexts.

However, if the male and female stereotype contexts blocked an effect of the pronoun's grammatical gender, we would expect to see an effect of stereotype itself when the gendered noun phrase is encountered. More specifically, we would expect an increase in reading time for noun phrases of which the gender does not match the gender stereotype (i.e., *women* + male stereotype; *men* + female stereotype), or at least for male referents in stereotypically female contexts, as Redl et al. (2018, Chapter 2) had found. Interestingly, at this early point in processing, we do not observe this. However, Redl et al. only found an effect of a stereotype violation later on in processing; male protagonists engaging in stereotypically female activities led to an increase in regression path duration and dwell time on the gendered noun (i.e., a proper noun in their case). In our current experiment, we solely focused on the effect of the masculine possessive pronoun and its potential interaction with stereotype information. Therefore, we did not analyze the female and male gender stereotype contexts when no effect of the pronoun was found. However, a quick visual inspection of the data of the different regions and reading times suggests that our data, too, show this asymmetrical stereotype violation effect later on, namely for dwell time on the gendered noun (see Figure A1 in the Appendix). To sum up, at this early stage in processing where an effect of the pronoun was found, the masculine gender of the pronoun did not interact with the stereotype information. Since we did not find an effect of the masculine pronoun in female and male stereotype

contexts, however, it appears likely that the stereotype information overrode the pronoun's grammatical gender information right when the former was encountered. A mismatch with the stereotype context only appears to have led to longer reading times later in processing, similar to Redl et al.

We conceptually replicated the experiment conducted by Redl et al. (2018, Chapter 2), who had found no evidence that generically used *zijn* 'his' triggered a gender inference and led to a male bias. In our current experiment, we did find evidence of a male bias, but exclusively for male participants, and only when the context did not provide additional gender information in the form of stereotypes. Thus, while men experienced a male bias, women appear to have interpreted the masculine generic as it was intended, namely as referring to all genders. As discussed in the Introduction, differences between previous studies regarding the strength of the male bias of masculine generics could suggest that a masculine generic is more likely to cause a male bias when it has to be processed more consciously due to the nature of the task. It is therefore possible that a male bias would not only surface for male participants, but also for female participants and across all gender stereotype contexts when employing a method such as the sentence evaluation task. We explored this hypothesis in the second experiment.

Experiment 2: Sentence evaluation

In this second experiment, we address the question whether a male bias of the Dutch generic pronoun *zijn* 'his' would surface when using a method such as sentence evaluation, which requires participants to process and evaluate the sentences – and thus the masculine possessive pronoun – in a more conscious manner than is the case during mere reading. The sentence evaluation paradigm employed in this experiment is similar to the acceptability judgment task, which has long been a subject of debate among linguists (e.g., Sprouse & Almeida, 2017). More specifically, there has been a discussion regarding the relationship between the processing of a linguistic stimulus and the acceptability of the same. How representative are explicit stimulus judgments of processing, and which additional factors might come into play when a participant is asked to not only read, but also to judge a sentence? For example, Sprouse (2008) found syntactic anomalies to affect acceptability judgments more strongly than semantic anomalies or other processing difficulties. It is thus clear that different methodologies tapping into language processing more or less directly can yield differential results. As outlined in the Introduction, research on the English masculine generic pronouns *he* and *his* has consistently shown that their use leads to a male bias, for example as attested by participants' description of more male mental imagery (e.g., Hamilton, 1988) or as attested by a higher number of male protagonists in stories written based on a prompt featuring a masculine generic (e.g., Moulton et al., 1978). Likewise, Gygax et al. (2008)

conducted sentence evaluation experiments and found that German and French masculine role nouns lead to a male bias across stereotype contexts. Irmen (2007), on the other hand, tested German role nouns using eye-tracking and found grammatical and stereotypical gender information to interact, as opposed to grammatical gender overriding gender stereotypes. This could suggest that methods requiring more conscious processing are more likely to yield evidence for a male bias of masculine generics. Even if the masculine possessive pronoun *zijn* 'his' can initially be automatically processed as gender-neutral – as seems to be possible for female language users across contexts and for male language users in gender-stereotypical contexts based on the results from Experiment 1 – it might be that the pronoun's gender leads to a male bias when performing an additional task. In the case of sentence evaluation, it might be that a mismatch between the pronoun's gender and the natural gender of the referents weighs more heavily when participants are asked to evaluate how well the two sentences go together. This could explain the difference in results between Gygax et al. and Irmen, as well as between Experiment 1 reported in this paper and previous research on English masculine generic pronouns, which has usually found both men and women to experience a male bias (even if this male bias was sometimes stronger for men). If this hypothesis is correct, it would be possible for a male bias of the pronoun to emerge not only for male, but also for female participants when performing the sentence evaluation task. More specifically, we would then expect sentences featuring reference to women to be evaluated as bad continuations more often. Furthermore, response times should be higher when a female referent is featured due to the mismatch with pronoun gender, even if the sentence is evaluated as good. To see if there was some truth to this hypothesis, we conducted a sentence evaluation experiment similar to that of Gygax et al. with the same stimuli that we used in the eye-tracking experiment reported in Experiment 1.

Gygax et al. (2008) used the sentence evaluation paradigm in English, German and French to test the effect of grammatical and stereotypical gender information on participants' mental representation of gender. They tested stimuli such as the following:

5. a. *The social workers were walking through the station.*
   b. *Since sunny weather was forecast several of the women weren't wearing a coat.*

Participants had to answer whether the sentence in (5b) was a good continuation to the sentence in (5a). They analyzed the type of response (i.e., yes or no) and the response time of yes-responses. In accordance with their hypothesis, they found that English-speaking participants were influenced by the stereotypical gender of the role noun (e.g., female for *social worker*). Thus, continuations mentioning men were deemed less good continuations after a stereotypically female role noun, while continuations mentioning

women were deemed less good after stereotypically male role nouns. This showed in the type of response participants gave, but not in the response times. In French and German, role nouns are marked for grammatical gender and the masculine form is used as a generic in sentences as in (5a). The results for French and German showed that participants were guided by the grammatical gender of the role noun in their responses, and not by the gender stereotype. Thus, second sentences mentioning men were deemed good continuations more often across all three stereotype contexts. Response times were significantly lower for male continuations in German, while this effect did not robustly show in French.

The same authors conducted a follow-up study in which they slightly adapted the stimuli. Garnham et al. (2012) inserted a sentence between (5a) and (5b), which gave additional information about the group of people using a 3rd person plural pronoun, e.g.:

6. *They went away.*

In English, the 3rd person plural pronoun *they* does not carry any gender information. In French, however, the appropriate pronoun is *ils*, which carries masculine gender and is another example of a masculine generic. In German, the available 3rd person plural pronoun is *sie*, the surface form of which is identical to the feminine 3rd person singular pronoun. Garnham et al. (2012) wanted to test whether a gender-congruent pronoun (i.e., French *ils*) or a gender-incongruent pronoun regarding its surface form (i.e., German *sie*) can increase (in the case of *ils*) or attenuate (in the case of *sie*) the role noun's male bias. The results for English and, more interestingly, French did not differ from the results by Gygax et al. (2008). That is, Garnham et al. did not find that an additional masculine generic pronoun increased the male bias experienced by French participants. For German, however, they found that the pronoun *sie* attenuated the role noun's male bias. These effects were found for the types of responses given and largely also for the response times. Note, however, that the newly collected data were analyzed together with the data collected by Gygax et al., with *experiment* as an additional factor in the design. Thus, the power for finding a main effect of continuation on response times was naturally higher for Garnham et al. as the data by Gygax et al. was included.

Below, we report the results of an experiment which was similar in design to Gygax et al. (2008), but used the stimuli from the eye-tracking experiment reported above. We hypothesized that a male bias of *zijn* 'his' would at least surface for male participants in neutral contexts, but possibly extend to stereotypically female and male contexts and also to female participants due to the task requiring more conscious processing of the masculine generic pronoun. We expected this result pattern to show in the responses provided by our participants, as a male bias had robustly surfaced regarding response type in Gygax et al. The effect did not show robustly in their analyzed response times.

We therefore deemed it possible that an effect of the pronoun would show in the response type, but possibly not in response times.

Materials & Method

Materials
We used the same 72 stimuli as for the eye-tracking experiment, but shortened them for the purpose of the sentence evaluation experiment in order to make the participants' task clearer. More specifically, the connective *maar* 'but' and everything following it was removed:

7. *Iedereen was zijn schoenen aan het aandoen, waaronder enkele vrouwen/mannen die al bijna klaar waren om de deur uit te gaan.*
   'Everyone was putting on his shoes, among whom some women/men who almost were ready to go out.'

These 72 stimuli were distributed over six conditions instead of twelve conditions as was the case with the eye-tracking experiment; we did not include the six control conditions (*Ze waren allemaal hun y aan het x-en…* 'They were all x-ing their y…'). The main reason for including them in the eye-tracking experiment in the first place was to make sure that any differences found are not solely due to differences in reading times between the words *vrouwen* 'women' and *mannen* 'men' regardless of our manipulation. This was of no concern in the sentence evaluation experiment due to the different method. Furthermore, we wanted to increase the number of stimuli per condition, since conducting an experiment outside of the lab could possibly introduce additional noise. We included 72 fillers. Due to the different nature of the task, these were different from the fillers used in the eye-tracking experiment.

Participants had to evaluate two sentence clauses, which were connected by a comma. In the case of the experimental stimuli, the most common expected answer was *yes*, indicating a good match. Thus, we constructed 36 fillers which asked for a clear no-response. An example is given in (8). These 36 filler items also allowed us to check whether participants complied with the task and read the sentences attentively. The other 36 fillers asked for a yes-response, as illustrated in (9).

8. *Iemand was de planten aan het bewonderen, waaronder een edelsteen die in Zuidoost-Azië gevonden is.*
   'Someone was admiring the plants, among which a gemstone that was discovered in South East Asia.'

9. *Iemand was de honden aan het wassen, waaronder een Golden Retriever die aan het blaffen was.*
   'Someone was washing the dogs, among which a Golden Retriever that was barking.'

We calculated each participant's mean rejection rate for the 32 incorrect fillers. Participants had to reject at least 75% (i.e., 27 out of 36) in order to be considered in the analysis. Four lists were created, as every stereotypical activity was embedded in four different stimulus versions, due to the variation of the continuation (*vrouwen* 'women' versus *mannen* 'men') and the variation between the quantifiers *enkele* 'some' and *een paar* 'a few', the latter variation not being experimentally relevant. Participants were pseudo-randomly assigned to one of the four lists. The experiment started with two fillers, but the remaining experimental and filler items were shown in a new fully randomized order for each participant.

Participants
Ninety-four native speakers of Dutch (49 male) completed the online experiment (age 18-30, $M = 20.2$). All participants were either students ($N = 92$) or had already obtained a university degree. None of the participants reported to have dyslexia or other reading problems or had participated in the eye-tracking experiment above.

Procedure
We implemented the experiment in Qualtrics (2018). Participants first received information about the experimental procedure itself as well as general information about the university's policy regarding data storage and participant rights, after which they provided consent. They then answered demographic questions before proceeding to the main part of the experiment. They received more detailed instructions regarding their task and saw two practice items. Similar to Gygax et al. (2008), every trial started with the prompt ***KLAAR?** Druk op de spatiebalk.* 'Ready? Press the space bar'. After pressing the space bar, participants proceeded to the first sentence clause, ending in a comma. By pressing the space bar again, they proceeded to the second sentence. Participants had to press the space bar again after reading the second sentence. They then saw a screen asking ***GOED VERVOLG?** Nee (C) Ja (M)* 'Good continuation? No (C) Yes (M)'. Participants could then indicate their choice by pressing either (C) for *no* or (M) for *yes*. This functionality was implemented in Qualtrics through JavaScript. Participants were asked to keep their thumbs on the space bar and their left and right index fingers on (C) and (M) respectively throughout the experiment. After the main part of the experiment, participants were asked to guess the purpose of the experiment. The whole procedure took approximately 30 minutes.

Analysis

One participant had to be excluded as they correctly guessed that the experiment's purpose was to test whether masculine *zijn* 'his' leads to a male bias. We calculated the mean rejection rate of the incorrect fillers per participant. Thirteen participants were excluded, as they rejected less than 75% of the incorrect filler items. This left us with the data of 80 participants (40 male, age 18-29, M = 20.1) – with 10 female and 10 male participants for every list. The equal distribution of participant genders across lists in the final sample was achieved by checking participants' responses to filler items throughout the testing process, whilst not inspecting any of the experimental items, and adjusting the list count in Qualtrics accordingly.

We excluded responses to sentence clauses which had been clicked away within less than 300ms (either sentence clause 1 or sentence clause 2), as we assumed that participants did not properly read these. This led to the exclusion of 3.3% of the data. We then visually inspected a histogram plotting the log-transformed response times in order to identify outliers. Based on this distribution, we decided to remove datapoints with a response time larger than 15000ms (or 15 seconds). This led to the exclusion of a further 13 datapoints.

For the response data, we fitted a mixed effects logistic regression model from the binomial family using the *glmer* function from the *lme4* package (Bates, Mächler, et al., 2015). The dependent variable was whether or not participants thought that the second part of the sentence was a good continuation (coded as 1) or a bad continuation (coded as 0). The fixed effects CONTINUATION, STEREOTYPE and PARTICIPANT GENDER were coded the same as for the eye-tracking experiment. The main difference in design compared to Experiment 1 was that the factor PRONOUN did not apply, since all stimuli featured *zijn* 'his'; this simpler design allowed us to analyze the full dataset (i.e., including stereotypically female and male contexts) from the start. The full random structure permitted by the design was initially included, thus random intercepts for participants and items as well as all permissible random slopes were fitted. Model simplification was done the same way as for the eye-tracking experiment.

We further fitted a linear mixed effects model with the response time of yes-responses as the dependent variable. We defined the response time as the timespan from the moment the second sentence became visible until the moment either (C) or (M) was pressed. Following Gygax et al. (2008), all no-responses (10.1% of the data after applying the above exclusion criteria) were discarded for this analysis. The response times were log-transformed to render the data more normal. Fitted fixed effects were the same as for the generalized linear model, and so was the approach regarding the random structure.

Results

Response

The final and best model included random slopes for CONTINUATION for both participants and items, as well as random slopes for STEREOTYPE (*female* versus *neutral*) for participants. Descriptively, sentences with male continuations resulted in more yes-responses than sentences with female continuations, but the main effect of CONTINUATION was far from significant ($\beta = -0.02$, $SE = 0.19$, $z = -0.1$, $p = 0.92$). None of the other fixed effects were significant either.

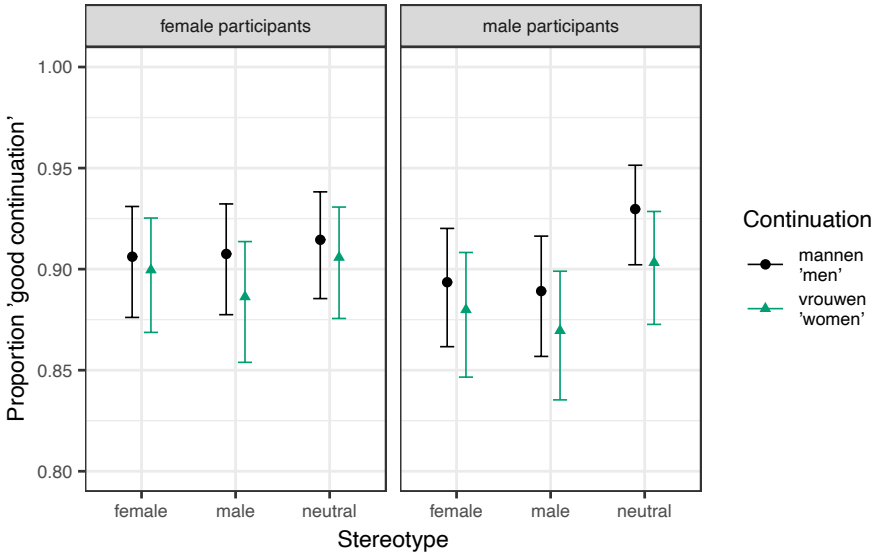

Figure 3. Mean proportion of sentences of which the continuation was deemed good by participants with 95% exact confidence intervals calculated with the *exactci* function from the *PropCIs* package in R (Scherer, 2018).

Response time

The results for the response times are shown in Figure 4. The final and best model included random slopes for CONTINUATION for items, as well as random slopes for STEREOTYPE (*male* versus *neutral*) for participants. The model yielded no significant effects.

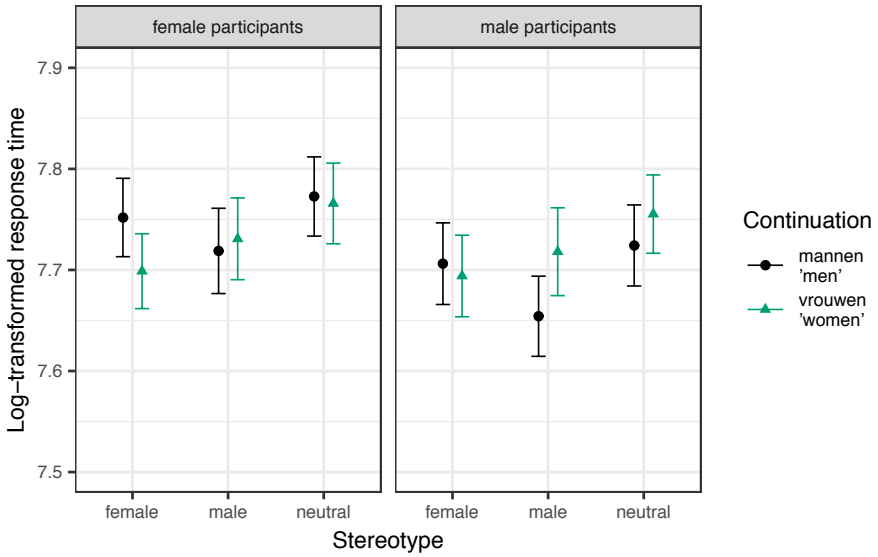

Figure 4. Log-transformed mean reaction times with 95% within-subject confidence intervals based on Morey (2008).

Discussion

We conducted a sentence evaluation experiment with stimuli featuring the masculine generic pronoun *zijn* 'his' followed by a reference to either women or men. Participants had to judge whether the sentence clause featuring this reference was a good continuation to the preceding sentence clause featuring *zijn* 'his'. The rationale was that if the masculine generic pronoun was not interpreted as intended and caused a male bias, this would be reflected in a lower acceptance rate of female continuations, as well as higher response times to female continuations even when they were deemed good continuations. However, we did not find that female continuations led to sentences being evaluated as good less often. The hypothesized male bias was also not reflected in response times. This is in stark contrast to the eye-tracking results of Experiment 1, which featured the very same stimuli and provided evidence of a male bias for male participants in neutral contexts. We had hypothesized to at least replicate this pattern or even see the male bias extend to other conditions, since the sentence evaluation task requires a different and more conscious processing of the masculine generic pronoun than reading during eye-tracking. However, all continuations scored very high with no significant differences between them. We will discuss possible reasons for these differential results between Experiment 1 and 2 in the General discussion.

General discussion and conclusion

We conducted two experiments to test whether the masculine generic pronoun *zijn* 'his' causes a male bias. Redl et al. (2018, Chapter 2) previously conducted an eye-tracking experiment addressing the same question, but did not find evidence for a male bias. The first of the two experiments presented in this paper is a conceptual replication of the Redl et al. study. After having made several improvements to the initial eye-tracking experiment, we did find evidence for a male bias early in processing, but for male participants and in stereotypically neutral contexts only. In a second experiment, we used the sentence evaluation paradigm with the same stimuli to see whether a method asking for explicit judgments would reveal a male bias, possibly even across contexts and for male as well as female participants. However, this was not the case. No evidence of a male bias was found in the sentence evaluation experiment. Taken together our results suggest that the masculine generic pronoun *zijn* 'his' can cause a male bias under certain conditions (namely for men and in stereotypically neutral contexts), but that this male bias only surfaces with a highly time-sensitive method tapping into language processing directly, as well as when looking at the earliest processing stages. Conversely, this suggests that the generic reading of the masculine generic pronoun *zijn* 'his' is readily available for women across the board; for men, it appears to be available as well when the pronoun is embedded in otherwise gendered contexts (i.e., stereotypically female or male contexts), as well as during a task requiring participants to go beyond processing and explicitly evaluate sentences featuring *zijn* 'his'.

Based on our results, it thus seems likely that our initial assumption regarding the testing method is incorrect: we did not find an experimental method requiring more conscious processing and evaluation of a masculine generic pronoun to lead to a larger male bias, at least not when comparing eye-tracking and sentence evaluation. However, it is possible that this hypothesis still holds for the offline methods used by researchers to test English *his* and *he* in the 1970s, 80s and 90s, but not for the sentence evaluation task. As outlined in the Introduction, common tasks in these early experiments were story-writing based on a prompt featuring a masculine generic (Hyde, 1984; Moulton et al., 1978; Switzer, 1990), while other researchers asked participants to describe their mental imagery after reading or listening to such a prompt (Gastil, 1990; Hamilton, 1988). It could be that the pronoun's gender is more likely to have an effect when engaging in such (production) tasks. For example, when being asked to write a story based on a prompt featuring a masculine generic pronoun such as *his* (e.g., *In a large coeducational institution the average student will feel isolated in* ***his*** *introductory courses*, as used by Moulton et al., 1978), participants were shown to be more likely to write a story about a man than when the pronoun *their* was featured in the same sentence. This is clearly a sign of a male bias of *his*, but these results do not exclude the possibility

that participants would deem stories featuring a woman an equally good example of the prompt in a rating study. To sum up, our participants appear to have been guided less by the pronoun's gender in the context of the sentence evaluation paradigm compared to early research on English masculine generics. Based on our results, it rather seems like a sensitive method directly tapping into processing such as eye-tracking is needed in order for the male bias of the masculine generic pronoun *zijn* 'his' to show.

While our hypothesis that the male bias would surface possibly even more strongly in the sentence evaluation experiment was not borne out, we did of course find different results for the two experiments, but in an unexpected form. One possibility for why we found evidence of a male bias in Experiment 1, but not in Experiment 2 lies in the arguably relatively small biasing effect of the pronoun *zijn* 'his'. While Experiment 1 provides evidence of a male bias, it does so only for men and only for neutral contexts and only in the very earliest stages of processing. Particularly this latter finding suggests that participants recuperate from these processing difficulties and adjust the mental gender representation of the referents relatively fast when confronted with information contradicting the male bias. Thus, when given additional time to process a reference to women as is the case in the sentence evaluation experiment, participants might not be affected by this initial male gender representation anymore and respond in a way that is in accordance with the generic reading of the masculine generic pronoun.

Finally, it has to be noted that our results as well as the results by Redl et al. (2018, Chapter 2) are in contrast with the experimental literature on role nouns, including sentence evaluation experiments on role nouns. As described in the Introduction, masculine generic role nouns have consistently been found to cause a male bias in languages such as French and German. This was shown with methods as varied as EEG (Misersky et al., 2019), eye-tracking (Irmen, 2007), self-paced reading (Irmen & Roßberg, 2004), sentence evaluation (Garnham et al., 2012; Gygax et al., 2008) and also with Moulton et al.'s (1978) story writing method (Heise, 2000). As also described by Redl et al., it is possible that role nouns simply cause a larger male bias than the masculine possessive pronoun *zijn* 'his'. At this point, it is impossible to say whether this is because masculine generic pronouns (or at least the possessive pronoun) are generally more easily interpreted as generic than role nouns, or whether this is a language-specific difference between Dutch, on the one hand, and French and German, on the other hand. Regarding the latter option, it is clear that feminine and masculine grammatical gender categories are less prevalent in Dutch spoken in the Netherlands, since they have collapsed into one common gender category for nouns. Due to a development from syntactic to semantic agreement in the domain of pronouns in Dutch, grammatically masculine pronouns enjoy a default status beyond reference to people (Audring, 2006). For example, a bicycle, which has common gender in Dutch (*de fiets*)

can also be referred to with a masculine pronoun, e.g. *Hij staat in de schuur* (lit. 'He is standing in the shed'). This increased default status of masculine pronouns might also make the generic reading more readily available when the pronoun is used in reference to people (Redl et al., 2018, Chapter 2). Extending the research to other masculine generic pronouns in Dutch as well as other languages such as German and French could answer whether *zijn* 'his' is the exception or the rule among masculine generic pronouns.

To conclude, we have shown that generically-intended *zijn* 'his' causes a male bias, albeit only for men and when no biasing gender stereotype information is provided. This effect was found in eye-tracking, but not in sentence evaluation, further suggesting that while a male bias can surface, the generic reading is often accessed, too.

Chapter 4: Masculine generic pronouns as a gender cue in generic statements

Abstract

This paper addresses the question whether a masculine generic pronoun causes a male bias when it is used in generic statements, that is, in the absence of a specific referent. An eye-tracking experiment was conducted with Dutch native speakers (N = 84, 36 male). We tested two different types of generic statements by varying conceptual number. We hypothesized that a gender inference based on the pronoun *zijn* 'his' was more likely to occur with a conceptually singular rather than a conceptually plural antecedent (e.g., *Iemand/Iedereen met een absoluut gehoor kan snel zijn instrument stemmen* 'Someone (CONCEPTUALLY SINGULAR)/Everyone (CONCEPTUALLY PLURAL) with perfect pitch can tune his instrument quickly'). We found male participants to exhibit a male bias, but with the conceptually singular antecedent only (i.e., *iemand* 'someone'). Female participants, on the other hand, showed no signs of a male bias in either context. The results show that the generically-intended masculine pronoun *zijn* 'his' in Dutch can lead to a male bias in generic contexts, but that this depends on participant gender as well as whether the generic statement is conceptually singular or plural.[10]

[10] This chapter has been submitted as: Redl, T., Szuba, A., De Swart, P., Frank, S.L. & De Hoop, H. Masculine generic pronouns as a gender cue in generic statements.

Introduction

Masculine generics describe the common language phenomenon of masculine words being used for people in general. Thus, masculine generics are generic in the sense that they are used to refer to humans of any gender, despite being grammatically or lexically masculine. One common type of masculine generic is the so-called role noun, that is, nouns referring to a person by means of their occupation or hobby. They are marked for grammatical gender in some languages and can then function as masculine generics. Pronouns are another common type of masculine generic. For example, the sentence *Every parent always wants the best for his children* is intended to apply to all parents regardless of their gender; the masculine possessive pronoun *his* is supposed to convey this meaning and is therefore used as a masculine generic. In a wider sense, the statement itself is also generic – as opposed to episodic – as it describes parents as a *kind* and does not refer to one or more *specific* parent(s). The statement thus generalizes over *all* parents.

Masculine generics can also be used in episodic, non-generic contexts. In the sentence *Every student came to the party with his parents* the pronoun *his* is used as a masculine generic, but not within a generic statement, since the antecedent *every student* refers to a specific, contextually determined group and not to all students in general. There is substantial evidence that users of languages such as German and French make gender inferences based on masculine generic role nouns in episodic contexts. Thus, when a masculine generic role noun (e.g., German *Student* 'student (MASC.)') – though intended to refer to persons of all genders – is used in episodic contexts, readers often use the grammatical gender to infer the referents' gender, even though it is not a reliable gender cue (e.g., for French and German see Garnham et al., 2012; Gygax et al., 2008; Misersky et al., 2019). Redl, Frank, De Swart, and De Hoop (2020, Chapter 3) found similar results for the processing of the Dutch masculine generic pronoun *zijn* 'his' in episodic contexts. They conducted an eye-tracking experiment in which they presented participants with sentences such as the following:

1. *Iedereen was zijn veters aan het strikken, waaronder een paar vrouwen/mannen die al tien minuten geleden hadden moeten vertrekken, maar zich hadden verslapen.*
   'Everyone was tying his shoelaces, among whom a few women/men who would have had to leave ten minutes ago, but had overslept.'

The activity in the first part of the sentence was varied between stereotypically neutral (e.g., *tying shoelaces* as in (1)), stereotypically female (e.g., *doing yoga exercises*) and stereotypically male (e.g., *practicing soccer tricks*). Redl, Frank et al. (2020, Chapter 3)

found male participants to show signs of a male bias (i.e., an increase in reading time on *a few women*) in neutral contexts, but not when additional gender stereotype information was provided. Redl, Frank et al. have thus shown that a generically-intended pronoun (i.e., *zijn* 'his') can lead to a male bias in episodic contexts, with research on role nouns confirming the same for this latter type of masculine generic, as well.

But do we also find such a male bias when the masculine generic is part of a generic statement, such as *Every parent always wants the best for his children*? When a masculine generic word form occurs in a generic statement, there is neither a specific individual referent nor a specific group of people whose gender could be inferred. Do masculine generics then still stimulate a male gender inference? Irmen (2007, Experiment 1) designed an eye-tracking experiment in German to test if masculine generic role nouns are a source of bias in generic contexts. Irmen varied the stereotypical gender of the role nouns between female, male and neutral, whereas the grammatical gender was always masculine. The generic antecedent introduced by means of the role noun was referred back to with the definite noun phrase *these men* or *these women* later on in the stimulus, for example:

2. *Dass Geburtshelfer zu jeder Zeit bereitstehen müssen, ist ja bekannt. Und dennoch klagen diese Männer/Frauen nie wegen ihres Berufs, zumal ihnen der Nutzen ihrer Arbeit einleuchtet.*
   'The fact that obstetricians (MASC., stereotypically female) have to be available at all times is well known. Nevertheless, these men/women never complain, because their work's use is obvious to them.'

Irmen (2007) hypothesized that if generic entities are mentally represented as abstract and genderless, the masculine generic role noun should not trigger a gender inference. The continuation *these women* and *these men* should then fit equally well and not lead to significant differences in reading times. However, Irmen found both the masculine grammatical gender and the stereotypical gender information to affect reading times, despite being used in generic contexts. More specifically, Irmen found that a stereotype mismatch slowed down reading on the determiner when followed by *women*. Irmen further found a main effect of continuation on the noun itself. Reading times increased for the female continuation, suggesting that German masculine generic role nouns are not truly generic or gender-neutral, not even in generic contexts. Note, however, that Irmen revealed the group of people referring back to the masculine generic role noun to be *exclusively* female (or male). Thus, the results allow us to conclude that masculine generic role nouns in German are not compatible with a fully female reading in generic contexts. However, we cannot determine whether a masculine generic role noun triggers a reading that includes men *and* women (i.e., a group of mixed gender) based on these

results. This latter reading is arguably more often intended when using masculine generics in plural contexts, at least in German (see Gygax et al., 2008 for a similar line of reasoning). It is also unclear if these findings on role nouns generalize to pronouns.

Above, we used English in the example for masculine generic pronouns, but the use of generic *he/him/his* has actually decreased over the past decades (Earp, 2012; LaScotte, 2016) in favor of an increased use of singular *they* (e.g., *Every parent always wants the best for* ***their*** *children*). The research focus in English has shifted accordingly. Even though not always targeted directly, some of this research can still provide insights into the processing of masculine generic pronouns in generic contexts. For example, Foertsch and Gernsbacher (1997) conducted two self-paced reading experiments to test whether singular *they* is a cognitively efficient substitute for the masculine generic *he* (or the less common generic *she*), despite the fact that the plural pronoun *they* is used to refer back to a grammatically singular antecedent. In Experiment 1, Foertsch and Gernsbacher compared the processing of singular *they* with generic *he* and *she* in generic contexts, while these pronouns were embedded in episodic contexts in Experiment 2. Foertsch and Gernsbacher used stereotypically female, male and neutral role nouns in both experiments, with the addition of the indefinite pronoun *anybody* in Experiment 1. The sentence in (3) is an example of a stimulus featuring the indefinite pronoun.

3. *Anybody who litters should be fined $50, even if he/she/they cannot see a trashcan nearby, because littering is an irresponsible form of vandalism and should be punished.*

Foertsch and Gernsbacher (1997) analyzed the reading times of the clause containing the generic pronoun *he, she* or *they*. They hypothesized that generic *he* (and *she*) could trigger a gender inference, while *they* would not. This gender inference would then be reflected in longer reading times for clauses containing *he* or *she* compared to *they* after neutral role nouns (e.g., *runner*) and after the indefinite pronoun *anybody*. This hypothesis was confirmed for the indefinite pronoun, but not for the role nouns. Following Foertsch and Gernsbacher, the increase in reading time when the generically intended personal pronoun *he* was anaphorically linked to the indefinite pronoun *anybody* can be interpreted as an indication that masculine generic pronouns may give rise to a gender inference, even in generic contexts (see Speyer & Schleef, 2019 for a replication of these results for German-speaking learners of English).

Noll, Lowry, and Bryant (2018) adapted the stimuli designed by Foertsch and Gernsbacher (1997). In two experiments conducted 15 years apart, they presented participants with sentences similar to the sentence in (3) above. As opposed to Foertsch and Gernsbacher, they only used the pronouns *they* and *he* as anaphors, as well as neutral role nouns and an indefinite pronoun as potential antecedents, but not varying gender

stereotype. Participants had to read the sentences and subsequently perform a lexical decision task featuring nouns with female or male lexical gender (e.g., *uncle* and *mother*). The rationale was that if the masculine generic pronoun *he* triggers a gender inference, participants should be quicker in recognizing a subsequent male prompt compared to a female prompt. This hypothesis was not confirmed in the earlier of the two experiments. In the experiment which was conducted 15 years later, however, *he* was indeed found to slow down response times to female words. Noll et al. suggest that the difference in results is due to changes in the English language over time. When the first experiment was conducted, *he* was still more widely used as a generic pronoun, facilitating the interpretation of the pronoun as generic. Since then, however, the popularity of singular *they* has vastly increased and pushed back generic *he*, which now has lost at least some of its generic potential. These results suggest that masculine generic pronouns can cause a male gender inference in generic contexts, but possibly only if the masculine generic reading of the pronoun is relatively infrequent or if there is no sufficiently frequent competing form.

In sum, there is tentative evidence that masculine generics *may* lead to a male bias in generic contexts under certain circumstances. Irmen (2007) found German masculine generic role nouns to lead to processing difficulties when an all-female reading was intended, but it is unclear whether a gender-mixed reading would lead to the same problems, and whether this finding generalizes to pronouns. Foertsch and Gernsbacher (1997) indirectly provided evidence that masculine generic *he* may cause a gender bias in generic contexts, but they only found this for the indefinite pronoun *anybody* and not for role nouns as the antecedent. Noll et al. (2018) provide more direct evidence of a male bias induced by *he* in generic contexts in a recent experiment, but not in an experiment conducted 15 years earlier, which suggests that a masculine generic pronoun may not lead to a male bias if the generic reading is sufficiently frequent. Dutch, for example, does not have a widespread gender-neutral alternative such as singular *they*. Masculine generic pronouns such as *zijn* 'his' are still frequently used, but it is unclear if they lead to a male bias when used in generic contexts. Across languages, very little is known about the effect of masculine generics when embedded in generic statements, since research on the processing of masculine generics has largely focused on episodic contexts instead. This is surprising considering that generic statements generalize over people, often regardless of their gender, while masculine generics are commonly used when a person's gender is unknown or irrelevant. Generic statements are therefore inviting contexts for masculine generics to be used. Do masculine generics then give rise to a male bias in generic contexts, that is, when no specific referent is present? More research is needed to answer this question.

In an effort to close this research gap, we conducted an eye-tracking experiment to investigate if masculine generic pronouns trigger a gender inference in generic contexts. More specifically, we presented Dutch native speakers with generic statements featuring the masculine generic pronoun *zijn* 'his'. As described above, Redl, Frank et al. (2020, Chapter 3) had previously found *zijn* 'his' to cause a male bias in episodic contexts. We put the same pronoun to the test in generic statements such as the one below:

4. *Iedereen met een absoluut gehoor kan snel zijn instrument stemmen*
   'Everyone with perfect pitch can tune his instrument quickly'

Like Redl, Frank et al. (2020, Chapter 3), we combined the masculine generic pronoun *zijn* 'his' with the indefinite pronoun *iedereen* 'everyone'. Redl, Frank et al. used episodic statements and *iedereen* 'everyone' therefore referred to a specific, contextually determined group. However, in the current experiment, *iedereen* was embedded in a generic statement and hence denoted *everyone in general* fitting the statement. Arguably, regardless of whether *everyone* is used in episodic or generic contexts, a language user's mental representation has to reflect that a group of people is described in both cases. However, not all generic statements can be assumed to trigger a group representation like *everyone* does. This is easily illustrated by exchanging the indefinite pronoun *iedereen* 'everyone' in (4) for *iemand* 'someone':

5. *Iemand met een absoluut gehoor kan snel zijn instrument stemmen*
   'Someone with perfect pitch can tune his instrument quickly'

Both indefinite pronouns are grammatically singular and are therefore combined with the 3rd person singular possessive pronoun *zijn* 'his'; this is the only acceptable pronoun to convey this generic meaning, as Dutch does not have a gender-neutral pronoun like singular *they*. Furthermore, both (4) and (5) are generic statements and apply to all individuals fitting the statement. However, we can assume that generic *someone* triggers a different mental representation than generic *everyone*, considering that *someone* is conceptually singular, while *everyone* is conceptually plural. Hence, *everyone* is likely represented as a group, while a generic statement featuring *someone* is more likely represented as a single prototypical individual. Both generic statements in (4) and (5) thus generalize over people, but the visualization and mental representation will most likely differ.

It follows that the masculine generic *zijn* 'his' might be processed differently depending on whether it is combined with an indefinite pronoun favoring the mental representation of a prototypical individual (i.e., *someone*) or whether it is combined with an indefinite pronoun favoring a group representation (i.e., *everyone*). Put differently, *zijn* 'his' might be more likely to cause a male bias when paired with *iemand* 'someone'

than with *iedereen* 'everyone'. One reason to assume this is the fact that assigning gender to a group is a more complex process than assigning gender to an individual. Kaup, Kelter, and Habel (2002) present both an analysis of linguistic data as well as experimental evidence which suggest that referents of conceptually plural expressions can be mentally represented in (at least) two ways. First, they can be represented by a number of tokens whereby each token represents a member of the set (*atomic-token representation*). Assuming the atomic-token representation, each token could be associated with a gender. Second, the individuals referred to by a plural expression can be represented as one single entity, a so-called group-level entity (or *assemblage-token representation*). It is less clear how gender would be assigned to such an entity. Following Kaup et al., the referents of an indefinite pronoun such as *everyone* can be assumed to be represented as multiple individual tokens (i.e., by the atomic-token representation). The masculine generic pronoun *zijn* 'his' could then potentially be used to determine the gender of all these individually represented tokens. If *zijn* 'his' triggers a male gender inference even when used in generic contexts, this would lead to most (if not all) tokens being represented as male. In case the pronoun is processed as generic and thus gender-neutral, the gender of the tokens could either be left unspecified or, alternatively, balanced between male and female. Conversely, in the case of generic statements featuring *someone*, the mental representation only features one token of which the gender could be specified. If the pronoun triggers a gender inference, the token's gender would be represented as male. If the pronoun is processed as generic, this individual token would most likely remain unspecified for gender. Based on these insights, we argue that a masculine generic pronoun such as Dutch *zijn* 'his' could affect processing differently depending on whether it occurs in a conceptually singular or plural generic statement, since assigning gender on the group-level is a more complex process than assigning gender to the mental representation of one individual. In other words, *zijn* 'his' may lead to a male bias in one kind of generic context, but not in the other.

We put this hypothesis to the test in our eye-tracking experiment. More specifically, we wanted to shed light on the question if a masculine generic pronoun is used to infer the gender of a generic and thus abstract, unspecific entity, and whether this is true across different types of generic statements. To this end, we used generic statements as in (4) and (5). The antecedent was varied between conceptually singular *iemand* 'someone' and conceptually plural *iedereen* 'everyone'. We hypothesized the male bias caused by *zijn* 'his' to be stronger or possibly only show in the conceptually singular generic condition featuring *iemand* 'someone'. Alternatively, it could be that the generic context facilitated the generic reading of the masculine pronoun to the extent that no male bias would emerge at all, even though it had been found in episodic contexts (Redl, Frank, et al., 2020, Chapter 3). We deemed it less likely that *zijn* 'his' would lead to a male bias

regardless of context type. We further tested whether participant gender affected how the masculine generic pronoun is processed, as previous research on masculine generic pronouns in English has occasionally found that men experience a stronger male bias than women (e.g., Moulton, Robinson, & Elias, 1978; Switzer, 1990). Even more so, only male participants showed evidence of a male bias in the eye-tracking experiment by Redl, Frank et al.

Materials & Method

Materials

We used 72 experimental items in the eye-tracking experiment, which followed the pattern below:

6. *Iemand/Iedereen met een absoluut gehoor kan snel zijn instrument stemmen, zo ook de vrouw/man op het conservatorium die nog nooit een stemvork nodig heeft gehad.*
   'Someone/Everyone with perfect pitch can tune his instrument quickly, such as the woman/man at the conservatory who has never needed a tuning fork.'

Thus, in all our stimuli a conceptually singular individual-referring or a conceptually plural group-referring antecedent was introduced and a generic statement was made about them. This first part of the stimuli always followed the exact same pattern (i.e., *someone/everyone with a* + adjective + noun + modal verb + adverb + *his* + noun + verb). Then one such person was explicitly referred to by means of the definite noun phrase *de vrouw* 'the woman' or *de man* 'the man' followed by a prepositional phrase identifying them further. We also included two control conditions which were highly similar, but which had a grammatically plural antecedent, and hence did not include the masculine possessive pronoun *zijn* 'his' but the gender-neutral plural possessive pronoun *hun* 'their' instead:

7. *Mensen met een absoluut gehoor kunnen snel hun instrument stemmen, zo ook de vrouw/man op het conservatorium die nog nooit een stemvork nodig heeft gehad.*
   'People with perfect pitch can tune their instrument quickly, such as the woman/man at the conservatory who has never needed a tuning fork.'

We first designed 120 potential stimuli with the goal to pick 72 stimuli (i.e., 12 per condition) based on two pre-tests. The stimuli were presented in the control condition. In Pre-test 1, we tested whether the stimuli were perceived to be plausible, as indicated by participants ($N = 24$) on a 7-point Likert scale ranging from *implausible* to *plausible*.

All stimuli were presented with a female as well as a male continuation, but never to the same participant. In Pre-test 2, we tested if the stimuli included any gender-biasing or stereotypical information. The latter was tested by presenting participants ($N = 44$) with the stimuli featuring a blank space where the noun *man* 'man' or *vrouw* 'woman' would be. Participants were asked to indicate on a 7-point scale which of the two nouns fit the sentence better. A rating of 4 indicated an equally good fit. We selected 72 items out of the potential 120 to be used in the eye-tracking experiment based on four pre-test measures of each item: the mean stereotype rating and its standard deviation from Pre-test 2, the mean plausibility rating from Pre-test 1, and the mean difference in plausibility ratings per item between the versions with a female and a male continuation from Pre-test 1 (i.e., an item had to be rated approximately equally plausible when presented with a female and a male continuation). All 72 items had a mean stereotype rating between 3.5 and 4.5 on a 7-point Likert scale. The items with the largest standard deviation were excluded and no selected item had a standard deviation above 1. We further aimed to select items with a relatively high plausibility rating; all final items had a mean rating of at least 4.5 when averaging across female and male continuations. We further selected items for which the difference in plausibility rating between female and male continuations was as low as possible. This difference was 0.34 ($SD = 0.27$) on average. More detailed information on the pre-tests can be found in the Appendix.

We also included 144 filler items in addition to the 72 experimental stimuli. Thirty-six fillers were generic statements including the generic pronoun *je* 'you'. Another 36 fillers were very similar to the experimental items, but featured statements about objects rather than people. Finally, 72 items were episodic statements about people in order to counterbalance the genericity of the other filler and experimental items.

A quarter of all experimental and filler items was followed by a comprehension statement, which had to be judged as correct or incorrect. Participants were required to respond to at least 80% of all statements correctly in order for their data to be included in the analysis.

We created six lists, so that each item would occur in each condition, but never for the same participant. Each participant saw the items in a different pseudo-randomized order, which was created with the program Mix (Van Casteren & Davis, 2006).

Participants

We tested 91 participants (39 male). The data of three participants were not included in the analysis as they failed to follow the instructions. The data of an additional four participants were excluded as they could not be properly calibrated, leading to poor data quality. This left us with the data of 84 native speakers of Dutch (36 male) between the ages of 18 and 30 ($M = 22.4$). The majority of participants were students ($N = 75$). All participants had normal or corrected-to-normal vision. None of the participants had

participated in either of the pre-tests or in the experiment conducted by Redl, Frank et al. (2020, Chapter 3). Participants received a 10€ coupon or course credit when preferred. Written consent was provided by all participants. The experiment was approved by the Ethics Assessment Committee Humanities of the Radboud University (number 4592).

Apparatus

The experiment took place at the Centre for Language Studies Lab at Radboud University in Nijmegen, The Netherlands. An EyeLink 1000+ remote desktop eye-tracker with a headrest was used. Data were recorded with a sampling rate of 1000Hz. We used Experiment Builder by SR Research (2011) for stimulus presentation on a BenQ XL 2420T 24" screen. The used resolution was 1024×768. The distance between the headrest and the screen was 108cm. The stimuli were presented in black letters on a gray background using Calibri with a font size of 19.

Procedure

Participants were first given general information about the experimental procedure at the lab as well as information specific to the experiment. They were then asked to sign the consent form. We tested for the participants' dominant eye to which we calibrated the eye-tracker. A 13-point calibration and validation procedure ensued. Participants were given the chance to ask clarification questions after four practice items. Breaks were scheduled after one third and two thirds of all items. Afterwards, participants filled in a short questionnaire probing them for the purpose of the experiment as well as asking several demographic questions. Participants then received either a coupon or were granted course credit. The experiment took approximately 50 minutes.

Analysis

Pre-processing of the raw eye-tracking data was done with EyeLink Data Viewer. We checked all of our participants' trials individually for drift. If a systematic and clear drift had occurred in a trial, the fixations were reassigned to the appropriate lines. Furthermore, whenever the first fixation of a trial did not fall on the first line of the stimulus, but the subsequent fixations did, the initial fixation was deleted, so as to allow for proper calculation of first run reading times. Fixations smaller than 80ms were merged with an adjacent fixation larger than 80ms within 0.25 degrees in visual angle. This was done by means of Data Viewer's cleaning procedure. Subsequently, unmerged fixations below 80ms and fixations above 1200ms were deleted.

We calculated three reading time measures for the regions of interest: first run dwell time (i.e., the sum of the duration of all fixations in a region when it is entered for the first time), regression path duration (i.e., first run dwell time with the addition of the duration of fixations back to previous regions out of the analyzed region) and dwell time

(i.e., the sum of the duration of all fixations in a region, also known as total fixation duration). The regions of interest are indicated in bold and by square brackets:

8. *Iemand met een lange vakantie kan even zijn stress vergeten,* ***[zo ook] [de vrouw] [in de duinen]*** *die er drie weken tussenuit is met het hele gezin.*
   'Someone with a long vacation can forget about his stress, **[such as] [the woman] [in the dunes]** who will be on holiday with the whole family for three weeks.'

Semantic information up to six to eight characters to the right of the current fixation is processed (McConkie & Rayner, 1975; Schroyens et al., 1999); we therefore did not only analyze the gendered noun phrase (*de vrouw* 'the woman' and *de man* 'the man'), but also the region preceding it. We further defined the propositional phrase further describing the woman or man in question as the spillover region.

We fitted linear mixed models using the *lmer* function from the *lme4* package (Bates, Mächler, et al., 2015) in R (R Core Team, 2018). All described models were fitted to log-transformed reading times to correct for a right skew in the data. PARTICIPANT GENDER (female versus male), NUMBER (conceptually singular *iemand* 'someone' versus conceptually plural *iedereen* 'everyone' versus grammatically plural *mensen* 'people') and CONTINUATION (*de vrouw* 'the woman' versus *de man* 'the man') served as fixed effects. Simple contrasts were used. Similar to dummy coding, a reference level can be chosen with simple coding. However, the intercept still represents the mean of means. The reference level is coded as $-1/k$, with k being the number of levels of a factor. The level to be contrasted with the reference level is coded as $(k-1)/k$. It follows that for two-level factors the coding is identical to sum or deviation contrasts. For CONTINUATION, *de vrouw* 'the woman' was coded as ½, *de man* 'the man' was coded as −½. For PARTICIPANT GENDER, the female participants were coded as ½, male participants as −½. For the three-level factor NUMBER, two contrasts were included. The grammatically plural control condition featuring *mensen* 'people' and no masculine pronoun served as the reference level. The first contrast compared conceptually singular *iemand* 'someone' to the reference level *mensen* 'people' (*iemand* 'someone' = ⅔, *iedereen* 'everyone' = −⅓, *mensen* 'people' = −⅓), the second contrast compared conceptually plural *iedereen* 'everyone' to the reference level *mensen* 'people' (*iedereen* 'everyone' = ⅔, *iemand* 'someone' = −⅓, *mensen* 'people' = −⅓).

We included random intercepts for participants and items. Initially, we further fitted the full random slope structure permitted by the design. We suppressed the correlation parameters as a first step to model simplification. We then tested for overparameterization by means of Principal Component Analysis using the RePsychLing package (Bates, Kliegl, et al., 2015). In case of overparameterization, we

reduced the random structure by removing random slopes which explained little to no variation, starting with higher-order effects and testing iteratively whether their removal decreased the model fit by means of the anova function. All final models included random intercepts for items and participants. The random slope structure of the final models is reported below. *P*-values were calculated using the lmerTest package (Kuznetsova et al., 2017). Furthermore, we applied false discovery rate control to correct for multiple comparisons (Benjamini & Hochberg, 1995). We did this in order to correct for the number of analyzed reading time measures and regions (three of each, leading to nine models or comparisons). Only *p*-values that were smaller than the FDR-corrected threshold are reported as being significant below. *P*-values below the original alpha level of 0.05, but which did fall above the FDR-corrected threshold are thus not reported. The fixed effect estimates of all models can be found in the Appendix.

Results

Region 1: *zo ook* 'such as'

On the pre-view region *zo ook* 'such as' we found significant effects for first run dwell time. The final model for first run dwell time included random slopes per participant for CONTINUATION and both NUMBER contrasts, as well as random slopes per item for NUMBER (*everyone* versus *people*) and PARTICIPANT GENDER*NUMBER (*someone* versus *people*). There was a significant three-way interaction between PARTICIPANT GENDER, CONTINUATION and NUMBER (*someone* versus *people*) ($\beta = -0.20$, $SE = 0.06$, $t = -3.52$, $p < 0.001$). As can be seen in Figure 1, for female participants, there is virtually no difference between the continuations *de vrouw* 'the woman' and *de man* 'the man' in the condition featuring *someone* and *his*, as well as in the control condition featuring *people* and *their*. For male participants, however, there was an increase for *the man* in the control condition, while the opposite effect was found in the *someone*-condition: There was an increase for the continuation *the woman* after having been introduced with *iemand* 'someone' and the pronoun *zijn* 'his'. Furthermore, descriptively, women seem to show an increase in reading time for male continuations in sentences featuring *iedereen* 'everyone'. However, the three-way interaction between PARTICIPANT GENDER, CONTINUATION and NUMBER (*everyone* versus *people*) to support this was not significant after correcting for multiple comparisons ($\beta = -0.14$, $SE = 0.06$, $t = -2.49$, $p = 0.013 > 0.0056$, n.s.).

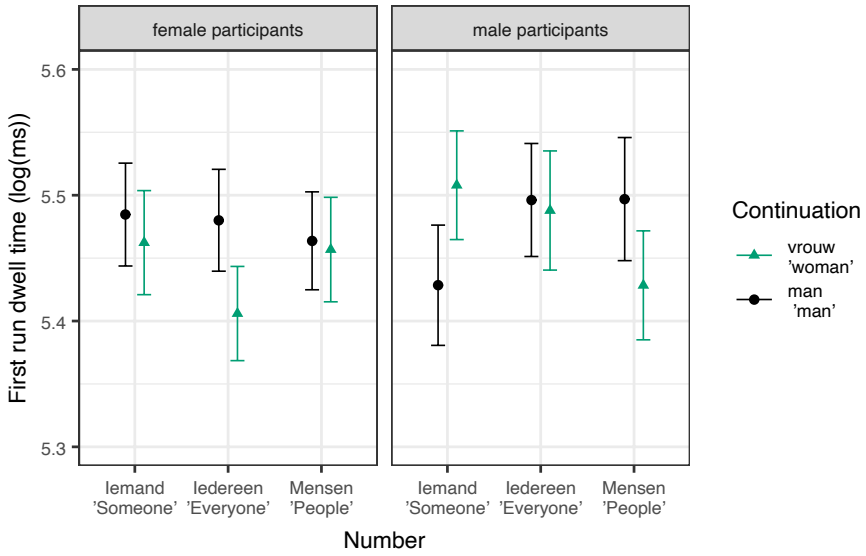

Figure 1. Mean first run dwell time on Region 1 *zo ook* 'such as' with 95% within-subject confidence intervals based on Morey (2008).

No significant effects were found for regression path duration on the pre-view region. For dwell time on the pre-view region, we did find the same three-way interaction as for first run dwell time. The random structure for the final model for dwell time included random slopes for CONTINUATION and both NUMBER contrasts per participant, as well as random slopes for both NUMBER contrasts, PARTICIPANT GENDER and CONTINUATION*NUMBER (*someone* versus *people*) per item. The three-way interaction between PARTICIPANT GENDER, CONTINUATION and NUMBER (*someone* versus *people*) was significant ($\beta = -0.18$, $SE = 0.07$, $t = -2.570$, $p = 0.010$). The pattern underlying this three-way interaction is very similar to that of the first run dwell time, though attenuated, as can be seen in Figure 2. Male participants show a tendency for the continuation *the woman* to lead to an increase in the *someone*-condition, while the reverse pattern can be observed in the control condition. Female participants however show a tendency for an increase for *the man* in the *someone*-condition, while this difference is negligible in the control condition.

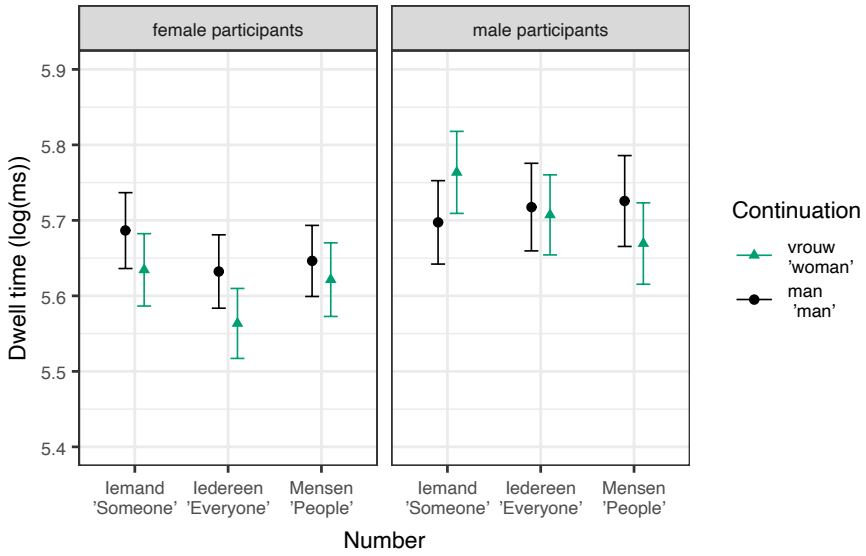

Figure 2. Mean dwell time on Region 1 *zo ook* 'such as' with 95% within-subject confidence intervals based on Morey (2008).

Region 2: *de vrouw* 'the woman'/*de man* 'the man'

We found no significant effects for the region *de vrouw* 'the woman'/*de man* 'the man' for any of the reading times.

Region 3: prepositional phrase

For the spillover region, we only found significant effects for first run dwell time. The final model's structure included random slopes for NUMBER (*everyone* versus *people*) and CONTINUATION*NUMBER (*someone* versus *people*) for participants, as well as random slopes for CONTINUATION, NUMBER (*everyone* versus *people*), CONTINUATION*NUMBER (*everyone* versus *people*) and PARTICIPANT GENDER*NUMBER (*someone* versus *people*) for items. There was a main effect of CONTINUATION, with female continuations leading to a longer first run dwell time in the spillover region overall ($\beta = 0.05$, $SE = 0.01$, $t = 4.850$, $p < 0.001$). Figure 3 below suggests that this effect is mainly driven by the male participants. However, the interaction effect between CONTINUATION and PARTICIPANT GENDER did not reach significance, since a false discovery rate corrected p-value lower than 0.0056 would have been required in this instance ($\beta = -0.06$, $SE = 0.02$, $t = -2.66$, $p = 0.008 > 0.0056$, n.s.).

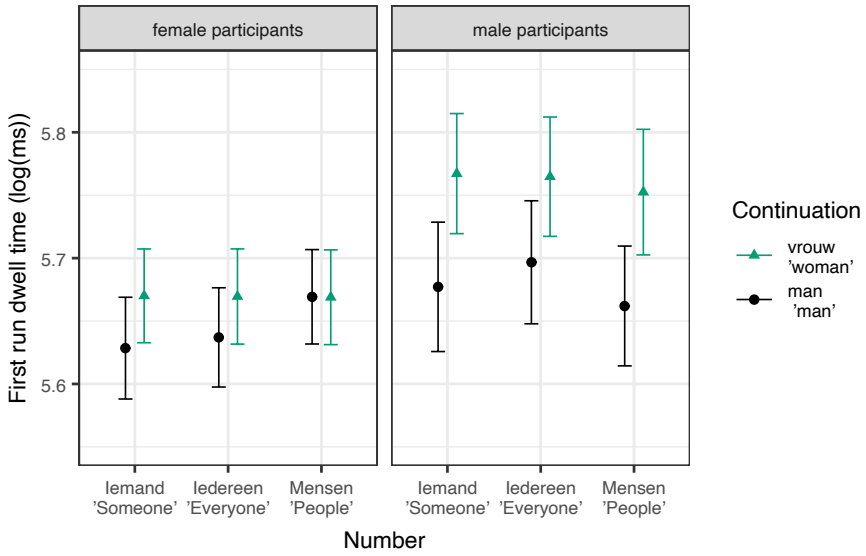

Figure 3. Mean first run dwell time on Region 3 with 95% within-subject confidence intervals based on Morey (2008).

Discussion

We conducted an eye-tracking experiment to test if a masculine generic pronoun such as Dutch *zijn* 'his' could trigger a gender inference and lead to a male bias when embedded in generic statements, that is, in the absence of a specific, contextually determined referent. We tested two different kinds of generic statements by varying conceptual number between singular, individual-referring and plural, group-referring antecedents. We expected language users to be more likely to use a masculine generic pronoun for a gender inference in generic contexts when a singular rather than a plural antecedent was featured.

We found a three-way interaction between number, continuation and participant gender on the earliest region we analyzed (i.e., the pre-view region) when comparing *iemand* 'someone' to the control condition. This three-way interaction suggests that the masculine generic possessive pronoun *zijn* 'his' can give rise to a gender inference in generic statements, despite being intended as gender-neutral and despite the absence of a specific referent. However, we found this effect of a male bias solely for male participants and not for female participants. This parallels the results by Redl, Frank et al. (2020, Chapter 3), who investigated *zijn* 'his' in episodic contexts and only found a male bias to surface for male participants and in the pre-view region, too. Furthermore, we found this effect to be borne out in generic statements featuring *iemand* 'someone', but not for *iedereen* 'everyone'. This suggests that the conceptual number of the

antecedent and consequently how the antecedent is mentally represented affects whether a masculine generic is readily processed as it is intended in generic contexts, namely as referring to all genders.

Our results thus show that a masculine generic pronoun such as *zijn* 'his' can trigger a male gender inference and therefore lead to a male bias even when no specific, contextually determined referent is presented. Previous research has largely focused on masculine generics in episodic contexts and only a small number of studies used generic contexts. For example, Noll et al. (2018) conducted two experiments 15 years apart in which they tested if masculine generic *he* causes a male bias. They used generic contexts and found a male bias of *he*, but only in the earlier of the two experiments. Noll et al. attribute this difference to the decrease in use of generic *he* (e.g., Earp, 2012; LaScotte, 2016). This could mean that the generic reading of a masculine generic pronoun is readily available in processing when it is relatively frequent. Dutch *zijn* 'his' is still very commonly used generically, as there is no widely used gender-neutral alternative. Thus, the generic reading can also be assumed to be relatively more frequent compared to the generic reading of English *he*. Nonetheless, we found *zijn* 'his' to cause a male bias when used in generic statements, albeit only for male participants and with a conceptually singular antecedent.

Conversely, this also suggests that the generic pronoun may be processed as it is intended in some instances. While we have shown that the masculine generic pronoun *zijn* 'his' can be the source of a gender inference in generic statements, this only held for our male participants and for conceptually singular contexts. Thus, as anticipated, we found that a gender inference based on the possessive pronoun *zijn* 'his' was more likely to be made when the pronoun referred back to a conceptually singular antecedent. We had based our hypothesis on the idea that a generic, conceptually singular antecedent introduced by *iemand* 'someone' is most likely mentally represented as one single prototypical person fitting the generic statement. In contrast, a conceptually plural generic antecedent would rather be represented the way plural expressions such as *everyone* typically are, namely by means of multiple tokens (Kaup et al., 2002). Assigning gender in the latter case is a more complex process. Together with the absence of a specific referent in these generic contexts, the plural antecedent thus seems to have allowed for generic *zijn* 'his' to indeed be processed as generic.

Furthermore, female participants showed no signs of a processing cost at all – neither with the conceptually singular, nor with the conceptually plural antecedent. This suggests that women can readily process the masculine generic pronoun as it is intended in a generic statement: as referring to men as well as women. This asymmetry between the genders in the processing of *zijn* 'his' was also found by Redl, Frank et al. (2020, Chapter 3). Several older offline studies on English masculine generic pronouns, too,

had found women and men to respond to masculine generics differently (e.g., Moulton, Robinson, & Elias, 1978; Switzer, 1990). Henley and Abueg (2003) suggest that this asymmetry is rooted in language acquisition. While girls are required from a young age to interpret masculine generics as they are intended in order to be included, this is not the case for boys. Boys may process masculine generics either as generic or as male-specific and they will be included in both cases. The gender-neutral reading of a masculine generic would then be more strongly represented in women's mental lexicon, as they would have had to access this reading more often than men did. This could explain why the women in our experiment seemingly processed the masculine generic as referring to persons of any gender and did not show signs of a male bias.

A masculine generic pronoun such as *zijn* 'his' can thus lead to a male bias in generic statements under certain circumstances. This adds further evidence to the notion that the mental representation of non-specific entities can still contain gender information, even based on as unreliable a cue as a masculine generic pronoun, which is not intended to give an indication of the referent's gender. An open question remains: What is the gender information on *zijn* 'his' in the conditions in which it did not cause a male bias? After all, we found no evidence of women experiencing a male bias at all, while for men this was restricted to conceptually singular antecedents. It could be that women and – under certain circumstances – men do not map the grammatical gender of the pronoun to the mental representation of the gender of the referents. The pronoun would thus still be processed as carrying masculine gender, but this information would not be added to a mental model. Alternatively, it could be that in the cases in which no gender inference is made, the pronoun is not processed as carrying gender to begin with. In her analysis of English singular *they*, Bjorkman (2017) suggests a three-way distinction in gender features (i.e., masculine versus feminine versus ∅). She suggests that singular *they* is not marked for gender and can thus easily be combined with quantificational or indefinite antecedents, like the ones in our experiment. We can extend this line of thinking to Dutch *zijn* 'his', which would then have to be thought of as ambiguous between two representations in the lexicon: one which is marked for masculine gender, the other not marked for gender at all. As mentioned above, it is possible that women can more easily access the latter, gender-unmarked representation of the pronoun due to differences in acquisition and the frequency of accessing the generic reading. Future research is needed to further explore how a masculine generic pronoun, when successfully interpreted as generic, is in fact stored in the lexicon.

It has to be noted that it is theoretically possible that the male bias found for male participants in conceptually singular contexts is not actually due to the pronoun, but resulted from a more general, nonlinguistic male bias. It has been suggested before that the prototypical human is generally thought of as male, which would in turn lead to even

neutral word forms conjuring up the image of a man, rather than the image of a woman or a mental representation which is unspecified for gender (Hamilton, 1991; Silveira, 1980). We did not find evidence for a male bias in our control items, which did not feature *zijn* 'his' and where such a general male bias could have surfaced. However, the control items were conceptually plural. It is therefore possible that conceptually singular generic statements favor a male gender representation as opposed to conceptually plural generic statements regardless of the masculine gender of the possessive pronoun, but for male participants only. While we deem this possibility unlikely, we will directly address this in future research to rule out this possibility.

Finally, we found one result pattern which was not predicted by our hypothesis. There was a general increase in first run dwell time for female continuations across all conditions on the spillover region. This could simply be an effect of frequency. We found 308,343 occurrences of *man* 'man' and 176,425 for *vrouw* 'woman' through the OpenSoNaR application, which searches two large Dutch corpora, namely the SoNaR corpus (Oostdijk et al., 2013) and the Corpus of Spoken Dutch ("Corpus Gesproken Nederlands," 2014). Alternatively, it could also be a spillover effect caused by the length of *vrouw* compared to *man*. We deem such lexical explanations most likely. Alternatively, this effect could be interpreted as a sign of a more general male bias, as described above. However, a lexical explanation is simpler and is therefore favored.

Conclusion

We found men to make a gender inference based on the masculine generic possessive pronoun *zijn* 'his' in generic statements, but only when the antecedent was conceptually singular. Women, on the other hand, were not found to make a gender inference based on the masculine generic with either a conceptually singular or conceptually plural antecedent. Our results therefore suggest that a male bias can arise even in generic statements, but only under certain circumstances. The conceptual number of referents as well as the gender of the person processing the masculine generic possessive pronoun affect whether or not a male bias arises in generic contexts.

Chapter 5: Gender-mismatching pronouns in context: The interpretation of possessive pronouns in Dutch and Limburgian

Abstract

Gender-(mis)matching pronouns have been studied extensively in experiments. However, a phenomenon common to various languages has thus far been overlooked: the systemic use of non-feminine pronouns when referring to a female individual. The present study is the first to provide experimental insights into the interpretation of such a pronoun: Limburgian *zien* 'his/its' and Dutch *zijn* 'his/its' are grammatically ambiguous between masculine and neuter, but while Limburgian *zien* can be used to refer to a woman, the Dutch equivalent *zijn* cannot. Employing an acceptability judgment task, we presented speakers of Limburgian (N = 51) with recordings of sentences in Limburgian featuring *zien*, and speakers of Dutch (N = 52) with Dutch translations of these sentences featuring *zijn* (e.g., *Fleur heeft zijn yogabroek aangedaan* 'Fleur put on his/its yoga pants'). All sentences featured a potential male or female antecedent embedded in a stereotypically male or female context. We found that ratings were higher for sentences in which the pronoun could refer back to the antecedent. For Limburgians, this extended to sentences mentioning female individuals. Context further modulated sentence appreciation. Possible mechanisms regarding the interpretation of *zien* as coreferential with a female individual will be discussed.[11]

[11] This chapter has been published as: Piepers, J., & Redl, T. (2018). Gender-mismatching pronouns in context. *Linguistics in the Netherlands, 35,* 97–110. https://doi.org/10.1075/avt.00007.pie

Introduction

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

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

They further found that participants who rated these sentences as unacceptable showed a P600 effect on the mismatching pronoun – an event-related potential traditionally linked to problems with syntactic processing. Thus, participants tried to map *she* onto *the king*, resulting in perceived ungrammaticality, instead of linking *she* to an unmentioned referent. Similarly, Nieuwland and Van Berkum (2006) found a P600 effect when the pronoun matched neither of two previously introduced possible antecedents in terms of gender, even in the absence of an explicit judgment task.

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

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

In addition to hybrid nouns, there is a lesser known, but more general case of gender-mismatching pronouns being used to establish coreferentiality *without* resulting in ungrammaticality: women can be referred to by non-feminine as well as feminine pronouns in certain languages. This variation is often informed by pragmatic factors (e.g., Nübling, 2015). In certain Polish dialects, for example, the feminine gender is used

exclusively for married women; unmarried women and young girls are referred to with neuter or masculine gender (Zaręba, 1984 as cited in Corbett, 1991, p. 100). In Telugu (South-Central Dravidian), the same pronouns that are used for animals and inanimate objects are also used for young girls, or girls the speaker has a close personal relationship with (Subbarao & Lalitha Murthy, 2011), and in Konkani (Indic), neuter agreement can be used for young women as well (Corbett, 1991).

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

2. ***ziej/het*** *haet zich pien gedaon (test sentence 272/location L329p)*[12]
   she/it has REFL pain done
   'She hurt herself'

Note that this use of neuter pronouns as referring to women does not require a grammatically neuter antecedent. By contrast, German *es* 'it' can only be used for a female individual when licensed by a grammatically neuter noun such as *Mädchen* 'girl'. Neuter *het* for female reference in Limburgian, however, is a more widespread and systemic phenomenon (see Bakker, 1992, for a description of the phenomenon in the dialect of Venlo). Although the Limburgian dialects are by no means homogeneous (see Cornips, 2013), the use of neuter pronouns for women can be found in varieties all across Limburg (see e.g., Van der Sijs, 2011, pp. 238–239).

The neuter possessive pronoun *zien* is used in a similar way.[13] *Zien* is particularly interesting, as the neuter form happens to be morphologically identical to the masculine form – that is, *zien* 'his/its' can be coreferential with a male as well as a female individual, denoted by a proper noun. For Dutch *zijn* 'his/its', coreferentiality with a female individual is not possible (see (3)).

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

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

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

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

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

Thus, neuter *zien* is only one of two possessive pronouns available for a female referent. Masculine *zien*, on the other hand, is the sole possessive pronoun available for male reference, meaning that masculine *zien* is more frequent than neuter *zien*.[14]

The use of non-feminine pronouns in reference to women can be commonly found across Limburg (as well as in other dialects of Dutch; e.g., De Vogelaer, 2007, pp. 200–201; Van der Sijs, 2011; Van Oostendorp, 2012; Weijnen, 1966), yet this phenomenon has not received much attention in the literature. The present study is the first to provide experimental evidence showing that Limburgian *zien* can indeed refer to a female antecedent. It further adds to a large body of research into gender-(mis)matching pronouns, which has up until now ignored the possibility that a non-feminine pronoun may link to a female single referent in some languages systemically without resulting in ungrammaticality. To this end, we presented an acceptability judgment task to both Dutch and Limburgian speakers.[15] The former rated Dutch sentences, the latter rated Limburgian sentences, which all featured the possessive pronoun *zijn* and *zien*, respectively, a possible female or male antecedent and a stereotypically female or male

[14] This claim is based on our analysis of the DynaSAND corpus (Barbiers et al., 2006), which shows that *zien* is used in 60% of the cases where a woman is referred to with a possessive pronoun, whereas a man is referred to with *zien* 100% of the time. These percentages are based on pronominal references in test sentences 163 (*Marie d'r/se(n) auto is kapot*) and 165 (*Piet z'n/se auto is kapot*). For both sentences we selected translations from the Dutch province of Limburg only, which we then limited to "*z'n*-constructions". This yielded 30 occurrences for *Marie,* 18 of which contained *zien* (and 12 *(h)eur*), and 22 for *Piet,* all of which contained *zien. Zien* referring to *Marie* was used by informants from all over the province of Limburg.

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

context. The rationale behind introducing stereotype contexts was twofold. First, the use of stereotypical contexts allowed us to confirm *implicitly* that *zien* is gender-ambiguous. This way, we could test a large number of participants using an easily distributed task, without having to ask participants explicitly whether the pronoun and subject are coreferential. Consider stereotypically female contexts featuring a female subject (e.g., *Emma packed his/its leggings*); if the pronoun can only be interpreted as referring to a man like Dutch *zijn*, the presence of a female subject and a stereotypically female context must lead to lower acceptability. This is due to a mismatch between the pronoun and the subject as well as between the pronoun and the context. If, on the other hand, the pronoun can refer to a woman, as should be the case with Limburgian *zien*, these sentences should be perfectly acceptable. Thus, we designed the contexts to strongly suggest a coreferential reading of the pronoun and the subject when the gender of the subject and the context matched, even when the pronoun did not match that gender as could happen for Dutch participants. Second, we sought to test to what extent a gender-biasing context affects pronoun resolution, both in the case of Dutch where *zijn* can only be interpreted as linking to a male referent, and in the case of Limburgian where its equivalent *zien* is ambiguous.[16]

Materials & Method

Participants

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

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

[16] We are not aware of any studies on the effect of gender stereotypes on ambiguous pronouns. For effects of other types of contexts on ambiguous pronouns see for example, Nieuwland and Van Berkum (2006). For the effect of gender stereotypes on unambiguous pronouns see for example Carreiras et al. (1996).

Materials

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

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

'Fleur put on his/its yoga pants'

The proper names were common unambiguously male or female Dutch names taken from the Dutch first name database (*Nederlandse Voornamenbank "Dutch First Name Database,"* n.d.). The 48 stimuli featured pre-tested gender stereotype contexts, taken from Redl et al. (2018, Chapter 2). Twenty-four of these were stereotypically female (e.g., *yogabroek aandoen* 'putting on yoga pants'), the other 24 stimuli were stereotypically male (e.g., *bokshandschoenen aandoen* 'putting on boxing gloves'). After careful consideration, experimental conditions featuring neutral contexts were not included, as we feared that this would render the experiment too long. The stereotypes had been pre-tested using a 7-point Likert scale on which 56 Dutch-speaking participants indicated how likely they thought it was for a man or a woman to engage in a particular activity (see Redl et al., 2018 or Chapter 2, for more information). We carefully selected stereotypically male and female activities such that they were comparable in strength and distribution ($M = 2.20$, $SD = 0.29$ for female activities; inverted $M = 2.24$, $SD = 0.28$ for male activities). This was to make sure that any difference between conditions would not be due to a difference in strength of the stereotypes. Two lists were created for each language group, so that each stereotype context occurred with a female as well as a male proper name, but never within the same list. To summarize, three factors were varied: STEREOTYPE CONTEXT, REFERENT GENDER – denoted by the proper name – and LANGUAGE, resulting in a 2×2×2 design.

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

Table 1. Design overview with the number of items per condition for stimuli and fillers.

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

Since Limburgian lacks a standardized form and spelling, we presented all stimuli auditorily. A female speaker of Standard Dutch and a female speaker of the Limburgian variety spoken in the area of Venlo recorded all 48 fillers and 48 experimental items in a sound-attenuated booth at the Centre for Language Studies lab at Radboud University using *Audacity* (Audacity Team, 2017). We opted to use two different speakers to ensure that the Dutch stimuli would not be pronounced with a Limburgian accent, as this could influence the ratings (e.g., Grondelaers, Van Hout, & Steegs, 2010). Each stereotype context occurred in two conditions – once with a female, once with a male proper name. To ensure that items differed minimally between conditions, we recorded each of the 48 sentences only once in each language and constructed the remaining 48 stimuli using *Praat* (Boersma & Weenink, 2017) by cutting out the proper name and the auxiliary, and subsequently inserting a proper name of the opposite gender and an auxiliary from a different item.

Procedure

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

Analysis

As is often done in the literature, the ordinal data were treated as continuous and subjected to parametric testing. We consider this decision warranted as the distances between points on the scale were considered to be equal. Data simulations have also suggested that seven categories, as is the case for our scale, are sufficient to treat ordinal data as continuous (Rhemtulla et al., 2012). We converted all obtained scores to *z*-scores to account for differences in scale use between participants (Schütze & Sprouse, 2013). The *z*-scores were modeled in R (R Core Team, 2018) using the *lmer* function from the *lme4* package (Bates, Mächler, et al., 2015). We first fitted two models with the maximal random structure permitted by the design (Barr et al., 2013): one with the three fixed effects LANGUAGE, STEREOTYPE CONTEXT and PROPER NAME and all possible interactions, the other with the additional fixed effect PARTICIPANT GENDER and all possible interactions as well as the accordingly larger maximal random structure. Factors were coded using sum contrasts. For the three fixed effects with the levels *female* and *male* (i.e., STEREOTYPE, PARTICIPANT GENDER and PROPER NAME), female was coded as ½, while male was coded −½. For the factor LANGUAGE, we coded Dutch as ½ and Limburgian as −½. While we did not expect PARTICIPANT GENDER to have an effect, we nevertheless chose to control for it, given the nature of the experiment. We compared the AIC of the two models and chose the model without PARTICIPANT GENDER as an additional fixed effect since it fit the data better, as indicated by a lower AIC. The final model included random intercept and slopes for items and participants. Using Principal Component Analysis from the *RePsychLing* package (Bates, Kliegl, et al., 2015), we identified the following random slopes structure to best fit the data: random slopes per participant for PROPER NAME, STEREOTYPE as well as the interaction between the two, and random slopes per item for the interaction between PROPER NAME and LANGUAGE. *P*-values were obtained using the package *lmerTest* (Kuznetsova et al., 2017).

Results

Figure 1 shows the mean raw scores of Dutch and Limburgian participants per condition. There was a significant effect of LANGUAGE, suggesting that Limburgians generally gave higher ratings ($\beta = -0.18$, $SE = 0.04$, $t = -4.85$, $p < 0.001$). However, this effect was modified by a significant interaction effect between LANGUAGE and PROPER NAME ($\beta = -0.35$, $SE = 0.17$, $t = -2.05$, $p = 0.043$). There was a significant effect of PROPER NAME, showing that sentences featuring male proper names generally scored higher ($\beta = -0.26$, $SE = 0.07$, $t = -3.51$, $p < 0.001$). However, as indicated by the interaction between LANGUAGE and PROPER NAME reported above, this advantage for sentences with male proper names was significantly lower for Limburgian participants. We further found a

significant effect of STEREOTYPE CONTEXT ($\beta = 0.17$, $SE = 0.04$, $t = 4.054$, $p = 0.001$), which was not meaningful given the significant interaction between STEREOTYPE and PROPER NAME ($\beta = 0.20$, $SE = 0.05$, $t = 4.20$, $p < 0.001$). Together with the significant effect of PROPER NAME, this interaction shows that male proper names generally boosted the naturalness of sentences, but even more so in male stereotype contexts.

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

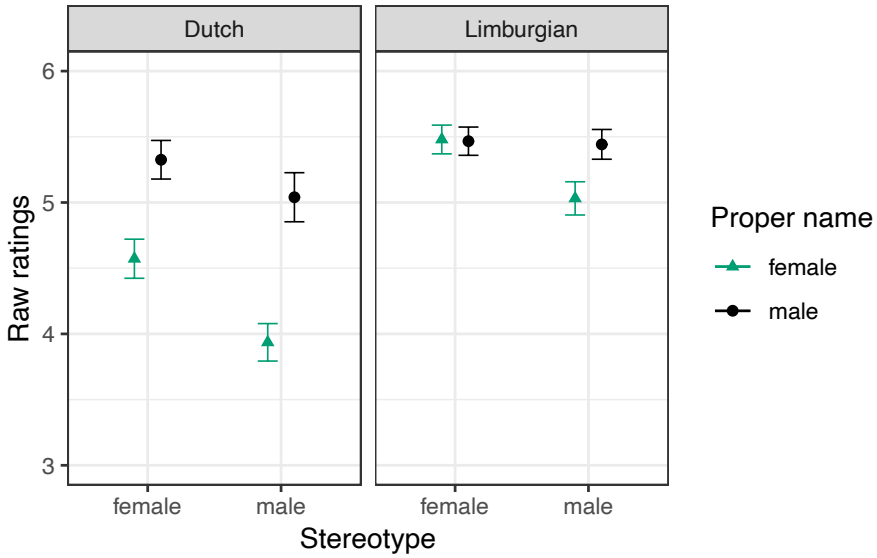

Figure 1. Mean raw scores given by Dutch participants for Dutch stimuli and by Limburgian participants for Limburgian stimuli per condition.

Discussion

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

Past research has shown that sentences featuring gender-mismatching pronouns are often perceived as ungrammatical and therefore dispreferred as reflected in lower acceptability as well as online measures such as EEG (e.g., Osterhout & Mobley, 1995; see also Nieuwland & Van Berkum, 2006). In order to test whether Limburgian *zien* 'his/its' can

refer to women as opposed to Dutch *zijn* 'his/its', we conducted an acceptability judgment task and presented Dutch and Limburgian participants with recordings of Dutch and Limburgian sentences, respectively, assuming that sentences in which coreferentiality can be established receive higher ratings in line with previous research. These sentences were stereotypically male or female, featured a male or female subject denoted by a proper name, and the pronoun *zijn* or *zien*, depending on the testing language. In line with our hypothesis, sentences featuring male proper names generally received higher ratings than sentences featuring female proper names due to the presence of the pronoun; sentences in which the pronoun could be linked to the subject were preferred. As expected, we found that this advantage for male proper names was significantly less pronounced for Limburgians as indicated by an interaction effect between the testing language and proper name gender; in female stereotype contexts, no difference between male and female proper names was found for Limburgian at all, confirming that *zien* 'its' can indeed be interpreted as referring to a woman. Furthermore, we found that whether a female or male proper name was presented had a larger effect on the ratings in male stereotype contexts. This held true for both the Limburgian and the Dutch data. In the following, we offer a possible explanation for this latter effect.

Exploring the effect of stereotype context

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

Limburgian *zien* is only one of two productive pronominal forms available for a female referent, but the sole option available for male reference. Therefore, the masculine reading of *zien* must have a stronger representation in the mental lexicon than neuter (i.e., female-interpreted) *zien*, which guides pronoun interpretation. The interpretation of ambiguous *zien* is further guided by both the gender of the sentence's subject and the context; that is, the female interpretation of *zien* is facilitated and most likely in a stereotypically female context and when a female subject is present. Whether or not coreferentiality is established between the subject and the pronoun *zien* thus depends, in case of a female subject, on whether or not the female interpretation is facilitated. Coreferentiality can always be established in the case of a male subject. Consider the example stimuli from Conditions A-D in Table 2:

Table 2. Example stimuli per condition (Cond.) by subject gender (Subj.), gender stereotype context (Stereo.) and language.

Cond.	Subj.	Stereo.	Language	Stimulus
A	F	F	Dutch	Fleur heeft zijn yogabroek aangedaan
			Limburgian	Fleur hɛt zien yogabʊks aangedo:n
B	M	F	Dutch	Lucas heeft zijn yogabroek aangedaan
			Limburgian	Lucas hɛt zien yogabʊks aangedo:n
C	F	M	Dutch	Lotte heeft zijn bokshandschoenen aangedaan
			Limburgian	Lotte hɛt zien bɔkshandschoon aangedo:n
D	M	M	Dutch	Jeroen heeft zijn bokshandschoenen aangedaan
			Limburgian	Jeroen hɛt zien bɔkshandschoon aangedo:n

Gender-mismatching pronouns are dispreferred, which is clearly visible in the results of the Dutch participants (see Figure 1). For speakers of Dutch, coreferentiality with *zijn* 'his' can only be established for male but not for female subjects. Conditions B and D feature a male subject and therefore show congruity with the pronoun, allowing for coreferentiality and boosting sentence appreciation. Conditions A and C, featuring a female subject and masculine *zijn* 'his', however, show incongruity, thus preventing coreferentiality and resulting in lower ratings. Gender stereotypes, then, are adhered to in Conditions A and D but violated in B and C. The interaction effect between *proper name* and *stereotype* shows that the difference in appreciation between Conditions C and D is larger than that between A and B. This suggests that incongruity between subject and pronoun is penalized, and that a mismatching stereotype context further adds to this.[17]

In other words, the Dutch results showed that while sentences featuring both a mismatching pronoun and a mismatching context received lower ratings than sentences that showed a mismatch in one or none of these respects, sentence appreciation was primarily guided by the possibility of coreferentiality. This also held true for Limburgians. In the Dutch sentences, however, the sole factor determining whether coreferentiality could be established was the subject's gender: *zijn* matches a man but not a woman. This was not the case in Limburgian, because *zien* is ambiguous in these contexts, and its interpretation was affected by subject gender and the stereotype context: it is easier to interpret *zien* as referring to a woman if the context favors this reading.

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

Thus, it appears that coreferentiality could be established (like in Dutch) in Conditions B and D, where a male antecedent was present, and additionally also in A but not C, which both featured a female subject but embedded in a male context in the case of C. This led to higher appreciation of sentences from conditions A, B and D.

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

Conclusion

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

Chapter 6: The male bias of a generically-intended personal pronoun in language processing

Abstract

We conducted a self-paced reading experiment to investigate if a generically-used masculine personal pronoun leads to a male bias in online processing. We presented Dutch native speakers ($N = 95$, 47 male) with generic statements featuring the masculine pronoun *hij* 'he' (e.g., *Someone who always promises that he will really be on time, such as Ms/Mr Knoop, will sometimes be late anyway*). We further presented participants with control items expressing the same meaning, but without the pronoun (e.g., *Someone who always promises to really be on time, such as Ms/Mr Knoop, will sometimes be late anyway*). Reading times were significantly higher when a female individual was given as an example (i.e., *Ms Knoop* in the example above) following the masculine generic pronoun *hij* 'he', but not in the control condition. This effect did not interact with participant gender. This shows that the masculine personal pronoun, even though intended as gender-neutral, leads to a male bias in online processing for male as well as female participants. Masculine personal pronouns are still commonly used for generic reference in many languages such as Dutch. However, the results of this experiment refute the notion that a pronoun such as *hij* 'he' lends itself for a gender-neutral reading.[18]

[18] This chapter has been submitted as: Redl, T., Frank, S.L., De Swart, P. & De Hoop, H. The male bias of a generically-intended personal pronoun in language processing.

Introduction

Each person knows when his appearance is unattractive. Moulton, Robinson, and Elias (1978) have shown that when we ask someone to write a story about such a person, the main character is more likely to be described as male rather than female. When singular *their* or the pronoun combination *his or her* is used instead of *his* to refer back to the person, however, the written stories are more gender-balanced (Moulton et al., 1978). Similarly, Gastil (1990) found that when a person reads a sentence such as *After a patient eats, he needs to rest*, they self-report to imagine the patient to be male significantly more often than when singular *they* or the combination of *he* and *she* is used in the sentence. Moulton et al. and Gastil along with other researchers (e.g., Hamilton, 1991; Hyde, 1984; Switzer, 1990; Wilson, 1978) have thus shown that when the English pronouns *he*, *him* and *his* are used as so-called masculine generics, that is, intended to refer to a person of any gender despite being grammatically masculine, language users often seem to interpret the pronoun as referring to males only. At least, this is visible in offline tasks such as story writing or the reporting of mental imagery.

However, we know comparably little about how masculine generic pronouns are processed online, even though a few early studies on masculine generic pronouns also collected response times. For example, MacKay and Fulkerson (1979) asked participants to listen to sentences featuring the masculine generic pronoun *he* or *his* (e.g., *A bicyclist can bet that he is not safe from dogs*) and then indicate as quickly as possible whether a presented sentence could refer to one or more women. If the pronoun is interpreted as intended, the expected answer would be *yes*. However, MacKay and Fulkerson found the sentences to be judged as being able to refer to one or more females only 13% of the time. The descriptive analysis of the response times further revealed that yes-responses took longer than no-responses. They also found that participants generally took longer to respond to sentences featuring a generic pronoun compared to control sentences (e.g., *The old housekeeper cleaned her carpet before sunrise*). They interpreted this as an indication that a reading including women is not readily available when a masculine generic pronoun is used. However, the difference in response time between experimental and control items could be due to a variety of reasons, as the sentences were highly dissimilar. Even more so, MacKay and Fulkerson did not subject these numbers to statistical testing due to the small number of yes-responses and it is therefore unclear if these findings generalize.

Criticism of generic *he* grew louder starting in the 1970s, and the studies cited above provided empirical evidence to substantiate the claim that the use of generic *he* can lead to a male bias, at least offline. Remarkably, Lakoff (1973), who was one of the early critics of a gender bias in the English language, stated that trying to change the pronoun

usage of English speakers and replacing generic *he* would be futile. Time has proven that her prediction was wrong; the frequency in use of generic *he* has since decreased, while usage of the gender-neutral alternative singular *they* has increased (Baranowski, 2002; Earp, 2012; LaScotte, 2016). More recent studies on generic pronouns have thus focused on singular *they*, but by comparing singular *they* to its predecessor of sort *he*, some conclusions regarding the processing of masculine generic pronouns can still be drawn. For example, Noll, Lowry, and Bryant (2018) employed a lexical decision task in which participants responded to female or male definitional gender nouns such as *aunt* or *uncle* after having read a sentence featuring either the masculine generic *he* or singular *they* (e.g., *A speaker should avoid reading a prepared speech, even if he/they will be nervous and want to get the wording exactly right*). They hypothesized that if masculine generic *he* causes a male bias, then responses to male definitional nouns should be faster after these sentences. Noll et al. found no evidence for a male bias induced by *he* in their first experiment, but when repeating the experiment fifteen years later, they did find a facilitation effect for male probes after sentences featuring generic *he*, hinting at a male bias. Thus, only one of the two experiments provides evidence of a male bias in online processing caused by a masculine generic pronoun, but these results can also be interpreted as suggesting that as the use of *he* as a masculine generic decreased, its male bias has increased.

As opposed to English, there are languages in which masculine generic pronouns are still commonly and frequently used, yet little is known about how they are processed. One such language is Dutch. In an attempt to better understand the effects of masculine generic pronouns on online processing, multiple experiments have previously investigated the possessive pronoun *zijn* 'his'. Redl, Eerland and Sanders (2018, Chapter 2) conducted an eye-tracking experiment in which participants read sentences such as *Iedereen was zijn tanden aan het poetsen* 'Everyone was brushing his teeth'. The activities in which the group of people described by *everyone* engaged were varied between stereotypically male, female and neutral. An individual member of the group was later referred to by means of a proper name, identifying them as either female or male. The authors hypothesized that reading times on female proper names would increase, as participants were expected to have previously made a male gender inference based on the pronoun *zijn* 'his', which would then mismatch the individual's actual gender. However, Redl et al. (2018, Chapter 2) found no such evidence of a male bias induced by the pronoun. Redl, Frank, De Swart, and De Hoop (2020, Chapter 3) then conceptually replicated this eye-tracking experiment and *did* find *zijn* 'his' to cause a male bias, however, only for male participants and in stereotypically neutral contexts. In a second experiment, Redl, Frank, et al. (2020, Chapter 3) used the same stimuli in a sentence evaluation task. Participants had to evaluate whether the continuation of the

sentence, which identifies part of the group as female or male, was a good continuation to the first part of the sentence featuring the masculine generic pronoun. They did not find sentences referring to men to be a better match than sentences referring to women. In other words, no signs of a male bias were found using the sentence evaluation paradigm. Finally, Redl, Szuba, De Swart, Frank, and De Hoop (2020, Chapter 4) conducted an eye-tracking experiment in which they embedded generic *zijn* 'his' in truly generic contexts, rather than episodic ones (e.g., *Iemand met een absoluut gehoor kan snel zijn instrument stemmen* 'Someone with perfect pitch can tune his instrument quickly'). Here again, the authors found *zijn* 'his' to cause a male bias only under certain conditions: only male participants experienced a delay in processing, and only when the antecedent was conceptually singular (i.e., *iemand* 'someone' as opposed to *iedereen* 'everyone'). The evidence regarding the processing of the possessive pronoun *zijn* 'his' when used as a masculine generic is thus mixed; men were found to show signs of a male bias in processing in two out of four experiments, but women never did.

One reason for focusing on the possessive pronoun *zijn* 'his' instead of the personal pronoun *hij* 'he' in these experiments was the assumption that if we found a male bias with *zijn* 'his', we would almost certainly find it with *hij* 'he' as well. However, since the evidence for *zijn* 'his' was mixed, it was necessary to conduct another experiment investigating *hij* 'he' to establish if a male bias would be found for this type of masculine generic. We used sentences such as the following:

1. *Iemand die steeds belooft dat hij echt op tijd zal komen, zoals mevrouw/meneer Knoop, zal alsnog soms te laat zijn.*
   'Someone who always promises that he will really be on time, such as Ms/Mr Knoop, will sometimes be late anyway.'

There is one important difference between *hij* 'he' and *zijn* 'his', or rather between personal and possessive pronouns in general, leading us to hypothesize that *hij* 'he' is more likely to lead to a male bias. This could then possibly be reflected in men's as well as women's processing of the masculine generic pronoun. The personal pronoun *hij* 'he' is an independent pronoun which always functions as the subject of the clause. By contrast, the possessive pronoun *zijn* 'his' always functions as a determiner, and is thus dependent on the head noun of that noun phrase. Whereas *zijn* 'his' refers to a male possessor, the head of the noun phrase (the possessee) can just as well refer to a female. Consider the sentence *Hij gaat met zijn moeder op vakantie* 'He is going on vacation with his mother'. Although the possessive pronoun *zijn* 'his' refers to the same male character as *hij* 'he', the noun phrase *zijn moeder* 'his mother' refers to a woman. This mismatch between the genders of the possessor and the possessee can even lead to an error in the use of the possessive pronoun. Slevc, Wardlow Lane, and Ferreira (2007)

conducted a production experiment and found that speakers were three times more likely to produce the wrong gender on the possessive pronoun when the gender of the possessor and possessee within the noun phrase mismatched (5.1% errors like *He gave **her** sister a present*) than when the genders matched (1.7% errors like *She gave **his** sister a present*). They also found the error rate to be independent of the lexical noun used as long as the gender of the referent was known. That is to say, the noun *cousin*, which can refer to either a male or female, would lead to the same amount of gender errors as *sister* when the context made it clear (by a picture of the cousin wearing a skirt) that *cousin* referred to a female individual. In the studies on the possessive pronoun *zijn* 'his' in Dutch (Redl et al., 2018, Chapter 2; Redl, Frank, et al., 2020, Chapter 3; Redl, Szuba, et al., 2020, Chapter 4), the head noun never referred to a person, hence there was never a gender mismatch within the noun phrase. Still, the fact that this type of mismatch (as in *zijn zus* 'his sister') is ubiquitous in everyday speech indicates that a masculine possessive pronoun, and as a consequence also its male referent, is less salient than (the male referent of) a masculine personal pronoun. The personal pronoun *hij* 'he', on the other hand, is syntactically independent, and always the subject of the clause. This means that the pronoun's referent – a male individual – is also more salient. We therefore deem it more likely that a gender inference would be made based on *hij* 'he' than on *zijn* 'his' and hypothesize that the male bias would not only be visible in the processing of our male, but also of our female participants. We conducted an online self-paced reading experiment to test this.

Materials & Method

Materials

The experiment featured 48 experimental items in four conditions (i.e., twelve per condition). All experimental items were generic statements about a type of person for which one specific individual was given as an example. Each item could occur in the experimental condition, which featured the complementizer *dat* 'that' followed by the masculine generic pronoun *hij* 'he' and including a finite verb. An example is provided in (1) above. The control condition expressed the same meaning through a non-finite clause with an implicit subject, hence without the personal pronoun *hij* 'he:

2. *Iemand die steeds belooft echt op tijd te zullen komen, zoals mevrouw/meneer Knoop, zal alsnog soms te laat zijn.*
   'Someone who always promises to really be on time, for example Ms/Mr Knoop, will sometimes be late anyway.'

The woman or man given as an example was introduced by *zoals* 'such as', *zo ook* 'also' or *bijvoorbeeld* 'for example'. This was done in order to break the repetitive pattern. We

further made sure that the woman or man introduced by *mevrouw/meneer* 'Ms/Mr' would always be interpreted as the subject right away. That meant that no other persons were present in the sentence, neither explicitly nor implicitly. We further avoided constructions in which the noun phrase introduced by *bijvoorbeeld* 'for example' could be temporarily construed as a direct object upon reading *bijvoorbeeld* 'for example' (e.g., a sentence such as *Iemand die altijd hoopt nuttig advies te kunnen geven, bijvoorbeeld* ... 'Someone who hopes to always give useful advice, for example …' would not have been included). We also designed the stimuli in such a way that they sounded equally natural in both the experimental and the control conditions. The last names we used were common last names in the Netherlands with a frequency of at least 1000 (*Nederlandse Familienamenbank "Dutch Family Name Database,"* n.d.). We chose 48 last names for the experimental items that could not be associated with female or male gender in any way (i.e., none of the following names would have been included: patronyms (e.g., *Hendricks*), role nouns (e.g., *De Boer* '*lit.* the farmer'), lexically male nouns (e.g., *Prins* '*lit.* prince'), names ending in *-man* (e.g., *Bosman* '*lit.* forest man'), anything that could be associated with gender in any other way (e.g., *Borst* '*lit.* breast' or *Damen* '*lit.* ladies')). Furthermore, all chosen last names consisted of one word only.

We also made sure that the first part of the stimuli did not contain any gender information apart from the masculine generic pronoun, as this could affect reading times. This was tested by subjecting the stimuli to a pre-test. Twenty-eight Dutch native speakers (12 male) completed this online pre-test. They ranged in age from 18 to 25 (M = 19.9). They were all students recruited through the SONA participant pool of Radboud University and received credit for their participation. We pretested 150 possible items in the control condition. Only the first part of the stimulus up until the first comma in (2) was presented. In addition, 50 filler items were created, 25 of which were stereotypically female, the other 25 being stereotypically male. All items had to be rated on a 7-point scale, indicating whether the participant thought that the description better fitted a woman or a man. The scale ranged from *man* to *woman* for half of the participants and was reversed for the other half. The middle of the scale (i.e., 4) represented an equally good fit for men and women. Before calculating the average for each item, we converted the scores, so that 1 corresponded to a female interpretation for both lists. We then checked whether participants followed the instructions and filled in the stereotypically male and female fillers as expected. The average ratings per participant for female fillers ranged from 1.00 to 3.04 (M = 1.81, SD = 0.47), while for male fillers they ranged from 4.6 to 7.00 (M = 6.02, SD = 0.54). This shows that all participants responded to the fillers as expected and no pre-test participant was excluded. The means for all 150 potential experimental items ranged from 2.89 to 5.32. We selected 48 items with a mean close to

4 as well as items with a low standard deviation. The means of the 48 selected items ranged from 3.21 to 4.79 (M = 4.01, SD = 0.42).

We constructed 48 fillers in four categories for the self-paced reading experiment in order to distract from the purpose of the experiment. We included 12 fillers describing habits of individuals (e.g., *Sanne gaat meestal voor de lunch naar de supermarket* 'Sanne usually goes to the supermarket before lunch'), and another 12 fillers about individuals were episodic (e.g., *Joey heeft de deadline voor de scriptie gisteren niet gehaald* 'Joey did not make the deadline for his thesis yesterday'). The individuals were denoted by a first name (18) or last name (6), none of which was used in the experimental items. Half of the sentences were about women, the other half about men. The final 24 fillers were not about specific individuals and were generic statements, either following the format *Without X you…* (e.g., *Zonder medewerkerspas mag je in sommige kantines niet lunchen* 'Without an employee ID you are not allowed to have lunch in some cafeterias') or generic statements starting with an inanimate subject and giving information about it (*Panna cotta is een Italiaans nagerecht en betekent letterlijk gekookte room* 'Panna cotta is an Italian dessert and literally means cooked cream'). Furthermore, a quarter of all experimental and filler items was followed by a comprehension statement which had to be judged as correct or incorrect.

Four lists were created, so that each item would occur in each condition, but never for the same participant. These lists were pseudo-randomized using the program Mix (Van Casteren & Davis, 2006). The following constraints applied: a maximum of two consecutive experimental items and three consecutive filler items was allowed, and a comprehension statement was presented at least every six items, but never twice in a row.

Participants

A total of 96 Dutch native speakers (48 male) participated in the experiment. They ranged in age from 18 to 35 (M = 23.3). None of the participants reported to have dyslexia or a different reading impairment. They were recruited through the subject database of the Max Planck Institute for Psycholinguistics and received €6 for their participation. All participants provided informed consent. Two exclusion criteria applied: participants who guessed the purpose of the experiment would be excluded, as well as participants responding incorrectly to more than 25% of the comprehension statements.

Procedure

The online experiment was implemented on Ibex Farm (Drummond, 2013). Ibex Farm only uses JavaScript and HTML, thereby not requiring the additional installation of plugins on the participants' part. Participants were first provided with general

information about the experiment as well as the research policies at Radboud University and the Max Planck Institute for Psycholinguistics regarding the use and storage of data. All participants provided consent. They were asked several demographic questions, after which they received more detailed instructions. Participants were then presented with four practice items, two of which were followed by a comprehension statement. The instructions were repeated in an abbreviated version and the main part of the experiment ensued. Ibex Farm uses the moving window paradigm, meaning that each trial started with a series of underscores representing each word. By pressing the spacebar, the first word appeared; when pressing the spacebar again, the first word disappeared and the second appeared etc. Participants were asked to use their dominant hand for this. A break was scheduled halfway through the experiment. Participants could determine the length of the break themselves. They were asked to guess the goal of the experiment after the self-paced reading task.

Analysis

One male participant had to be excluded, as he responded correctly to less than 75% of the comprehension statements. No participant guessed the purpose of the experiment. We analyzed the reading times on two regions, namely on the word *mevrouw/meneer* 'Ms/Mr' as well as on the last name following it, the latter region serving as a spillover region. We excluded datapoints with a reading time below 150ms. This led to the exclusion of 0.42% and 0.84% of all datapoints for the main and spillover region, respectively. We then plotted a histogram of the log-transformed reading times on each region to identify outliers in the right tail. Based on this, we excluded datapoints exceeding 6.8 on the logarithmic scale (approx. 900ms) for the main region of interest. This led to the exclusion of a further 0.18% of the data for this region. For the spillover region, we excluded datapoints exceeding 7 on the logarithmic scale (approx. 1100ms), leading to the exclusion of a further 0.2% of the data in the spillover region.

The data were pre-processed and analyzed in R (R Core Team, 2018). We fitted a linear mixed model to the log-transformed reading times on the main region of interest as well as on the spillover region using the *lmer* function from the *lme4* package (Bates, Mächler, et al., 2015). We fitted three fixed effects and all interactions between them. The fixed effects were PARTICIPANT GENDER (*female* versus *male*), CONTINUATION (*female* versus *male*) and STIMULUS TYPE (*control* versus *hij* 'he'). We used sum contrasts, with the first level of each factor named above coded as ½ and the second level coded as −½. We initially fitted the full random structure permitted by the design. Following Bates, Kliegl, Vasishth, and Baayen (2015), we suppressed the correlation parameters as a first step of simplification. We then checked for overparameterization using Principal Component Analysis from the *RePsychLing* package and removed

components which explained little to no variation, starting with higher order terms. All models included random intercepts for participants and items. The random slope structure of the final models is reported below. *P*-values were obtained through the *lmerTest* package (Kuznetsova et al., 2017). We followed Benjamini and Hochberg (1995) and applied false discovery rate control in order to correct for multiple comparisons, as we analyzed two regions. Significant effects are reported below, but the estimates for all fixed effects can be found in the Appendix.

Results

Main region of interest: *mevrouw/meneer* 'Ms/Mr'

The final model included random slopes for CONTINUATION and STIMULUS TYPE per participant, as well as CONTINUATION, PARTICIPANT GENDER, STIMULUS TYPE, CONTINUATION*STIMULUS TYPE and CONTINUATION*PARTICIPANT GENDER per item. There was a significant interaction effect between CONTINUATION and STIMULUS TYPE ($\beta = -0.06$, $SE = 0.02$, $t = 3.00$, $p = 0.004$). As can be seen in Figure 1, men as well as women showed a significant increase in reading time for the female continuation *mevrouw* 'Ms' in the experimental condition featuring the pronoun *hij* 'he', but not in the control condition.

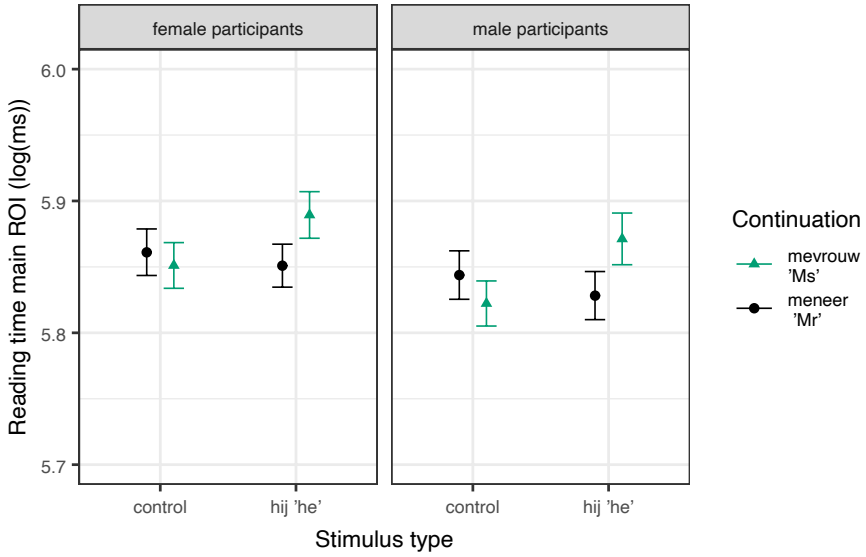

Figure 1. Mean reading times on the main region of interest *mevrouw/meneer* 'Ms/Mr' based on log-transformed data with 95% within-subject confidence intervals based on Morey (2008).

Spillover region: *last name*

The final model included random slopes for CONTINUATION per participant, as well as CONTINUATION, PARTICIPANT GENDER, STIMULUS TYPE, CONTINUATION*STIMULUS TYPE and CONTINUATION*PARTICIPANT GENDER per item. The interaction effect between CONTINUATION and STIMULUS TYPE was again significant ($\beta = -0.08$, $SE = 0.02$, $t = 3.58$, $p < 0.001$). As can be seen in Figure 2, the result pattern was similar to the main region of interest.

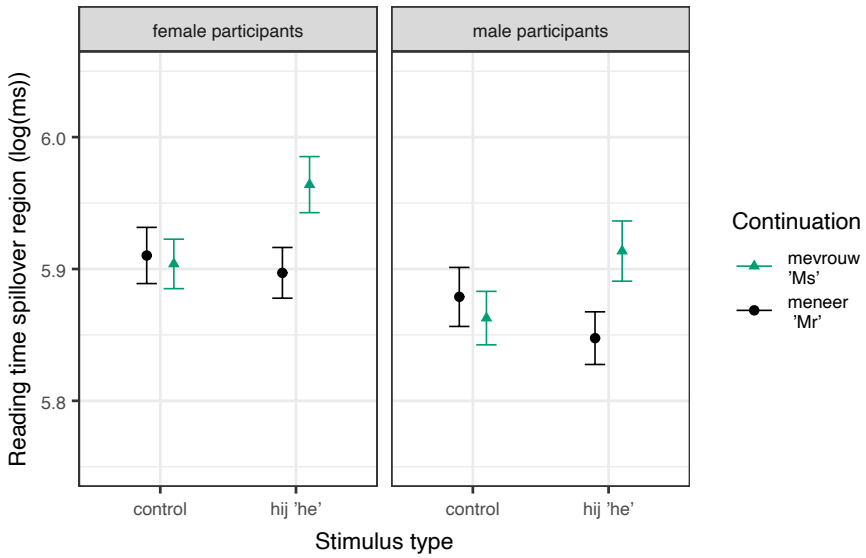

Figure 2. Mean reading times on the spillover region based on log-transformed data with 95% within-subject confidence intervals based on Morey (2008).

Discussion

We conducted a self-paced reading experiment to investigate the effect of the masculine generic personal pronoun *hij* 'he' on language processing. To this end, we embedded the pronoun in a generic description of a person (e.g., *Someone who always promises that he will really be on time*) and then mentioned either a woman or man fitting that description by name (e.g., *Ms/Mr Knoop*). The rationale was that if the pronoun triggers a gender inference despite being intended as generic, reading times for mentions of female individuals as an example would increase compared to mentions of male individuals. This is indeed what we found. Both male and female participants showed a significant increase in reading time on female continuations after the pronoun *hij* 'he' occurred, but not in the control condition, in which no pronoun was present. This is clear

evidence of a male bias in language processing induced by the masculine generic pronoun *hij* 'he'.

As described in the Introduction, surprisingly little was known about the processing of masculine generic pronouns despite a long research tradition regarding gender bias in language, particularly in English. However, the pioneering studies on English masculine generic pronouns seldomly used online tasks. Newer studies do not fill this gap either, since the research focus now is on singular *they*, as its use has vastly increased while generic *he* has lost in popularity (Baranowski, 2002; Earp, 2012; LaScotte, 2016). One exception are the two experiments by Noll et al. (2018), which suggest that the use of generic *he* leads to a male bias nowadays; in an experiment conducted 15 years earlier, however, they found no evidence of a male bias. To our knowledge, the only other language in which the processing of masculine generic pronouns was directly investigated is Dutch. Several experiments have tested whether the possessive pronoun *zijn* 'his' leads to a male bias when used generically, with mixed results. Two out of four experiments found evidence of a male bias, but in both cases for male participants only (Redl et al., 2018, Chapter 2; Redl, Frank, et al., 2020, Chapter 3; Redl, Szuba, et al., 2020, Chapter 4). What has become clear from our experiment is that the Dutch personal pronoun *hij* 'he' leads to a male bias in online processing for both male and female participants, despite *hij* 'he' being frequently used as a generic. Thus, while the results obtained by Noll et al. suggest that *he* might not have led to a male bias when the generic reading was still highly frequent in English, we do not find this to be true for the Dutch equivalent *hij*. Despite *hij* 'he' still being frequently used generically, this reading is not readily available in online processing. Our results clearly suggest that language users make a gender inference based on the masculine generic pronoun during processing, even though the masculine gender is not intended as an indication of the referent's actual gender. It then takes additional time to accommodate the mental representation to include a female referent.

The masculine possessive pronoun *zijn* 'his' has previously only been found to lead to a male bias for male participants (Redl, Frank, et al., 2020, Chapter 3; Redl, Szuba, et al., 2020, Chapter 4). In this study, we did not find the genders to differ when it comes to the processing of *hij* 'he'. The gender difference found for *zijn* 'his' is in line with several offline studies on English masculine generic pronouns, of which many have found the genders to differ. More specifically, when an overall male bias was found, this bias was often larger for male participants (e.g., Gastil, 1990; Hamilton, 1988; Moulton et al., 1978; Switzer, 1990; Wilson, 1978). Several possible explanations have been put forward for this phenomenon. For example, Henley and Abueg (2003) suggest that this difference is rooted in language acquisition. Girls simply have to learn from a young age that masculine word forms can also be used to refer to them and they are therefore better

at processing them this way. Alternatively, it has been suggested that language users project their own gender onto a mentioned person with unspecified gender (Hamilton, 1988; Silveira, 1980). Women would then mentally represent such a person as female, while men would resort to a male gender representation. However, this should then also be visible at least to some extent when no masculine generic pronoun is presented, such as in our control condition. This was not the case. Whatever the underlying mechanism for the previously found gender differences may be, our results suggest that it does not prevent the surfacing of a male bias when it comes to *hij* 'he' as opposed to *zijn* 'his'. As outlined in the Introduction, we believe a male referent of the personal pronoun *hij* 'he' to be more salient than a male referent of the possessive pronoun *zijn* 'his' due to the structural difference between personal and possessive pronouns. Our results suggest that this leads to a stronger male bias for *hij* 'he' than *zijn* 'his', which then in turn surfaces for men as well as women.

Finally, our current results underpin the validity of the eye-tracking experiment described by Redl, Szuba, et al. (2020, Chapter 4). They had found a male bias to arise for male participants when presented with generic statements such as *Iemand met een absoluut gehoor kan snel zijn instrument stemmen* 'Someone with perfect pitch can tune his instrument quickly'. They did not find a male bias in their control condition, for example *Mensen met een absoluut gehoor kunnen snel hun instrument stemmen* 'People with perfect pitch can tune their instrument quickly'. However, the authors could not exclude the possibility that the male bias in the experimental condition was actually due to a more general male bias and not due to the pronoun. It was theoretically feasible that a prototypical person introduced by *someone* would be represented as male regardless of the masculine generic pronoun following it, which could have explained the results, as well (Hamilton, 1991; Silveira, 1980). However, the control items in the current experiment were similar generic statements featuring the indefinite pronoun *iemand* 'someone' and no pronoun, and we did not find our results to be compatible with the idea of such a more general male bias affecting language processing. This suggests that the male bias shown by male participants in Redl, Szuba, et al. was truly due to the presence of the masculine generic pronoun *zijn* 'his', and constitutes further evidence showing that masculine generic pronouns can cause a male bias even when there is no specific referent for the pronoun to refer to.

Chapter 7: Summary and conclusions

The masculine gender serves as the default for human reference in the vast majority of languages which distinguish between masculine and feminine gender (Aikhenvald, 2016; Hellinger & Bußmann, 2001b). Whenever a person's gender is unknown, irrelevant, or when a group of mixed gender is referred to, words with masculine gender – so-called masculine generics – are used. The default status of the masculine gender goes so far that masculine generics are sometimes even used in contexts where reference is made to women exclusively. While many different word forms such as nouns, adjectives, verbs and adpositions can function as masculine generics – just to name a few (Corbett, 1991), pronouns are a particularly interesting case. As was shown in Chapter 1, masculine generic pronouns are highly common across languages and are often in use even when the language does not distinguish between masculine and feminine grammatical gender on other word forms. This dissertation focused on Dutch as one of these languages and aimed to shed light on how masculine generic pronouns are processed. Do masculine generic pronouns give rise to a gender inference and lead to a male bias in online processing? Or are the pronouns processed as they are intended, namely as referring to all genders? The experiments in this dissertation contribute towards answering this question.

Summary of experiments

Chapter 2 presented an eye-tracking experiment which tested whether the possessive pronoun *zijn* 'his' leads to a male bias during reading. The pronoun was embedded in episodic contexts and referred to a specific group of people, which was introduced by means of the indefinite pronoun *iedereen* 'everyone' (e.g., *Everyone was brushing his teeth*). A male or female member of the group was subsequently mentioned by first name, the rationale being that reading times would increase for female proper names, since they do not match the gender of the generic pronoun. Importantly, another type of (unreliable) gender information was also included in the stimuli: gender stereotypes. The mentioned group could either engage in a stereotypically neutral activity (e.g., *brushing teeth*), a stereotypically female activity (e.g., *doing yoga exercises*) or a stereotypically male activity (e.g., *practicing soccer tricks*). Gender stereotypes have been previously shown to give rise to gender inferences (e.g., Carreiras et al., 1996), and embedding the masculine generic pronoun in these contexts constituted a way of testing the strength of the pronoun's hypothesized male bias. However, no evidence for the hypothesis that the masculine generic pronoun *zijn* 'his' triggers a gender inference and leads to a male bias was found. Only an effect of gender stereotype surfaced. More specifically, reading

times increased on male proper names after having introduced a female stereotype. The reverse did not hold, suggesting that the societal phenomenon of men being penalized for gender-nonconforming behavior more than women (e.g., McCreary, 1994) is also reflected in language processing.

The two experiments reported in Chapter 3 conceptually replicated the experiment presented in Chapter 2. The first of the two experiments again employed eye-tracking during reading, but the experimental design was improved by adapting the stimuli in various ways. Among other things, proper names were eliminated as the unambiguous gender cue, and the nouns *vrouwen* 'women' and *mannen* 'men' were used instead. The membership of these men and women to the previously introduced group was also made explicit linguistically. Furthermore, all experimental conditions were mirrored by a control condition which did not feature the masculine generic pronoun. This was done in order to be able to zoom in on reading time differences caused by the hypothesized male bias of the pronoun and unambiguously tease potential effects of the gender stereotypes and the pronoun apart. The results of the eye-tracking experiment revealed the pronoun to cause a male bias, but for male participants and in neutral stereotype contexts only. Thus, the gender of the pronoun was not found to have an effect in otherwise gendered contexts for male participants, or for female participants in any of the contexts. The second experiment reported in Chapter 3 used the same stimuli as the eye-tracking experiment, but employed the sentence evaluation paradigm. Participants had to indicate whether the sentence clause identifying a subpart of the group as male or female was a good continuation to the preceding sentence clause featuring the masculine generic pronoun *zijn* 'his'. Against the hypothesis and unlike the results in the first experiment, no evidence for a male bias was found. The results reported in Chapter 3 thus suggest that the possessive pronoun *zijn* 'his' can lead to a male bias in early language processing when used generically, but only for men and only in contexts which do not provide additional gender information in the form of gender stereotypes. When participants were explicitly asked to rate sentences, no evidence of a male bias surfaced, suggesting that the male bias of the masculine generic pronoun can automatically surface during reading – as evidenced by the results of the eye-tracking experiment, but does not necessarily persist once explicit reference to women was made. In other words, men initially experienced a male bias during reading, but seemed to quickly adapt their mental representation in order to include women after they were explicitly referred to.

Chapter 4 again looked at the possessive pronoun *zijn* 'his' as a masculine generic. Unlike the experiments in Chapter 2 and Chapter 3, the stimuli in this eye-tracking experiment featured non-episodic, truly generic contexts. The experiment thus addressed the question whether the possessive pronoun leads to a male bias even in generic contexts, that is, when no specific person whose gender could be inferred is referred to.

Two different types of generic statements were tested by varying the conceptual number of the pronoun's antecedent. We hypothesized that the masculine generic pronoun *zijn* 'his' was more likely to trigger a gender inference when referring back to a conceptually singular rather than a conceptually plural antecedent (e.g., *Iemand/Iedereen met een absoluut gehoor kan snel zijn instrument stemmen* 'Someone (CONCEPTUALLY SINGULAR)/Everyone (CONCEPTUALLY PLURAL) with perfect pitch can tune his instrument quickly'). Male participants showed a male bias, but only with the conceptually singular antecedent (i.e., *iemand* 'someone'). Female participants did not show signs of a male bias in either context, suggesting that they were able to access the generic reading of the pronoun across the different types of generic statements. In sum, the masculine generic pronoun *zijn* 'his' can lead to a male bias even in generic contexts (i.e., when no specific referent is presented), but other than participant gender, this also depends on whether the generic statement is conceptually singular or plural.

Chapter 5 took a final look at the possessive pronoun *zijn* 'his', but not as a masculine generic pronoun. Instead, this chapter investigates yet another linguistic phenomenon that allows for women to be referred to using non-feminine pronouns. The Limburgian dialect as spoken in the south of the Netherlands uses the equivalent of Dutch *zijn* 'his', namely *zien,* to refer to female individuals in a systemic manner – a use of the pronoun which would be ungrammatical in Dutch. It has been noted that Limburgian *het* 'it' can likewise be used in reference to women (Bakker, 1992). This as well as similar phenomena in other languages suggest that it is actually the neuter pronoun *zien* 'its' that is used in reference to women (e.g., Nübling, 2015 for Luxembourgish). Limburgian *zien* is thus ambiguous between masculine and neuter gender, and it can refer back to a female 3rd person singular antecedent, while Dutch *zijn* 'his' cannot. To confirm this experimentally and explore the circumstances in which *zien* can be coreferential with women, speakers of Limburgian and speakers of Dutch were presented with recordings of sentences featuring the possessive pronoun *zien* 'his/its' or *zijn* 'his', respectively, and had to rate these sentences (e.g., *Fleur put on his/its yoga pants*). These sentences were varied between female and male regarding gender stereotypicality, and they featured a male or female subject denoted by a proper name. Unsurprisingly, the results for Dutch showed that – even though *zijn* 'his' is regularly used in reference to women as a masculine generic (see Chapters 1 to 4) – sentences in which the pronoun was used to refer to a female individual received significantly lower ratings, with the (non)adherence to gender stereotypes having additional influence. The results for Limburgian showed a different pattern. Ratings were high for all conditions, except when a female subject was embedded in a stereotypically male context. This suggests that the stereotype context influenced the resolution of the ambiguous pronoun *zien* 'his/its', favoring *zien* 'his' and blocking coreferentiality of the pronoun and the subject in this case. However, if the

context allows for coreference, sentences in which *zien* refers to a female individual are appreciated just as much as sentences in which the pronoun refers to a male individual.

Chapter 6 turns to a different pronoun which can be used for generic reference, namely the personal pronoun *hij* 'he'. Just like *zijn* 'his', *hij* 'he' is used to refer to people of any gender in generic contexts, but there are reasons to believe that the male bias induced by *hij* 'he' is stronger and more all-encompassing than that of possessive *zijn* 'his'. This is an assumption that is likely to extend to other languages, as it lies in a more general difference between personal and possessive pronouns. While a personal pronoun such as *hij* 'he' is an independent pronoun that always serves as the subject, a possessive pronoun such as *zijn* 'his' functions as a determiner and relies on the head of the noun phrase. This head does not have to match the gender of the pronoun in languages such as English and Dutch (e.g., *his* (MASC.) *mother* (FEM.)). In fact, these mismatches are ubiquitous and it is reasonable to assume that they render the pronoun's referent's gender less salient. Consequently, Chapter 6 tested if the male bias of the personal pronoun *hij* 'he' would extend to female participants, who have not shown evidence of a male bias in any of the experiments presented in Chapters 2 to 4 investigating *zijn* 'his'. The results of a self-paced reading experiment using stimuli such as *Someone who always promises that he will really be on time* indeed revealed evidence of a male bias for both male as well as female participants with no significant difference in strength.

Masculine generic pronouns – male bias or not?

The main question this dissertation set out to answer was whether masculine generic pronouns are processed as intended, namely as referring to everyone regardless of gender, or whether their use might lead to a male bias in the readers' minds. As so often, the results presented in this dissertation cannot offer an answer in absolute terms. Neither can we conclude that masculine generic pronouns *always* lead to a male bias, nor that they *never* do. So what can we conclude? The short answer is that masculine generic pronouns *sometimes* lead to a male bias in online processing, at least when looking at Dutch. Since this answer is rather unsatisfying, let us take a look at the factors that contribute to whether a masculine generic pronoun is processed as intended or whether it leads to a male bias, based on the results reported above. The experiments investigating masculine generic pronouns in this dissertation highlighted several factors – tested directly or indirectly – that may influence whether a male bias occurs. They have all been discussed in more detail in the separate chapters, but will be summarized below – including suggestions for future research.

Participant gender. One factor which was directly investigated and clearly affected whether a male bias arises was participant gender. In Chapters 3 and 4, we saw that men experienced a male bias induced by the possessive pronoun *zijn* 'his' during online

processing, but women did not. In Chapter 6, which investigated the personal pronoun *hij* 'he' instead, both men and women were found to show signs of a male bias to an equal extent. We can conclude that while both men and women can experience a male bias, men are more *at risk*.

Type of pronoun. These gender differences regarding *zijn* 'his' and the absence thereof when it comes to *hij* 'he' – unsurprisingly – suggest that not all pronouns work the same. The personal pronoun *hij* 'he' was found to cause a male bias across genders and in both regions which were subject to analysis in the self-paced reading experiment in Chapter 6. The results of Chapters 2, 3 and 4 suggest that the possessive pronoun *zijn* 'his', however, also has the potential to be interpreted generically. This emphasizes that one verdict regarding the genericity, or alternatively male bias, of masculine generics does not necessarily fit all.

Method. While evidence for a male bias was found in the eye-tracking experiment in Chapter 3, there was no male bias when using the very same stimuli in a sentence evaluation experiment. More research is required to further explore the role of the method, but the results seem to suggest that while an automatic and online male bias can surface during the processing of the pronoun, readers may quickly adapt their mental gender representation and accommodate female referents when they are explicitly mentioned. The male bias then does not seem to surface in a subsequent rating task.

Genericity. The experiments in Chapters 2 and 3 used episodic stimuli, while the experiments reported in Chapters 4 and 6 embedded the masculine generic pronouns in truly generic statements, that is, contexts without a specific real-world referent. As we did not directly compare generic and episodic contexts, one can only speculate as to whether a male bias is more likely to arise in episodic than in generic contexts. We can, however, conclude that a male bias *can* arise even in generic contexts. Thus, even in contexts in which a hypothetical person that could be of any gender is described, masculine generic pronouns make it harder to reconcile this person with a woman. However, the fact that *zijn* 'his' paired with *iedereen* 'everyone' led to a male bias in episodic contexts in Chapter 3, but not in generic contexts in Chapter 4 could be an indication that the male bias is stronger in episodic contexts. It could be fruitful to directly investigate this in future experiments.

Conceptual number. Chapter 4 showed that when *zijn* 'his' is used generically in truly generic statements, the conceptual number of the antecedent affects whether a male bias arises or not. No evidence of a male bias was found when *iedereen* 'everyone' was the antecedent; the male bias only surfaced with *iemand* 'someone'. This suggests that, at least when embedded in truly generic statements, the use of either a conceptually singular or plural antecedent influences whether the masculine generic pronoun causes a male bias – or is interpreted as generic. As mentioned above, a male bias was found

with *iedereen* ‘everyone’ in the eye-tracking experiment reported in Chapter 3, using episodic contexts. None of the experiments featured episodic contexts paired with the conceptually singular indefinite pronoun *iemand* ‘someone’ (e.g., *Someone forgot his jacket*). Testing whether number affects the strength of the male bias in episodic contexts, too, could be an interesting avenue for future research, as this could shed further light on whether pluralization is an effective method in order to avoid or at least decrease a male bias.

Stereotype context. Chapters 2 and 3 both embedded the possessive pronoun *zijn* ‘his’ in stereotypically female, male and neutral contexts. While Chapter 2 did not provide evidence for a male bias in any of the contexts, a male bias surfaced in Chapter 3, but only in neutral contexts. This suggests that the female and male stereotype contexts overrode the pronoun gender. While this shows that stereotype context can have an effect on a masculine generic pronoun’s male bias, the exact workings of this could be interesting to explore further.

In sum, masculine generic pronouns can cause a male bias in processing, but the results of this dissertation suggest that the gender-neutral, intended reading is also sometimes accessible during processing, particularly for women. There is a multitude of factors further contributing to which reading is accessed, some of which were identified in the present research. But what does this mean beyond language processing?

	Pronoun type	Method	Genericity	Conceptual number	Stereotype context	Participant gender	Increase for female continuations		Measure
Chapter 2	*zijn* 'his'	eye-tracking	episodic	plural	neutral	female	12		Reading time in milliseconds for total fixation duration on main region
						male			
					female	female	-37		
						male			
					male	female	5		
						male			
Chapter 3 Exp1	*zijn* 'his'	eye-tracking	episodic	plural	neutral	female	-8		Reading time in milliseconds for first run dwell time on preview region
						male	24		
					female	female	7		
						male	-12		
					male	female	-7		
						male	9		
Chapter 3 Exp2	*zijn* 'his'	sentence evaluation	episodic	plural	neutral	female	5	0.009	Response time in milliseconds on the left, proportion point increase of no-responses on the right
						male	63	0.026	
					female	female	-183	0.007	
						male	-36	0.014	
					male	female	42	0.021	
						male	237	0.020	
Chapter 4	*zijn* 'his'	eye-tracking	generic	singular	neutral	female	-8		Reading time in milliseconds for first run dwell time on pre-view region
						male	18		
				plural		female	-22		
						male	0		
Chapter 6	*hij* 'he'	self-paced reading	generic	singular	neutral	female	29		Reading time in milliseconds for spillover region
						male	28		

Table 1. Overview of the identified possible factors affecting whether a masculine generic pronoun leads to a male bias. Difference scores for the continuations are shown. Positive numbers indicate an increase for female continuations.

Implications beyond language processing

From a societal perspective, the question how this male bias of masculine generic pronouns translates to situations beyond language processing is highly relevant. Could this male bias have wide-reaching consequences and actually hinder gender equality? A large number of research going as far back as to the early 1970s shows that it just might. For example, Bem and Bem (1973) illustrated the adverse effects gender-specific wording can have on men's as well as women's willingness to apply for a job. The studies presented in their paper were in fact presented as legal testimony on behalf of the Equal Employment Opportunities Commission against the U.S. American phone company AT&T, which, for example, advertised the job for a telephone service representative under the heading *If we were an airline, she'd be our stewardess*, whilst adding the phrase *An Equal Opportunity Employer m/f* at the bottom. Similarly, stereotypically male jobs were advertised using masculine word forms (e.g., *The telephone frameman plays a vital role in telephone communications. ... He also works with other craftsmen to correct troubles in wiring.*). Bem and Bem (1973) found men as well as women to be significantly less willing to apply for a job when the wording catered to the opposite gender than when the wording was unbiased regarding gender.

More recent research confirms these negative effects of masculine generics. Stout and Dasgupta (2011) conducted three experiments in English which showed that when the masculine generic pronoun *he* is used in the description of a job during a mock job interview, female participants experienced a decreased sense of belonging, were less motivated and identified less with the job. A study by Horvath and Sczesny (2016) on German as spoken in Austria investigated whether the use of masculine generic role nouns in a job description decreases the chance that the participant – the simulated employer in this case – will pick a female applicant. The results showed that men were selected for high-status leadership positions significantly more often than women when the masculine generic role noun was used; female and male applicants were chosen approximately equally often when pair forms were used.

Research on children focusing on role nouns as masculine generics suggests that the youngest members of society are not spared by these effects. For example, Vervecken et al. (2013) presented primary school children in German and the Dutch-speaking part of Belgium with job titles in either the masculine generic form (e.g., Dutch *astronauten* 'astronauts (MASC.)') or the so-called pair form (i.e., *astronauten en astronautes* 'astronauts (MASC.) and astronauts (FEM.)'). In a series of experiments, the authors found that using the masculine generic role noun to refer to a stereotypically male occupation further decreased the extent to which children associated the occupation with women. Children further estimated women's chances to succeed in these jobs as higher when the

pair forms were used, and girls' interest in stereotypically male jobs also increased when the pair form was presented. Similarly, Vervecken and Hannover (2015) found that both boys and girls perceived stereotypically male jobs to be more accessible and rated their own chance of success in the job higher when the job was presented using the pair form in both Dutch and German. Vervecken, Gygax, Gabriel, Guillod, and Hannover (2015) found similar results for French.

Taken together, these results suggest that the male bias of masculine generic role nouns as well as pronouns (see Stout & Dasgupta, 2011) can have consequences which hinder gender equality. The experiments presented in this dissertation show that even a possessive pronoun can lead to a male bias during processing. Even if this does not always happen, it is not possible to endorse their use as "gender-neutral" based on these results. The personal pronoun *hij* 'he' has been shown to cause a male bias in men as well as women. And while the results in Chapters 3 and 4 suggest that the generic reading of *zijn* 'his' was accessible during processing for women, it was not for men. Men are still in the majority in leadership positions in the Netherlands and elsewhere in the world (*Global Gender Gap Report 2020*, 2020), and they are consequently the decision-makers whilst also being more likely to experience a male bias based on masculine generic pronouns. It therefore makes sense to avoid masculine generics where possible in order to avoid discrimination based on gender.

It further has to be noted that while my results suggest that readers can recuperate from this male bias quickly when specific reference to women is made, women – and non-binary individuals for that matter – are not usually specifically referred to in real-world texts that are generic in nature, as that would defeat the point of masculine generics in the first place. More often than not, we find ourselves reading documents such as Radboud University's doctorate regulations, putting the reading instruction shown below at the beginning of the document and then never making reference to women again.

1. *Omwille van de leesbaarheid is steeds 'hij' gebruikt in deze teksten. Waar 'hij' staat, kan in de regel ook 'zij' worden gelezen.*
   'For the sake of readability, 'he' was consistently used in these documents. Where it says 'he', one can usually also read 'she'.'

Prioritizing readability over gender equality might be questioned from an ethical point of view, but research into the readability and comprehensibility of texts featuring alternatives to masculine generics also counters this argument. For example, Steiger-Loerbroks and Von Stockhausen (2014) conducted an eye-tracking experiment with German legal texts featuring either masculine generics or gender-neutral word forms. There was no difference in total reading times between the two types of texts, indicating that their processing difficulty was on par. Moreover, the authors actually found that

comprehensibility increased for gender-neutral texts. Similarly, Blake and Klimmt (2010) found that German newspaper articles featuring gender-neutral word forms were not perceived as less readable or aesthetically less pleasing than the same newspaper articles featuring masculine generic word forms. Furthermore, research shows that reminding readers that masculine generic word forms can also refer to women does not fully prevent a male bias (Gygax et al., 2012). Thus, if a reading instruction as in (1) does not achieve its goal, one will have to use gender-inclusive language after all. So how can one avoid masculine generics?

Avoiding the male bias

There are two main strategies for avoiding masculine generics and rendering language more gender-neutral or – alternatively called – gender-fair or gender-inclusive: neutralization and feminization (or a combination of the two) (e.g., Sczesny et al., 2016). The choice of strategy largely depends on how prominent a category grammatical gender is in the language at hand. For example, all nouns in German either carry feminine, masculine or neuter gender and other gender-marked word forms agree accordingly. In cases where a noun's grammatical gender and the natural gender of the person it refers to do not match, pronouns still often agree with the grammatical gender instead of the person's actual gender, particularly when pronoun and antecedent are in close proximity (Oelkers, 1996) (e.g., *Siehst du das Mädchen, das dort steht?* 'Do you see the girl (NEUT.) that (NEUT.) stands there?'). This ubiquity and prevalence of grammatical gender in German has made feminization the strategy of choice regarding the avoidance of masculine generics. Thus, wherever a masculine generic would be used on its own, it is paired with the feminine word form. Take the example presented in Chapter 1, taken from Article 5 of the German constitution[19] and repeated here:

2. ***Jeder*** *hat* *das* *Recht,* ***seine*** *Meinung […]*
   everyone.M has the right **his** opinion
   frei *zu äußern.*
   freely to express
   'Everyone may freely express his opinion'

The feminization strategy can be applied to the example above in the following way:

[19] Article 5 of the German constitution (*Grundgesetz für die Bundesrepublik Deutschland*) can be found at http://www.gesetze-im-internet.de/gg/art_5.html.

3. ***Jeder/jede*** *hat* *das* *Recht,* ***seine/ihre*** *Meinung […]*
   everyone.M/everyone.F has the right **his/her** opinion
   frei *zu äußern.*
   freely to express
   'Everyone may freely express his/her opinion'

Alternatively, the use of masculine generic pronouns can often be avoided by using plural forms instead, as these make no distinction between feminine and masculine gender:

4. ***Alle*** *haben* *das* *Recht,* ***ihre*** *Meinung […]*
   all have the right **their** opinion
   frei *zu äußern.*
   freely to express
   'Everybody may freely express their opinion'

English, on the other hand, does not mark grammatical gender on nouns. The masculine generics to avoid are therefore the small number of role nouns which (used to) explicitly make reference to men (e.g., *fireman*) and the masculine generic pronouns. This is easily done by using gender-neutral word forms instead (e.g., *firefighter* and singular *they*), thereby opting for the neutralization strategy.

Put simplistically, Dutch falls somewhere in between German an English. Distinguishing only between common and neuter gender on nouns, but between feminine, masculine and neuter gender on 3rd person singular pronouns, the choice between feminization and neutralization as a strategy towards gender-neutral language is not as straightforward and has been debated extensively among feminist linguists (e.g., Van Alphen, 1983). Nonetheless, research of the last 20 years (Gerritsen, 2001, 2002) as well as more recent developments such as the Dutch railways addressing passengers as *beste reizigers* 'dear passengers' instead of *beste dames en heren* 'dear ladies and gentlemen' (*"Beste Reizigers...,"* n.d.) show a clear trend towards neutralization of previously gendered forms. One of the advantages of neutralization is the fact that attention is diverted from the traditional binary distinction of the genders and that non-binary-identifying individuals are equally included (e.g., Gabriel et al., 2018; Mortelmans, 2008). However, neutralization in Dutch is often done by using word forms that are not fully neutral. Generally-speaking, nouns are only marked for common or neuter gender, but many role nouns know an unmarked version (e.g., *reiziger* 'passenger') as well as a feminine version (e.g., *reizigster*). Strictly speaking, *reiziger* is therefore not a neutral term, as the presence of a feminine counterpart has been shown to increase the male bias of the supposedly neutral form (Gygax & Gabriel, 2008). Research on Norwegian, a language similar to Dutch when it comes to role nouns, shows

that even though the originally masculine version of the role nouns has been in use as gender-neutral for 40 years and the feminine version is not in use anymore, the former still leads to a male bias (Gabriel & Gygax, 2008).

Neutralization in Dutch is further complicated by the fact that there is no widely accepted neutral alternative to masculine generic pronouns such as singular *they* in English or *hen* in Swedish. An online poll by the *Transgender Netwerk Nederland* ('Transgender Network Netherlands') chose *hen* to be the new gender-neutral personal pronoun and *hun* as its accompanying possessive pronoun for Dutch (Transgender Netwerk Nederland, 2016). *Hen* already exists as a 3rd person plural object pronoun (i.e., 'them'), but the use as a 3rd person singular subject pronoun is novel. *Hun* is already in use as the 3rd person plural possessive as well as a personal pronoun, but the use in singular contexts is likewise new. Thus, the use of *hen* and *hun* as singular pronouns is currently not wide-spread, and it will be interesting to see whether the frequency of these – or other still to be coined – gender-neutral pronouns will increase as was the case with the relatively recently introduced Swedish *hen* (Bäck et al., 2015; Gustafsson Sendén et al., 2015).

Another – already existing – gender-neutral option for a personal pronoun exists in Dutch, namely *die*. This 3rd person common gender distal demonstrative pronoun is commonly used as a personal pronoun as well, both deictically (e.g., *Die bedoel ik* 'I mean her/him/it') and anaphorically (e.g., *Zag je die vrouw? Die heb ik hier wel vaker gezien* 'Did you see that woman. I've seen her here before'). In fact, its use as such is so widespread that Audring (2013) treats *die* as a personal pronoun. Rather than serving as a conscious alternative to the masculine generic pronoun *hij*, the demonstrative pronoun *die* is predominantly used for low-salient referents (for example in object position, see Kaiser, 2011) and it can therefore not simply be swapped for *hij* in its current use. However, the *Transgender Netwerk Nederland* stated that *die* came forward as another popular gender-neutral pronoun among non-binary individuals (2016). Time will tell whether its use will extend to wider linguistic contexts, but for the time being, other strategies to avoid masculine generics are more commonly found.

As already noted above, the common strategy regarding role nouns is neutralization by means of the masculine word form, but this may still lead to a male bias, as has been shown for Norwegian (Gabriel & Gygax, 2008). To minimize the risk of a male bias, it is advisable to use plural role nouns, since speakers of Dutch and German have been found to judge plural masculine generic role nouns to be able to refer to women more easily than their singular counterparts (Backer & Cuypere, 2012). Regarding pronouns, the leading dictionary of the Dutch language *Van Dale* states that masculine pronouns are commonly used for generic reference, but alternatively *hij/zij* 'he/she' or *hij of zij* 'he or she' can be used (2015, p. xxxvi). Similarly, the website *taaladvies.net*

('languageadvice.net') by the Dutch Language Union, a regulatory institution with respect to the Dutch language, still advises to use masculine pronouns when a person's gender is not known or irrelevant. Pair forms are the recommended alternative, but only "if one wants to avoid the risk of a one-sided male interpretation or if one really wants to emphasize that male as well as female individuals are being referred to" (" *Zijn / Haar (de Sollicitant)* 'His/Her (the Applicant),'" n.d., author's translation). Once again, one can avoid this issue altogether by using plural forms, as no gender distinctions are made there (for similar advice see Misersky & Redl, 2020). The headline presented in Chapter 1 taken from *De Telegraaf* features a singular masculine generic role noun as well as a masculine generic pronoun. Pluralization will eliminate the male bias, which would otherwise likely occur based on the results of Chapter 6 on *hij* 'he':

5. *Wat kosten studenten? En wat*
   what cost students and what
   *leveren **zij** op?*
   generate **they** PART
   'How much do students cost [society]? And how much do they generate?'

However, the plural reading may be dispreferred in some instances. For example, the doctorate regulations always only apply to one PhD candidate at a time and Radboud University might then prefer to keep the singular reading intact. It is advised to then use split forms and refer to women and men explicitly:

6. *[De rector] geeft het woord aan de **promovendus/promovenda**, die de … openingstekst uitspreekt. … Vervolgens geeft **hij of zij** een samenvatting van maximaal tien minuten van de inhoud van de dissertatie. **Hij of zij** sluit de samenvatting af met de woorden: "Na deze samenvatting van mijn proefschrift gegeven te hebben, geef ik het woord terug aan u, rector."*

   '[The Rector] invites **the PhD candidate (MASC.)/ PhD candidate (FEM.)** to say the opening words. Afterwards, **he or she** presents a summary lasting no more than ten minutes of the contents of the dissertation. **He or she** concludes the summary with the words: "Having presented this summary of my thesis, I return the floor to you, Rector."'
   (Radboud University, n.d.)

To conclude in the style of the doctorate regulations: Having provided evidence of a male bias of masculine generics in language processing and suggestions regarding its prevention, I pass the torch to you, reader.

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Appendix

Chapter 2

Stimuli

Table A1. Stimuli for the experiment reported in Chapter 2.

Experimental stimuli				
Nr.	**List**	**Stereotype**	**Continuation**	**Stimulus**
1	1	female	female	Iedereen was zijn nagels aan het lakken. Zo was ook Amber een felle nagellak aan het aanbrengen.
1	2	female	male	Iedereen was zijn nagels aan het lakken. Zo was ook David een felle nagellak aan het aanbrengen.
2	2	female	female	Iedereen was zijn wimpers aan het verven. Zo was ook Esther mascara aan het opdoen voor donkere wimpers.
2	1	female	male	Iedereen was zijn wimpers aan het verven. Zo was ook Sander mascara aan het opdoen voor donkere wimpers.
3	1	female	female	Iedereen was zijn wenkbrauwen aan het epileren. Zo was ook Nienke met een pincet bezig om de wenkbrauwen een mooie vorm te geven.
3	2	female	male	Iedereen was zijn wenkbrauwen aan het epileren. Zo was ook Wesley met een pincet bezig om de wenkbrauwen een mooie vorm te geven.
4	2	female	female	Iedereen was zijn handtas aan het inpakken. Zo was ook Anna alles aan het pakken om te gaan stappen.
4	1	female	male	Iedereen was zijn handtas aan het inpakken. Zo was ook Adam alles aan het pakken om te gaan stappen.
5	1	female	female	Iedereen was zijn oorbellen aan het indoen. Zo was ook Femke een mooi gouden paar aan het insteken.

5	2	female	male	Iedereen was zijn oorbellen aan het indoen. Zo was ook Ruben een mooi gouden paar aan het insteken.
6	2	female	female	Iedereen was zijn balletschoenen aan het aantrekken. Zo was ook Romy zich aan het klaarmaken voor het optreden.
6	1	female	male	Iedereen was zijn balletschoenen aan het aantrekken. Zo was ook Timo zich aan het klaarmaken voor het optreden.
7	1	female	female	Iedereen was zijn cupcakes aan het versieren. Zo was ook Manon mooie toefjes op de lekkere baksels aan het spuiten.
7	2	female	male	Iedereen was zijn cupcakes aan het versieren. Zo was ook Floris mooie toefjes op de lekkere baksels aan het spuiten.
8	2	female	female	Iedereen was zijn dagcrème aan het aanbrengen. Zo was ook Tessa een likje aan het aanbrengen om een droge huid te voorkomen.
8	1	female	male	Iedereen was zijn dagcrème aan het aanbrengen. Zo was ook Pepijn een likje aan het aanbrengen om een droge huid te voorkomen.
9	1	female	female	Iedereen was zijn roddelblad aan het lezen. Zo was ook Laura helemaal verdiept in de verhalen over verschillende beroemdheden.
9	2	female	male	Iedereen was zijn roddelblad aan het lezen. Zo was ook Joris helemaal verdiept in de verhalen over verschillende beroemdheden.
10	2	female	female	Iedereen was zijn haar aan het föhnen. Zo was ook Sterre het haar aan het drogen in het zwembad.
10	1	female	male	Iedereen was zijn haar aan het föhnen. Zo was ook Wouter het haar aan het drogen in het zwembad.

11	1	female	female	Iedereen was zijn paard aan het borstelen. Zo was ook Sarah de vacht aan het schoonmaken na een lange rit.
11	2	female	male	Iedereen was zijn paard aan het borstelen. Zo was ook Justin de vacht aan het schoonmaken na een lange rit.
12	2	female	female	Iedereen was zijn hart aan het uitstorten. Zo was ook Fenna over de problemen op het werk aan het vertellen.
12	1	female	male	Iedereen was zijn hart aan het uitstorten. Zo was ook Kevin over de problemen op het werk aan het vertellen.
13	1	female	female	Iedereen was zijn dagboek aan het bijhouden. Zo was ook Sanne aan het opschrijven wat er deze dag te beleven was geweest.
13	2	female	male	Iedereen was zijn dagboek aan het bijhouden. Zo was ook Jeroen aan het opschrijven wat er deze dag te beleven was geweest.
14	2	female	female	Iedereen was zijn yogaoefeningen aan het doen. Zo was ook Lieke goed bezig met een oefening.
14	1	female	male	Iedereen was zijn yogaoefeningen aan het doen. Zo was ook Peter goed bezig met een oefening.
15	1	female	female	Iedereen was zijn prosecco aan het drinken. Zo was ook Esmee een flinke slok aan het nemen.
15	2	female	male	Iedereen was zijn prosecco aan het drinken. Zo was ook Jesse een flinke slok aan het nemen.
16	2	female	female	Iedereen was zijn kaarsen aan het aansteken. Zo was ook Kelly wat lichtjes aan het branden om een leuke sfeer te creëren.
16	1	female	male	Iedereen was zijn kaarsen aan het aansteken. Zo was ook Lucas wat lichtjes aan het branden om een leuke sfeer te creëren.

17	1	neutral	female	Iedereen was zijn vakantie aan het plannen. Zo was ook Judith op zoek naar mooie bestemmingen.
17	2	neutral	male	Iedereen was zijn vakantie aan het plannen. Zo was ook Jelle op zoek naar mooie bestemmingen.
18	2	neutral	female	Iedereen was zijn presentatie aan het voorbereiden. Zo was ook Bente nog met de opmaak van de slides bezig.
18	1	neutral	male	Iedereen was zijn presentatie aan het voorbereiden. Zo was ook Jacob nog met de opmaak van de slides bezig.
19	1	neutral	female	Iedereen was zijn boodschappen aan het doen. Zo was ook Myrthe nog wat ingrediënten voor het avondeten aan het kopen.
19	2	neutral	male	Iedereen was zijn boodschappen aan het doen. Zo was ook Thomas nog wat ingrediënten voor het avondeten aan het kopen.
20	2	neutral	female	Iedereen was zijn ouders aan het bezoeken. Zo was ook Mandy weer een keer thuis bij de ouders.
20	1	neutral	male	Iedereen was zijn ouders aan het bezoeken. Zo was ook Dennis weer een keer thuis bij de ouders.
21	1	neutral	female	Iedereen was zijn telefoon aan het checken. Zo was ook Merel tijdens het college de hele tijd berichtjes aan het beantwoorden.
21	2	neutral	male	Iedereen was zijn telefoon aan het checken. Zo was ook Jasper tijdens het college de hele tijd berichtjes aan het beantwoorden.
22	2	neutral	female	Iedereen was zijn fiets aan het stallen. Zo was ook Lotte de fiets bij het station aan het neerzetten.
22	1	neutral	male	Iedereen was zijn fiets aan het stallen. Zo was ook Marco de fiets bij het station aan het neerzetten.

23	1	neutral	female	Iedereen was zijn tanden aan het poetsen. Zo was ook Daphne zich aan het klaarmaken om naar bed te gaan.
23	2	neutral	male	Iedereen was zijn tanden aan het poetsen. Zo was ook Robert zich aan het klaarmaken om naar bed te gaan.
24	2	neutral	female	Iedereen was zijn lunch aan het eten. Zo was ook Marit een boterham met kaas aan het nuttigen.
24	1	neutral	male	Iedereen was zijn lunch aan het eten. Zo was ook Gerrit een boterham met kaas aan het nuttigen.
25	1	neutral	female	Iedereen was zijn veters aan het strikken. Zo was ook Maaike zich aan het klaarmaken om naar buiten te gaan.
25	2	neutral	male	Iedereen was zijn veters aan het strikken. Zo was ook Stefan zich aan het klaarmaken om naar buiten te gaan.
26	2	neutral	female	Iedereen was zijn OV-kaart aan het opladen. Zo was ook Linda geld erop aan het zetten op het station.
26	1	neutral	male	Iedereen was zijn OV-kaart aan het opladen. Zo was ook Remco geld erop aan het zetten op het station.
27	1	neutral	female	Iedereen was zijn paper aan het schrijven. Zo was ook Inge druk bezig om de deadline te halen.
27	2	neutral	male	Iedereen was zijn paper aan het schrijven. Zo was ook Tygo druk bezig om de deadline te halen.
28	2	neutral	female	Iedereen was zijn ramen aan het opendoen. Zo was ook Anouk wat frisse lucht aan het binnenlaten.
28	1	neutral	male	Iedereen was zijn ramen aan het opendoen. Zo was ook Dylan wat frisse lucht aan het binnenlaten.
29	1	neutral	female	Iedereen was zijn koffie aan het opdrinken. Zo was ook Sophie aan het proberen het kopje voor de les leeg te krijgen.

29	2	neutral	male	Iedereen was zijn koffie aan het opdrinken. Zo was ook Willem aan het proberen het kopje voor de les leeg te krijgen.
30	2	neutral	female	Iedereen was zijn hond aan het uitlaten. Zo was ook Emma met de trouwe viervoeter naar het park gegaan.
30	1	neutral	male	Iedereen was zijn hond aan het uitlaten. Zo was ook Hugo met de trouwe viervoeter naar het park gegaan.
31	1	neutral	female	Iedereen was zijn gitaar aan het stemmen. Zo was ook Esther aan de stemmechanieken aan het draaien.
31	2	neutral	male	Iedereen was zijn gitaar aan het stemmen. Zo was ook Sander aan de stemmechanieken aan het draaien.
32	2	neutral	female	Iedereen was zijn afval aan het wegbrengen. Zo was ook Nienke het vuilnis aan het buitenzetten.
32	1	neutral	male	Iedereen was zijn afval aan het wegbrengen. Zo was ook Wesley het vuilnis aan het buitenzetten.
33	1	male	female	Iedereen was zijn aandelen aan het verkopen. Zo was ook Anna aan het proberen om meer verlies te voorkomen.
33	2	male	male	Iedereen was zijn aandelen aan het verkopen. Zo was ook Adam aan het proberen om meer verlies te voorkomen.
34	2	male	female	Iedereen was zijn computer aan het repareren. Zo was ook Femke een nieuwe harde schijf aan het inbouwen.
34	1	male	male	Iedereen was zijn computer aan het repareren. Zo was ook Ruben een nieuwe harde schijf aan het inbouwen.
35	1	male	female	Iedereen was zijn mountainbike aan het inladen. Zo was ook Romy het rijwiel achter in het busje aan het plaatsen.
35	2	male	male	Iedereen was zijn mountainbike aan het inladen. Zo was ook Timo het rijwiel achter in het busje aan het plaatsen.

36	2	male	female	Iedereen was zijn golfclubs aan het poetsen. Zo was ook Manon nog wat opgedroogde aarde van de clubs aan het afborstelen.
36	1	male	male	Iedereen was zijn golfclubs aan het poetsen. Zo was ook Floris nog wat opgedroogde aarde van de clubs aan het afborstelen.
37	1	male	female	Iedereen was zijn biceps aan het trainen. Zo was ook Tessa fanatiek bezig met de gewichten.
37	2	male	male	Iedereen was zijn biceps aan het trainen. Zo was ook Pepijn fanatiek bezig met de gewichten.
38	2	male	female	Iedereen was zijn voetbaltrucs aan het oefenen. Zo was ook Laura al urenlang met de bal bezig.
38	1	male	male	Iedereen was zijn voetbaltrucs aan het oefenen. Zo was ook Joris al urenlang met de bal bezig.
39	1	male	female	Iedereen was zijn barbecue aan het aansteken. Zo was ook Sterre de houtskool aan het aanmaken om lekkere steaks te kunnen gaan grillen.
39	2	male	male	Iedereen was zijn barbecue aan het aansteken. Zo was ook Wouter de houtskool aan het aanmaken om lekkere steaks te kunnen gaan grillen.
40	2	male	female	Iedereen was zijn auto aan het waxen. Zo was ook Sarah bezig om de auto weer te laten glimmen.
40	1	male	male	Iedereen was zijn auto aan het waxen. Zo was ook Justin bezig om de auto weer te laten glimmen.
41	1	male	female	Iedereen was zijn sigaar aan het roken. Zo was ook Fenna trekjes aan het nemen van een havanna.
41	2	male	male	Iedereen was zijn sigaar aan het roken. Zo was ook Kevin trekjes aan het nemen van een havanna.

42	2	male	female	Iedereen was zijn vrachtwagen aan het parkeren. Zo was ook Sanne de vrachtwagen bij een tankstation aan het neerzetten voor een pauze.
42	1	male	male	Iedereen was zijn vrachtwagen aan het parkeren. Zo was ook Jeroen de vrachtwagen bij een tankstation aan het neerzetten voor een pauze.
43	1	male	female	Iedereen was zijn autobanden aan het verwisselen. Zo was ook Lieke weer de zomerbanden onder de auto aan het zetten.
43	2	male	male	Iedereen was zijn autobanden aan het verwisselen. Zo was ook Peter weer de zomerbanden onder de auto aan het zetten.
44	2	male	female	Iedereen was zijn snor aan het scheren. Zo was ook Esmee met het scheerapparaat in de weer.
44	1	male	male	Iedereen was zijn snor aan het scheren. Zo was ook Jesse met het scheerapparaat in de weer.
45	1	male	female	Iedereen was zijn whisky aan het drinken. Zo was ook Kelly aan het genieten van een glaasje single malt.
45	2	male	male	Iedereen was zijn whisky aan het drinken. Zo was ook Lucas aan het genieten van een glaasje single malt.
46	2	male	female	Iedereen was zijn haargel aan het indoen. Zo was ook Judith het haar aan het stylen met wat gel.
46	1	male	male	Iedereen was zijn haargel aan het indoen. Zo was ook Jelle het haar aan het stylen met wat gel.
47	1	male	female	Iedereen was zijn pijp aan het roken. Zo was ook Bente Deense natuurtabak aan het paffen.
47	2	male	male	Iedereen was zijn pijp aan het roken. Zo was ook Jacob Deense natuurtabak aan het paffen.

48	2	male	female	Iedereen was zijn land aan het ploegen. Zo was ook Myrthe een akker aan het voorbereiden voor nieuw zaad.
48	1	male	male	Iedereen was zijn land aan het ploegen. Zo was ook Thomas een akker aan het voorbereiden voor nieuw zaad.

Controls

Nr.	List	Stereotype	Continuation	Item
1	1	neutral	female	Iedereen was broodjes aan het smeren. Zo was ook Mandy wat pistoletjes aan het beleggen met ham en kaas.
1	2	neutral	male	Iedereen was broodjes aan het smeren. Zo was ook Dennis wat pistoletjes aan het beleggen met ham en kaas.
2	2	neutral	female	Iedereen was de post aan het lezen. Zo was ook Merel een brief van de belastingdienst aan het doornemen.
2	1	neutral	male	Iedereen was de post aan het lezen. Zo was ook Jasper een brief van de belastingdienst aan het doornemen.
3	1	neutral	female	Iedereen was geld aan het uitgeven. Zo was ook Lotte allerlei nieuwe spullen aan het kopen.
3	2	neutral	male	Iedereen was geld aan het uitgeven. Zo was ook Marco allerlei nieuwe spullen aan het kopen.
4	2	neutral	female	Iedereen was de huur aan het overmaken. Zo was ook Daphne het bedrag naar de huisbaas aan het overschrijven.
4	1	neutral	male	Iedereen was de huur aan het overmaken. Zo was ook Robert het bedrag naar de huisbaas aan het overschrijven.
5	1	neutral	female	Iedereen was ballonnen aan het opblazen. Zo was ook Marit met de voorbereidingen voor het feest aan het helpen.

5	2	neutral	male	Iedereen was ballonnen aan het opblazen. Zo was ook Gerrit met de voorbereidingen voor het feest aan het helpen.
6	2	neutral	female	Iedereen was de baas aan het bellen. Zo was ook Maaike aan het proberen om de baas aan de lijn te krijgen.
6	1	neutral	male	Iedereen was de baas aan het bellen. Zo was ook Stefan aan het proberen om de baas aan de lijn te krijgen.
7	1	neutral	female	Iedereen was ski's aan het aandoen. Zo was ook Linda zich aan het klaarmaken voor de piste.
7	2	neutral	male	Iedereen was ski's aan het aandoen. Zo was ook Remco zich aan het klaarmaken voor de piste.
8	2	neutral	female	Iedereen was een paraplu aan het opendoen. Zo was ook Inge zich aan het beschermen tegen de regen.
8	1	neutral	male	Iedereen was een paraplu aan het opendoen. Zo was ook Tygo zich aan het beschermen tegen de regen.
9	1	neutral	female	Iedereen was cadeautjes aan het uitpakken. Zo was ook Anouk met veel plezier inpakpapier van een groot cadeau aan het afhalen.
9	2	neutral	male	Iedereen was cadeautjes aan het uitpakken. Zo was ook Dylan met veel plezier inpakpapier van een groot cadeau aan het afhalen.
10	2	neutral	female	Iedereen was de krant aan het lezen. Zo was ook Sophie zich op de hoogte aan het stellen van het wereldnieuws.
10	1	neutral	male	Iedereen was de krant aan het lezen. Zo was ook Willem zich op de hoogte aan het stellen van het wereldnieuws.
11	1	neutral	female	Iedereen was de cijfers aan het bekijken. Zo was ook Emma de resultaten van het tentamen aan het bestuderen.

11	2	neutral	male	Iedereen was de cijfers aan het bekijken. Zo was ook Hugo de resultaten van het tentamen aan het bestuderen.
12	2	neutral	female	Iedereen was een treinkaartje aan het kopen. Zo was ook Amber bij het loket in de rij gaan staan.
12	1	neutral	male	Iedereen was een treinkaartje aan het kopen. Zo was ook David bij het loket in de rij gaan staan.

Table A2. Activities with mean rating and standard deviation on a 7-point scale with 1 representing female and 7 representing male.

Experimental stimuli									*Controls*		
Female stereotype	***M***	***SD***	**Male stereotype**	***M***	**SD**	**Neutral stereotype**	***M***	**SD**	**Neutral stereotype**	***M***	***SD***
nagels lakken 'polishing nails'	1.33	0.53	snor scheren 'shaving moustache'	6.48	0.82	vakantie plannen 'planning a vacation'	3.65	0.62	broodjes smeren 'preparing a sandwich'	3.88	0.33
wimpers verven 'dyeing eyelashes'	1.38	0.67	pijp roken 'smoking pipe'	6.13	0.79	presentatie voorbereiden 'preparing a presentation'	3.75	0.54	de post lezen 'reading the mail'	3.88	0.33
wenkbrauwen epileren 'plucking eyebrows'	1.78	0.77	autobanden verwisselen 'changing car tires'	5.83	0.87	boodschappen doen 'doing groceries'	3.78	0.53	geld uitgeven 'spending money'	3.75	0.63
handtas inpakken 'packing purse'	1.90	0.74	vrachtwagen parkeren 'parking a truck'	5.75	0.81	ouders bezoeken 'visiting parents'	3.85	0.43	de huur overmaken 'transfering the rent'	4.08	0.35
oorbellen indoen 'putting earrings in'	1.95	0.68	haargel indoen 'applying hair gel'	5.68	0.80	telefoon checken 'checking one's phone'	3.85	0.43	ballonnen opblazen 'inflating balloons'	3.98	0.28
balletschoenen aantrekken 'putting ballet shoes on'	2.13	0.99	sigaar roken 'smoking cigar'	5.65	0.83	fiets stallen 'parking the bike'	3.95	0.32	de baas bellen 'calling the boss'	4.05	0.45
cupcakes versieren 'decorating cupcakes'	2.15	0.86	land ploegen 'plowing land'	5.60	0.90	tanden poetsen 'brushing teeth'	3.98	0.16	ski's aandoen 'putting on skis'	3.98	0.42
dagcrème aanbrengen 'putting on moisturizer'	2.15	0.80	voetbaltrucs oefenen 'practicing soccer tricks'	5.55	0.90	lunch eten 'eating lunch'	3.98	0.16	een paraplu opendoen 'opening an umbrella'	3.93	0.53
roddelblad lezen 'reading gossip magazine'	2.25	0.67	barbecue aansteken 'firing up the barbecue'	5.50	0.91	veters strikken 'tying shoelaces'	4.00	0.00	cadeautjes uitpakken 'unpacking presents'	3.85	0.43
haar föhnen 'blow-drying hair'	2.28	0.88	auto waxen 'waxing the car'	5.50	0.96	OV-kaart opladen 'charging the Oyster card'	4.00	0.00	de krant lezen 'reading the newspaper'	4.10	0.38
paard borstelen 'brushing horse'	2.45	0.88	computer repareren 'reparing the computer'	5.45	0.78	paper schrijven 'writing a paper'	4.00	0.23	de cijfers bekijken 'looking at the grades'	3.95	0.55
hart uitstorten 'pouring out one's heart'	2.65	0.83	biceps trainen 'training one's biceps'	5.40	0.90	ramen opendoen 'opening windows'	4.03	0.36	de kaartjes printen 'printing tickets'	3.90	0.44

dagboek bijhouden 'updating diary'	2.70	0.76	whisky drinken 'drinking whisky'	5.20	0.82	koffie opdrinken 'drinking coffee'	4.08	0.35			
yogaoefeningen doen 'doing yoga exercises'	2.85	0.83	golfclubs poetsen 'cleaning golf clubs'	5.13	0.88	hond uitlaten 'letting the dog out'	4.13	0.40			
prosecco drinken 'drinking prosecco'	2.88	0.88	mountainbike inladen 'loading the mountain bike'	5.05	0.90	gitaar stemmen 'tuning the guitar'	4.33	0.66			
kaarsen aansteken 'lighting candles'	2.93	0.89	aandelen verkopen 'selling one's shares'	5.00	0.68	afval wegbrengen 'taking away the trash'	4.38	0.63			
TOTAL	2.23	0.50	*TOTAL*	5.55	0.38	*TOTAL*	3.98	0.19	*TOTAL*	3.94	0.10

Model summaries

Table A3. Fixed-effect coefficients β, their t-scores and p-values for the experimental items.

Region 1: Proper name - first fixation duration			
	β	t	p
Intercept	5.17	355.51	<0.001
Continuation	0.004	1.11	0.266
Stereotype (female)	0.01	1.21	0.228
Stereotype (male)	0.01	1.13	0.256
Continuation * Stereotype (female)	-0.002	-0.34	0.732
Continuation * Stereotype (male)	0.01	1.84	0.065

Region 1: Proper name - first gaze duration			
	β	t	p
Intercept	5.35	237.08	<0.001
Continuation	-0.01	-1.63	0.104
Stereotype (female)	0.003	0.32	0.750
Stereotype (male)	0.03	2.56	0.010
Participant gender	-0.05	-2.24	0.025
Continuation * Stereotype (female)	-0.01	-0.96	0.335
Continuation * Stereotype (male)	0.002	0.16	0.871

Region 1: Proper name - regression path duration			
	β	t	p
Intercept	5.78	165.19	<0.001
Continuation	-0.01	-1.77	0.077
Stereotype (female)	-0.005	-0.31	0.756
Stereotype (male)	-0.0008	-0.05	0.959
Continuation * Stereotype (female)	-0.04	-3.25	0.001
Continuation * Stereotype (male)	0.02	1.92	0.055

Region 1: Proper name - total fixation duration			
	β	t	p
Intercept	5.86	185.11	<0.001
Continuation	-0.01	-1.48	0.138
Stereotype (female)	0.03	1.17	0.244
Stereotype (male)	0.02	0.70	0.486
Participant gender	-0.11	-3.80	<0.001
Continuation * Stereotype (female)	-0.04	-3.61	<0.001
Continuation * Stereotype (male)	0.02	1.89	0.058

Region 2: Spillover - first fixation duration	*β*	*t*	*p*
Intercept	5.25	361.88	<0.001
Continuation	-0.01	-2.24	0.025
Stereotype (female)	-0.01	-0.52	0.605
Stereotype (male)	0.02	2.12	0.034
Continuation * Stereotype (female)	-0.01	-1.01	0.313
Continuation * Stereotype (male)	-0.003	-0.55	0.585

Region 2: Spillover - first gaze duration	*β*	*t*	*p*
Intercept	6.02	174.07	<0.001
Continuation	0.001	0.19	0.848
Stereotype (female)	-0.01	-0.27	0.789
Stereotype (male)	-0.02	-0.63	0.529
Continuation * Stereotype (female)	-0.01	-0.52	0.604
Continuation * Stereotype (male)	-0.02	-1.59	0.111

Region 2: Spillover - regression path duration	*β*	*t*	*p*
Intercept	6.19	148.75	<0.001
Continuation	0.01	1.36	0.175
Stereotype (female)	-0.02	-0.43	0.670
Stereotype (male)	0.002	0.05	0.957
Participant gender	-0.07	-2.27	0.023
Continuation * Stereotype (female)	-0.01	-1.06	0.288
Continuation * Stereotype (male)	0.01	0.87	0.383

Region 2: Spillover - total fixation duration	*β*	*t*	*p*
Intercept	6.35	151.88	<0.001
Continuation	0.01	0.68	0.497
Stereotype (female)	-0.01	-0.26	0.795
Stereotype (male)	0.01	0.29	0.772
Participant gender	-0.07	-2.52	0.012
Continuation * Stereotype (female)	-0.02	-1.73	0.084
Continuation * Stereotype (male)	0.01	0.49	0.624
Continuation * Participant gender	0.02	2.13	0.033
Stereotype (female) * Participant gender	-0.02	2.13	0.064
Stereotype (male) * Participant gender	0.01	0.74	0.459

Continuation * Stereotype (female) * Participant gender	-0.02	-1.46	0.144
Continuation * Stereotype (male) * Participant gender	-0.02	-1.80	0.072

Table A4. Fixed-effect coefficients β, their t-scores and p-values for the control items.

Region 1: Proper name - first fixation duration			
	β	t	p
Intercept	5.17	337.46	<0.001
Continuation	0.01	1.05	0.296

Region 1: Proper name - first gaze duration			
	β	t	p
Intercept	5.31	193.81	<0.001
Continuation	0.01	0.76	0.448
Participant gender	-0.05	-2.18	0.030

Region 1: Proper name - regression path duration			
	β	t	p
Intercept	5.77	136.44	<0.001
Continuation	-0.02	-0.96	0.337
Participant gender	-0.07	-2.00	0.046

Region 1: Proper name - total fixation duration			
	β	t	p
Intercept	5.79	155.46	<0.001
Continuation	0.00	-0.23	0.815
Participant gender	-0.11	-3.75	<0.001

Region 2: Spillover - first fixation duration	β	t	p
Intercept	5.25	0.02	<0.001
Continuation	0.00	0.01	0.820

Region 2: Spillover - first gaze duration	β	t	p
Intercept	6.00	105.75	<0.001
Continuation	0.00	-0.22	0.829
Participant gender	-0.05	-2.12	0.034

Region 2: Spillover - regression path duration	*β*	*t*	*p*
Intercept	6.10	99.21	<0.001
Continuation	0.01	0.83	0.404

Region 2: Spillover - total fixation duration	*β*	*t*	*p*
Intercept	6.25	140.58	<0.001
Continuation	0.01	1.01	0.312
Participant gender	-0.09	-2.86	0.004

Chapter 3

Stimuli

Table A5. Stimuli for Experiment 1 reported in Chapter 3. All stimuli are provided in the experimental condition with a female continuation and the quantifier *enkele* 'some'. Stimuli for Experiment 2 were the same as below, but shortened by replacing everything starting from ", maar" with a period.

Nr.	Stereotype	Stimulus
1	neutral	Iedereen was zijn gordel aan het vastmaken, waaronder enkele vrouwen die al een tijdje in het vliegtuig zaten te wachten, maar nu eindelijk konden vertrekken.
2	neutral	Iedereen was zijn schoenen aan het aandoen, waaronder enkele vrouwen die al bijna klaar waren om de deur uit te gaan, maar een beetje aan het treuzelen waren.
3	neutral	Iedereen was zijn jas aan het aandoen, waaronder enkele vrouwen die al een tijdje hadden uitgekeken naar een wandeling in de zon, maar eerst nog hadden vergaderd.
4	neutral	Iedereen was zijn lunch aan het eten, waaronder enkele vrouwen die al eerder honger hadden gekregen, maar nog een belangrijke afspraak gehad hadden.
5	neutral	Iedereen was zijn telefoon aan het opladen, waaronder enkele vrouwen die al een hele dag met een lege batterij hadden rondgelopen, maar niet eerder een stopcontact waren tegengekomen op het festivalterrein.
6	neutral	Iedereen was zijn bagage aan het inchecken, waaronder enkele vrouwen die al over dertig minuten bij de gate moesten zijn, maar nog steeds bij de incheckbalie stonden.
7	neutral	Iedereen was zijn cijfers aan het bekijken, waaronder enkele vrouwen die al gelijk na het mondeling wisten dat ze het vak gehaald hadden, maar toch heel benieuwd waren.
8	neutral	Iedereen was zijn rooster aan het samenstellen, waaronder enkele vrouwen die al snel de eerste periode hadden volgepland, maar er voor de tweede periode nog niet uit waren.
9	neutral	Iedereen was zijn tanden aan het poetsen, waaronder enkele vrouwen die al een jaar niet meer bij de tandarts waren geweest, maar er nu aan moesten geloven.
10	neutral	Iedereen was zijn tentamen aan het maken, waaronder enkele vrouwen die al in het vierde jaar zaten, maar deze toets nog niet gehaald hadden.

11	neutral	Iedereen was zijn antwoord aan het opschrijven, waaronder enkele vrouwen die al vaker de pubquiz hadden gewonnen, maar deze week minder goed presteerden.
12	neutral	Iedereen was zijn rijlessen aan het inplannen, waaronder enkele vrouwen die al een keer examen hadden gedaan, maar toen gezakt waren.
13	neutral	Iedereen was zijn paspoort aan het zoeken, waaronder enkele vrouwen die al bijna moesten boarden, maar nog steeds niet alle papieren hadden gevonden.
14	neutral	Iedereen was zijn neus aan het snuiten, waaronder enkele vrouwen die al twee weken verkouden waren, maar nog niet naar de dokter waren geweest.
15	neutral	Iedereen was zijn stembiljet aan het invullen, waaronder enkele vrouwen die al twee keer de stemwijzer hadden gedaan, maar nog steeds stonden te twijfelen.
16	neutral	Iedereen was zijn wachtwoord aan het wijzigen, waaronder enkele vrouwen die al twee keer een herinnering per e-mail hadden ontvangen, maar er pas nu aan toekwamen.
17	neutral	Iedereen was zijn CV aan het opstellen, waaronder enkele vrouwen die al een jaar een baan hadden, maar nu op zoek waren naar iets anders.
18	neutral	Iedereen was zijn patiënten aan het behandelen, waaronder enkele vrouwen die al een dubbele dienst erop hadden zitten, maar gelukkig bijna naar huis mochten.
19	neutral	Iedereen was zijn veters aan het strikken, waaronder enkele vrouwen die al tien minuten geleden hadden moeten vertrekken, maar zich hadden verslapen.
20	neutral	Iedereen was zijn ski's aan het aandoen, waaronder enkele vrouwen die al vaker op wintersport waren geweest, maar tot nu toe alleen maar gesnowboard hadden.
21	neutral	Iedereen was zijn koffie aan het opdrinken, waaronder enkele vrouwen die al een half uur pauze hadden gehad, maar nog steeds niet terug aan het werk wilden.
22	neutral	Iedereen was zijn laptop aan het opstarten, waaronder enkele vrouwen die al lang een nieuwe nodig hadden, maar er geen geld voor hadden.
23	neutral	Iedereen was zijn werkmails aan het beantwoorden, waaronder enkele vrouwen die al twee weken vakantie hadden, maar het werk toch niet konden laten liggen.

24	neutral	Iedereen was zijn fiets aan het stallen, waaronder enkele vrouwen die al tien minuten naar een plek hadden gezocht, maar er pas nu een hadden gevonden.
25	male	Iedereen was zijn dak aan het repareren, waaronder enkele vrouwen die al sinds de dag van de storm in de weer waren met emmers, maar het probleem nu grondig wilden aanpakken.
26	male	Iedereen was zijn pijp aan het roken, waaronder enkele vrouwen die al jaren niet meer gerookt hadden, maar nu toch weer waren begonnen.
27	male	Iedereen was zijn auto aan het repareren, waaronder enkele vrouwen die al eerder naar de motor hadden gekeken, maar het probleem nog niet hadden gevonden.
28	male	Iedereen was zijn bouwklus aan het afronden, waaronder enkele vrouwen die al drie maanden bezig waren, maar meteen in het begin vertraging hadden opgelopen.
29	male	Iedereen was zijn pak aan het aandoen, waaronder enkele vrouwen die al over vijf minuten weg moesten, maar dit waarschijnlijk niet zouden gaan halen.
30	male	Iedereen was zijn sigaar aan het roken, waaronder enkele vrouwen die al jaren probeerden om te stoppen, maar het toch niet konden laten.
31	male	Iedereen was zijn borstspieren aan het trainen, waaronder enkele vrouwen die al meer dan een uur in de sportschool waren, maar de work-out nog steeds niet af hadden.
32	male	Iedereen was zijn autobanden aan het verwisselen, waaronder enkele vrouwen die al een maand te lang met winterbanden rondreden, maar niet eerder tijd hadden gehad om deze te vervangen.
33	male	Iedereen was zijn pistool aan het reinigen, waaronder enkele vrouwen die al een uur op de schietbaan hadden gestaan, maar nu ruimte moesten maken voor anderen.
34	male	Iedereen was zijn voetbaltrucs aan het oefenen, waaronder enkele vrouwen die al tien minuten klaar waren met warmlopen, maar eerst op de rest van het team hadden moeten wachten.
35	male	Iedereen was zijn bouwhelm aan het vastmaken, waaronder enkele vrouwen die al een half jaar aan het verbouwen waren, maar pas nu de nieuwe ramen konden plaatsen.
36	male	Iedereen was zijn oliepeil aan het controleren, waaronder enkele vrouwen die al langer een waarschuwingslichtje zagen branden, maar pas vandaag onder de motorkap keken.

37	male	Iedereen was zijn gereedschap aan het klaarleggen, waaronder enkele vrouwen die al dagen van plan waren om te gaan klussen, maar het steeds hadden uitgesteld.
38	male	Iedereen was zijn motorvakantie aan het plannen, waaronder enkele vrouwen die al vaker in eigen land op reis waren geweest, maar nu eens een ander land wilden verkennen.
39	male	Iedereen was zijn geweer aan het laden, waaronder enkele vrouwen die al van jongs af aan op jacht gingen, maar nog nooit een hert hadden geschoten.
40	male	Iedereen was zijn sportauto aan het parkeren, waaronder enkele vrouwen die al heel lang een parkeerplek hadden gezocht, maar er tot nu toe steeds te laat bij waren geweest.
41	male	Iedereen was zijn bokshandschoenen aan het aandoen, waaronder enkele vrouwen die al over een week een wedstrijd hadden, maar nog flink moesten trainen.
42	male	Iedereen was zijn hengel aan het uitwerpen, waaronder enkele vrouwen die al de hele ochtend aan het vissen waren, maar nog steeds niets gevangen hadden.
43	male	Iedereen was zijn mountainbike aan het afstellen, waaronder enkele vrouwen die al enige tijd gefietst hadden, maar het stuur toch te laag vonden staan.
44	male	Iedereen was zijn voetbalschoenen aan het aandoen, waaronder enkele vrouwen die al over vijf minuten op het veld moesten staan, maar de tijd niet in de gaten hadden gehouden.
45	male	Iedereen was zijn krachtoefeningen aan het doen, waaronder enkele vrouwen die al vaker naar de sportschool waren geweest, maar tot nu toe alleen maar cardio hadden gedaan.
46	male	Iedereen was zijn blikje aan het adten, waaronder enkele vrouwen die al een tijdje op het feestje waren, maar nu pas het eerste biertje dronken.
47	male	Iedereen was zijn inzet aan het verhogen, waaronder enkele vrouwen die al twee uur aan het spelen waren, maar nog geen ronde hadden gewonnen.
48	male	Iedereen was zijn tent aan het opzetten, waaronder enkele vrouwen die al een tijdje bezig waren, maar kennelijk een paar haringen tekortkwamen.
49	female	Iedereen was zijn breiwerk aan het afmaken, waaronder enkele vrouwen die al de hele winter met dezelfde trui bezig waren, maar het inmiddels bijna af hadden.

50	female	Iedereen was zijn wenkbrauwen aan het epileren, waaronder enkele vrouwen die al sinds de puberteit regelmatig haartjes verwijderden, maar het nog steeds heel pijnlijk vonden.
51	female	Iedereen was zijn oorbellen aan het indoen, waaronder enkele vrouwen die al een tijdje stonden te prutsen, maar de sluiting er maar moeilijk op kregen.
52	female	Iedereen was zijn balletschoenen aan het aantrekken, waaronder enkele vrouwen die al twee keer hadden opgetreden vandaag, maar nu zelfs nog een derde voorstelling hadden.
53	female	Iedereen was zijn naam aan het borduren, waaronder enkele vrouwen die al een uur bezig waren, maar deze oefening voor beginners nog niet af hadden.
54	female	Iedereen was zijn sieraden aan het opbergen, waaronder enkele vrouwen die al jaren niet meer de moeite daartoe hadden genomen, maar na recente inbraken waren geschrokken.
55	female	Iedereen was zijn roddelblad aan het lezen, waaronder enkele vrouwen die al drie kwartier in de wachtkamer zaten, maar nog steeds niet aan de beurt waren.
56	female	Iedereen was zijn naaimachine aan het klaarzetten, waaronder enkele vrouwen die al een tijdje hadden uitgekeken naar de cursus, maar er de eerste keer helaas niet bij konden zijn.
57	female	Iedereen was zijn pirouettes aan het oefenen, waaronder enkele vrouwen die al vijf jaar op dansles zaten, maar pas binnenkort een eerste uitvoering zouden hebben.
58	female	Iedereen was zijn haar aan het verven, waaronder enkele vrouwen die al vroeg grijs waren geworden, maar niet wilden dat andere mensen dit zagen.
59	female	Iedereen was zijn cupcakes aan het versieren, waaronder enkele vrouwen die al eerder vormpjes van marsepein hadden gemaakt, maar hadden moeten wachten totdat de baksels waren afgekoeld.
60	female	Iedereen was zijn oksels aan het scheren, waaronder enkele vrouwen die al drie weken geen scheermesje hadden aangeraakt, maar zich nu gereedmaakten voor het zwembad.
61	female	Iedereen was zijn dagcrème aan het aanbrengen, waaronder enkele vrouwen die al een uur geleden hadden gedoucht, maar tussendoor eerst hadden ontbeten.
62	female	Iedereen was zijn dagboek aan het bijhouden, waaronder enkele vrouwen die al sinds de basisschool regelmatig schreven, maar er niet meer elke dag aan toekwamen.

63	female	Iedereen was zijn paard aan het borstelen, waaronder enkele vrouwen die al over een uur moesten starten, maar nog lang niet klaar waren met de voorbereidingen.
64	female	Iedereen was zijn yogaoefeningen aan het doen, waaronder enkele vrouwen die al drie weken niet naar de les waren geweest, maar wel thuis hadden geoefend.
65	female	Iedereen was zijn horoscoop aan het lezen, waaronder enkele vrouwen die al jaren elke zondag naar deze rubriek keken, maar de verhalen toch niet geloofwaardig vonden.
66	female	Iedereen was zijn calorieën aan het opschrijven, waaronder enkele vrouwen die al weken op dieet waren, maar nog niet veel waren afgevallen.
67	female	Iedereen was zijn hart aan het uitstorten, waaronder enkele vrouwen die al jaren een vaste relatie hadden, maar nu geen passie meer voelden.
68	female	Iedereen was zijn kaarsen aan het aansteken, waaronder enkele vrouwen die al snel een mooie sfeer hadden gecreëerd, maar toch nog wat meer lichtjes wilden.
69	female	Iedereen was zijn relatieproblemen aan het bespreken, waaronder enkele vrouwen die al lang niet meer gelukkig waren, maar nog niet de moed hadden gehad om het uit te maken.
70	female	Iedereen was zijn thee aan het drinken, waaronder enkele vrouwen die al bij het ontbijt een hele pot hadden gehad, maar nu wel nog een kopje lustten.
71	female	Iedereen was zijn outfit aan het samenstellen, waaronder enkele vrouwen die al een half uur voor de spiegel hadden gestaan, maar nog steeds geen keuze hadden gemaakt.
72	female	Iedereen was zijn was aan het doen, waaronder enkele vrouwen die al een tijdje in de wasserette op een vrije droger zaten te wachten, maar nu eindelijk aan de beurt waren.

Results of rating study for stereotypical activities

Table A6. Results of rating study for stereotypical activities.

Activity	M	SD	Literal translat. *noun*	Literal translat. *verb*	Translation
meidenavond plannen	1.196	0.483	girls' night	planning	planning a girls' night out
beha rechtdoen	1.196	0.585	bra	straightening	adjusting one's bra
bikini aantrekken	1.214	0.594	bikini	putting on	putting on a bikini
panty aandoen	1.286	0.530	tights	putting on	putting on tights
mascara opdoen	1.321	0.636	mascara	putting on	putting on mascara
trouwjurken bekijken	1.339	0.668	wedding dresses	viewing	looking at wedding dresses
zomerjurken inpakken	1.339	0.668	summer dresses	packing	packing sundresses
wimpers verven	1.339	0.611	eyelashes	painting	dyeing one's eyelashes
make-up bijwerken	1.339	0.640	make up	retouching	touching up one's make up
lippenstift bijwerken	1.411	0.682	lipstick	retouching	fixing one's lipstick
make-up opdoen	1.411	0.654	make up	putting on	putting on make up
tampons kopen	1.429	0.684	tampons	buying	buying tampons
nagels lakken	1.429	0.710	nails	painting	painting one's nails
krulspelden indoen	1.482	0.738	curlers	putting in	putting in hair rollers
lingerie wassen	1.571	0.735	lingerie	washing	washing lingerie
korset kopen	1.571	0.684	corset	buying	buying a corset
lippen verven	1.571	0.710	lips	painting	painting lips
buikdansles volgen	1.625	0.799	belly dance class	following	taking belly dance classes
benen scheren	1.625	0.728	legs	shaving	shaving one's legs
handtas inpakken	1.643	0.819	handbag	packing	packing one's handbag
haar vlechten	1.643	0.672	hair	braiding	braiding one's hair
breipatroon uitzoeken	1.679	0.741	knitting patterns	picking out	picking out knitting patterns
haar stijlen	1.696	0.761	hair	styling	straightening one's hair
modeblog updaten	1.714	0.847	fashion blog	updating	updating a fashion blog
breiwerk afmaken	1.714	0.731	knitwork	finishing	finishing the knitwork
Barbie aankleden	1.732	0.863	Barbie doll	dressing	dressing a Barbie doll
gezichtsmasker aanbrengen	1.768	0.809	face mask	applying	applying a face mask
wenkbrauwen epileren	1.768	0.853	eyebrows	plucking	plucking one's eyebrows
legging inpakken	1.768	0.809	tights	packing	packing a legging
sjaal breien	1.768	0.786	scarf	knitting	knitting a scarf

modetijdschrift lezen	1.821	0.789	fashion magazine	reading	reading a fashion magazine
nagels vijlen	1.875	0.854	nails	filing	filing one's nails
tas naaien	1.875	0.854	bag	sewing	sewing a bag
oorbellen indoen	1.911	0.900	earrings	putting in	putting on earrings
balletschoenen aantrekken	1.929	0.783	ballet shoes	putting on	putting on ballet shoes
naam borduren	1.929	0.828	name	embroiding	needlepointing a name
sierkussens kopen	1.946	0.862	decorative cushions	buying	buying decorative cushions
huishoudbeurs bezoeken	1.964	0.934	Huishoudbeurs	visiting	visiting the Huishoudbeurs (an annual Dutch fair for household products)
modeshow bekijken	1.964	0.808	fashion show	viewing	watching a fashion show
sieraden opbergen	1.982	0.904	jewelry	putting away	putting away jewelry
haarverf kopen	2.018	0.924	hair dye	buying	buying hair dye
bloemenkransen maken	2.036	0.830	flower wreaths	making	making flower wreaths
liefdesverhalen lezen	2.054	0.840	love stories	reading	reading love stories
yogabroek aandoen	2.071	0.931	yoga pants	putting on	putting on yoga pants
roddelblad lezen	2.089	0.745	gossip magazine	reading	reading a gossip magazine
hakschoenen poetsen	2.089	1.164	high heels	cleaning	cleaning high heels
naaimachine klaarzetten	2.107	0.888	sewing machine	setting up	setting up a sewing machine
pirouettes oefenen	2.107	0.779	pirouettes	practicing	practicing pirouettes
haar verven	2.125	0.916	hair	painting	dyeing one's hair
cupcakes versieren	2.161	0.869	cupcakes	decorating	decorating cupcakes
oksels scheren	2.161	0.910	armpits	shaving	shaving one's armpits
haar borstelen	2.161	0.910	hair	brushing	brushing one's hair
vlinders tekenen	2.179	0.811	butterflies	drawing	drawing butterflies
liefdesfilm kijken	2.232	0.809	love movie	watching	watching a romantic movie
bontjas aandoen	2.250	0.919	fur coat	putting on	putting on a fur coat
dagcrème aanbrengen	2.268	1.000	day cream	applying	applying day cream
haar föhnen	2.268	0.981	hair	blow-drying	blow-drying one's hair
theeblaadjes lezen	2.304	0.933	tea leaves	reading	reading tea leaves
dagboek bijhouden	2.304	0.872	diary	keeping up	keeping a diary
paard borstelen	2.321	0.855	horse	brushing	grooming a horse
yogaoefeningen doen	2.357	0.883	yoga exercises	doing	doing yoga exercises
vriendje bellen	2.375	1.214	boyfriend	calling	calling one's boyfriend
horoscoop lezen	2.375	0.843	horoscope	reading	reading the horoscope

roddels vertellen	2.411	1.058	gossip	telling	gossiping
lampionkettingen knutselen	2.429	0.931	lantern chains	crafting	crafting lantern chains
calorieën opschrijven	2.446	0.971	calories	writing down	writing down calories
paard opzadelen	2.446	0.933	horse	saddling	saddling horse
taart glaceren	2.446	0.913	cake	icing	icing a cake
danswedstrijd volgen	2.464	0.914	dance competition	following	following dance competition
boeket samenstellen	2.464	0.852	bouquet	putting together	putting together a bouquet
porselein beschilderen	2.464	0.953	china	painting	painting china
soap kijken	2.482	0.894	soap opera	watching	watching a soap opera
baby voeden	2.482	1.044	baby	feeding	feeding a baby
sandaaltjes kopen	2.500	1.265	sandals	buying	buying sandals
hart uitstorten	2.500	0.915	heart	pouring out	pouring one's heart out
accessoires uitkiezen	2.518	0.934	accessories	picking out	picking out accessories
koekjes bakken	2.536	0.894	cookies	baking	baking cookies
kapsels bekijken	2.554	1.043	haircuts	viewing	looking at haircuts
dromen opschrijven	2.554	1.043	dreams	writing down	writing down one's dreams
kaarsen aansteken	2.589	0.910	candles	lighting	lighting candles
wierook aansteken	2.607	1.139	incense	lighting	lighting incense
relatieproblemen bespreken	2.625	0.926	relationship problems	discussing	discussing relationship problems
baby bewonderen	2.625	1.071	baby	admiring	admiring a baby
paard bestijgen	2.643	0.883	horse	mounting	mounting a horse
musicallessen volgen	2.696	0.952	musical lessons	following	taking musical lessons
babytaal spreken	2.696	1.094	baby language	speaking	speaking baby language
harp bespelen	2.696	0.851	harp	playing	playing the harp
dieet volgen	2.696	0.851	diet	following	following diet
verjaardagskaart tekenen	2.714	1.039	birthday card	singing	singing birthday card
handlijnen lezen	2.732	1.000	hand lines	reading	reading hand lines
kooktijdschrift doorbladeren	2.750	0.995	cooking magazine	browsing	browsing a cooking magazine
bonbons eten	2.786	0.847	chocolates	eating	eating chocolates
luiers verschonen	2.786	0.803	diapers	changing	changing diapers
huwelijksplannen maken	2.804	0.923	wedding plans	making	making wedding plans
heupen trainen	2.804	1.135	hips	training	training hips
toonladders zingen	2.821	0.993	scales	singing	singing scales

huis schoonmaken	2.821	0.876	house	cleaning	cleaning the house
thee drinken	2.821	0.855	tea	drinking	drinking tea
fotoboeken bekijken	2.839	0.968	photo books	viewing	looking at photo books
chocola eten	2.839	0.848	chocolate	eating	eating chocolate
outfit samenstellen	2.857	0.773	outfit	putting together	putting together an outfit
schaatskunstjes perfectioneren	2.875	0.992	ice skating tricks	perfecting	perfecting ice skating tricks
tarotkaarten leggen	2.875	0.935	tarot cards	laying	laying tarot cards
was doen	2.875	0.955	laundry	doing	doing laundry
vloer dweilen	2.875	0.955	floor	mopping	mopping the floor
cadeaus inpakken	2.929	0.970	presents	wrapping	wrapping presents
parfum opdoen	2.946	0.999	perfume	putting on	putting on perfume
bed opmaken	2.946	0.818	bed	making up	making the bed
kleurplaat inkleuren	2.964	0.894	coloring page	coloring (in)	coloring a picture
chocoladereep eten	2.964	0.785	chocolate bar	eating	eating a candy bar
ramen schoonmaken	3.000	1.206	windows	cleaning	cleaning windows
stem opwarmen	3.000	0.972	voice	warming up	warming up one's voice
prosecco drinken	3.018	1.104	prosecco	drinking	drinking prosecco
kerstboom versieren	3.054	0.999	Christmas tree	decorating	decorating Christmas tree
liedjes zingen	3.054	0.840	songs	singing	singing songs
spaarkaart inruilen	3.089	1.014	savings card	exchanging	exchanging a savings card
bubbelbad nemen	3.089	0.793	bubble bath	taking	taking a bubble bath
karaoke zingen	3.089	0.959	karaoke	singing	singing karaoke
avondeten klaarmaken	3.107	0.888	dinner	preparing	preparing dinner
boekenbonnen inleveren	3.125	0.974	book vouchers	handing in	redeem book vouchers
kinderen ophalen	3.125	0.955	children	picking up	picking up the children
boodschappen doen	3.143	0.980	groceries	doing	getting groceries
gedichten lezen	3.143	1.034	poems	reading	reading poetry
koffiedik kijken	3.161	1.125	coffee grounds	watching	reading the tea leaves
tanden bleken	3.161	0.987	teeth	bleaching	whitening one's teeth
foto's maken	3.179	0.974	pictures	making	taking pictures
kinderen wegbrengen	3.196	0.961	children	taking away	dropping off the children
schoolfeest voorbereiden	3.214	0.909	school party	preparing	preparing school party
surprise maken	3.232	0.809	surprise	making	making a surprise gift
ouderschapsverlof regelen	3.268	1.120	parental leave	arranging	arranging parental leave

pralines eten	3.286	0.780	chocolates	eating	eating chocolates
kind voorlezen	3.286	0.929	child	reading to	reading to a child
spiegelbeeld bestuderen	3.304	0.893	reflection	studying	studying one's reflection
haar wassen	3.321	0.917	hair	washing	washing one's hair
brief schrijven	3.357	0.923	letter	writing	writing a letter
geld uitgeven	3.357	1.017	money	spending	spending money
kat aaien	3.357	0.819	cat	petting	petting a cat
levensverhaal vertellen	3.375	1.088	life story	telling	telling one's life story
passagiers uitzwaaien	3.375	0.885	passengers	wave goodbye	waving goodbye to passengers
ouders bezoeken	3.375	0.843	parents	visiting	visiting one's parents
boek lezen	3.393	0.908	book	reading	reading a book
volleybaloefeningen doen	3.411	0.910	volleyball exercises	doing	doing volleyball exercises
verlanglijst maken	3.464	0.713	wish list	making	making wish list
schilderij maken	3.464	0.762	painting	making	making painting
ramen opendoen	3.518	0.972	windows	opening	opening the windows
bureau opruimen	3.518	0.934	desk	tidying up	tidying a desk
maan bekijken	3.536	1.095	moon	viewing	watching the moon
handen wassen	3.554	0.685	hands	washing	washing one's hands
tentoonstelling bekijken	3.571	0.783	exhibition	viewing	checking out an exhibition
woordenschat oefenen	3.571	0.783	vocabulary	practicing	practicing vocabulary
popliedjes luisteren	3.571	0.684	pop songs	listening	listening to pop songs
vakantie plannen	3.571	1.093	vacation	planning	planning a vacation
koffers pakken	3.589	0.949	suitcases	taking	taking suitcases
taart eten	3.589	0.804	cake	eating	having cake
Facebook checken	3.607	0.679	Facebook	checking	checking Facebook
telefoon checken	3.607	0.731	phone	checking	checking one's phone
spullen pakken	3.607	0.755	stuff	taking	taking stuff
bezoek begroeten	3.625	0.728	visitor/visitors	greet	greeting a visitor
hockeyschoenen aandoen	3.625	0.843	hockey shoes	putting on	putting on hockey shoes
reisinformatie bestuderen	3.679	1.011	travel information	studying	studying travel information
brood smeren	3.679	0.917	bread	buttering	preparing a sandwich
presentatie voorbereiden	3.696	0.658	presentation	preparing	preparing a presentation
kater zoeken	3.696	0.913	tomcat	searching	looking for one's tomcat
opdracht maken	3.714	0.680	assignment	making	making assignment

paraplu openklappen	3.714	0.868	umbrella	folding open	opening an umbrella
Sinterklaas vieren	3.732	0.674	Sinterklaas	celebrating	celebrating Sinterklaas
ruzie maken	3.750	0.815	argument	making	having an argument
uitzicht bewonderen	3.750	0.667	view	admiring	admiring the view
lenzen indoen	3.768	0.713	contact lenses	putting in	putting in contact lenses
kaartje printen	3.768	0.853	ticket	printing	printing a ticket
appelflap eten	3.786	0.624	apple turnover	eating	eating an apple turnover
gordel vastmaken	3.804	0.483	seat belt	attaching	fastening the seat belt
puinzooi opruimen	3.804	1.482	mess	cleaning up	cleaning up a mess
schoenen aandoen	3.839	0.682	shoes	putting on	putting on shoes
werkstuk schrijven	3.857	0.520	paper	writing	writing a paper
telefoon opladen	3.875	0.541	phone	charging	charging one's phone
lunch eten	3.875	0.541	lunch	eating	having lunch
jas aandoen	3.875	0.541	coat	putting on	putting on a coat
boardingpass printen	3.893	1.107	boarding pass	printing	printing a boarding pass
rooster samenstellen	3.893	0.928	schedule	putting together	putting together a schedule
bagage inchecken	3.893	0.947	luggage	checking in	checking in luggage
cijfers bekijken	3.893	0.731	grades	viewing	checking one's grades
tanden poetsen	3.893	0.366	teeth	cleaning	brushing one's teeth
tentamen maken	3.893	0.493	exam	making	taking an exam
post lezen	3.893	0.824	mail	reading	reading mail
OV-kaart opladen	3.911	0.668	public transport card	charging	topping up the balance on a public transport card
zonnebril opzetten	3.911	0.745	sunglasses	putting on	putting on sunglasses
antwoord opschrijven	3.911	0.478	answer	writing down	writing down the answer
rijlessen inplannen	3.929	0.806	driving lessons	scheduling	scheduling driving lessons
cocktails mixen	3.929	1.126	cocktails	mixing	mixing cocktails
zitplaats zoeken	3.946	0.699	seat	searching	looking for a seat
ballon opblazen	3.964	0.873	balloon	blowing up	blowing up a balloon
sherry drinken	3.964	1.361	sherry	drinking	drinking sherry
kerstpakket afhalen	3.982	0.904	Christmas package	picking up	picking up a Christmas package
muziek luisteren	3.982	0.522	music	listening	listening to music
paspoort zoeken	4.000	0.972	passport	searching	looking for one's passport
tennispartner zoeken	4.018	0.863	tennis partner	searching	looking for a tennis partner
stembiljet invullen	4.018	0.774	voting ballot	filling out	marking a ballot
wachtwoord wijzigen	4.018	0.842	password	changing	changing one's password
koelkast ontdooien	4.018	1.053	fridge	defrosting	defrosting the fridge

neus snuiten	4.018	0.447	nose	blowing	blowing one's nose
treinkaartje kopen	4.036	0.687	train ticket	buying	buying a train ticket
CV opstellen	4.036	0.914	resume	drafting	drafting a resume
shotjes doen	4.036	0.762	shots	doing	drinking shots
pauze nemen	4.036	0.631	pause	taking	taking a break
radio luisteren	4.054	0.553	radio	listening	listening to the radio
documentaire kijken	4.071	0.871	documentary	watching	watching a documentary
frustratie uiten	4.071	1.042	frustration	expressing	expressing frustration
veters strikken	4.071	0.499	shoelaces	tying	tying one's shoelaces
patiënten behandelen	4.071	0.759	patients	treating	treating (one's) patients
weerbericht kijken	4.107	0.755	weather forecast	watching	watching the weather forecast
carnaval vieren	4.107	0.412	carnival	celebrating	celebrating carnival
tv kijken	4.107	0.779	TV	watching	watching TV
fietsroute opzoeken	4.143	1.119	cycle route	looking up	looking up cycle route
oplossing zoeken	4.143	0.923	solution	searching	finding a solution
skipasje scannen	4.161	0.733	ski pass	scanning	scanning a ski pass
ski's aandoen	4.161	0.532	skis	putting on	putting on skis
onderzoek doen	4.179	0.765	research	doing	doing research
koffie opdrinken	4.179	0.741	coffee	drinking up	finishing the coffee
laptop opstarten	4.179	0.690	laptop	starting up	starting up a laptop
werkmails beantwoorden	4.196	0.699	work e-mails	answering	answering work e-mails
huur overmaken	4.214	1.057	rent	transferring	paying rent
baas bellen	4.214	0.624	boss	calling	calling the boss
regenbroek aantrekken	4.232	0.914	rain pants	putting on	putting on rain pants
vriendinnetje trakteren	4.250	1.871	girlfriend	treating	treating one's girlfriend (to something)
journaal kijken	4.250	0.694	journal	watching	watching the news
fiets stallen	4.250	0.769	bicycle	storing	storing a bike
hond uitlaten	4.304	0.761	dog	letting out	walking the dog
breakdancelessen volgen	4.321	1.146	breakdance lessons	following	following breakdance lessons
pakketten afhalen	4.357	1.135	packages	picking up	picking up packages
rekeningen betalen	4.357	1.135	bills	paying	paying the bills
buikspieren trainen	4.393	1.123	abdominal muscles	training	training one's abs
bowlingschoenen aandoen	4.393	0.705	bowling shoes	putting on	putting on bowling shoes

tranen onderdrukken	4.393	1.423	tears	suppressing	holding back tears
data analyseren	4.429	0.759	data	analyzing	analyzing data
krant lezen	4.464	0.808	newspaper	reading	reading the newspaper
doktersjas aandoen	4.482	1.027	doctor's coat	putting on	putting on a doctor's coat
gitaar spelen	4.482	0.738	guitar	playing	playing the guitar
pokerface oefenen	4.536	0.972	poker face	practicing	practicing one's poker face
lawaai maken	4.536	1.008	noise	making	making noise
marathon lopen	4.554	0.829	marathon	walking	running a marathon
grapjes maken	4.607	0.755	jokes	making	telling jokes
liedje fluiten	4.607	0.888	song	whistling	whistling a song
postzegels organiseren	4.696	1.060	stamps	organizing	stamps
trainingsplan uitwerken	4.768	0.972	training plan	working out	developing a training plan
broek afritsen	4.768	1.279	pants	zipping off	zipping off one's pants
afval wegbrengen	4.786	1.187	garbage	taking away	disposing of garbage
parachute openen	4.857	0.943	parachute	opening	opening the parachute
uniform aandoen	4.857	0.980	uniform	putting on	putting on a uniform
gaspedaal indrukken	4.893	1.021	accelerator pedal	pushing in	pressing on the gas
vogels spotten	4.893	1.021	birds	spotting	bird watching
muren verven	4.929	0.970	walls	painting	painting walls
goocheltrucs oefenen	4.946	0.724	magic tricks	practicing	practicing magic tricks
klimschoenen aandoen	4.964	0.972	climbing shoes	putting on	putting on climbing shoes
woede afreageren	4.964	0.934	anger	abreacting	to vent one's anger
buit verstoppen	4.964	1.061	loot	hiding	hiding the loot
berg beklimmen	5.036	0.914	mountain	climbing	climbing a mountain
basgitaar stemmen	5.054	0.818	bass guitar	tuning	tuning a bass guitar
stripverhalen lezen	5.054	0.749	comics	reading	reading comics
inzet verhogen	5.054	0.840	bet	increasing	increasing the bet
veldbed opzetten	5.071	1.042	camp bed	setting up	setting up a camp bed
maten waarschuwen	5.071	1.219	pals	warning	warning one's pals
tent opzetten	5.071	0.931	tent	setting up	pitching a tent
werkbroek aandoen	5.089	0.978	overalls	putting on	putting on overalls
wiet roken	5.089	0.940	weed	smoking	smoking weed
fietsbanden oppompen	5.107	0.985	bicycle tires	inflating	inflating bicycle tires
spareribs eten	5.107	0.985	spare ribs	eating	eating spare ribs
surfplank waxen	5.125	1.028	surf board	waxing	waxing a surf board
drugs smokkelen	5.143	1.034	drugs	smuggling	smuggling drugs

golfbal slaan	5.161	0.781	golf ball	hitting	hitting a golf ball
zeilen hijsen	5.161	0.930	sails	hoisting	hoisting the sails
scheerapparaat reinigen	5.179	1.503	razor	cleaning	cleaning a razor
weddenschap afsluiten	5.179	0.897	bet	shutting down	placing a bet
keu krijten	5.179	1.208	cue	chalking	chalking a pool stick
metal luisteren	5.214	1.004	metal	listening	listening to metal music
club toejuichen	5.250	0.939	club	cheering on	cheering on a sports team
golfclubs poetsen	5.268	0.944	golf clubs	cleaning	cleaning golf clubs
vliegtuigjes vouwen	5.304	0.872	planes	folding	folding paper planes
auto wassen	5.304	1.008	car	washing	washing a car
bier drinken	5.321	0.956	beer	drinking	having a beer
superheldenfilm kijken	5.357	0.862	super hero movie	watching	watching a super hero movie
paintball spelen	5.357	0.903	paint ball	playing	playing paint ball
western kijken	5.357	0.923	western	watching	watching a western movie
geld vergokken	5.357	0.862	money	gambling away	gambling away money
blikje adten	5.357	0.923	can	chugging	chugging a can
bierglas leegdrinken	5.375	0.906	beer glass	drinking empty	finishing one's beer
legerkistjes poetsen	5.411	1.203	combat boots	cleaning	cleaning combat boots
ontvoering plannen	5.429	1.189	kidnapping	planning	planning a kidnapping
gras maaien	5.429	0.931	grass	mowing	mowing the lawn
krachtoefeningen doen	5.446	0.913	strength exercises	doing	doing strength exercises
computerspelletjes spelen	5.446	0.913	computer games	playing	playing computer games
stormschade opruimen	5.446	1.043	storm damage	cleaning up	cleaning up storm damages
sneeuw scheppen	5.446	0.952	snow	shoveling	shoveling snow
fietsband plakken	5.464	0.953	bicycle tire	sticking	patching a bicycle tire
aandelen verkopen	5.500	0.972	shares	selling	selling shares
mountainbike afstellen	5.518	0.972	mountain bike	adjusting	adjusting a mountain bike
voetbalschoenen aandoen	5.518	0.914	soccer shoes	putting on	putting on soccer shoes
pet opdoen	5.518	0.853	cap	putting on	putting on a cap
hengel uitwerpen	5.536	0.972	fishing rod	ejecting	casting out a fishing rod
bokshandschoenen aandoen	5.571	0.912	boxing gloves	putting on	putting on boxing gloves
vriendinnetje zoenen	5.589	1.262	girlfriend	kissing	kissing one's girlfriend
vuurwerk afsteken	5.589	0.869	fireworks	standing out	lighting fireworks
push-ups doen	5.589	0.949	push-ups	doing	doing push-ups

sportauto parkeren	5.607	0.966	sports car	parking	parking a sports car
racefiets opknappen	5.625	1.105	racing bike	fixing up	fixing up a racing bike
vogelhuisje timmeren	5.625	0.926	birdhouse	woodworking	building a birdhouse
Ferrari bewonderen	5.643	0.943	Ferrari	admiring	admiring a Ferrari
whisky drinken	5.643	0.903	whiskey	drinking	drinking whiskey
controller wegsmijten	5.661	1.083	controller	throwing away	throwing away a game controller
voetbalwedstrijd kijken	5.679	0.855	soccer game	watching	watching a soccer game
visnet uitgooien	5.679	0.993	fishing net	throwing out	throwing out a fishing net
skateboardtrucs doen	5.696	0.913	skateboard tricks	doing	doing skateboard tricks
meubels monteren	5.696	0.971	furniture	assembling	assembling furniture
geweer laden	5.696	0.933	gun	loading	loading a gun
motorvakantie plannen	5.714	0.909	motorcycle vacation	planning	planning a motorcycle vacation
boomhut bouwen	5.714	0.847	treehouse	building	building a treehouse
bankoverval voorbereiden	5.732	1.036	bank robbery	preparing	preparing a bank robbery
bokszak ophangen	5.750	0.958	boxing bag	hanging up	hanging up boxing bag
biljart spelen	5.750	0.919	billiards	playing	playing billiards
barbecue aansteken	5.768	0.874	barbecue	lighting	lighting a barbecue
gereedschap klaarleggen	5.786	0.967	tools	laying out	laying out tools
bouwhelm vastmaken	5.804	0.840	construction helmet	attaching	fastening a construction helmet
zwembroek aandoen	5.804	1.119	swimming pants	putting on	putting on a swimsuit
oliepeil controleren	5.804	0.942	oil level	checking	checking the oil level
biceps trainen	5.804	0.903	biceps	training	training one's biceps
lasbril opdoen	5.821	0.855	welding goggles	putting on	putting on welding goggles
modelvliegtuig starten	5.821	1.011	model airplane	starting	starting a model airplane
bokswedstrijd kijken	5.821	1.011	boxing match	watching	watching a boxing match
gewichten heffen	5.821	0.897	weights	lifting	lifting weights
overhemd aandoen	5.839	0.890	shirt	putting on	putting on a shirt
planken zagen	5.857	0.862	planks	sawing	cutting boards
voetbaltrucs oefenen	5.893	0.824	soccer tricks	practicing	practicing soccer tricks
autobanden verwisselen	5.893	0.802	car tires	swap	changing car tires
schoorsteen vegen	5.893	0.928	chimney	sweeping	sweeping a chimney
pistool reinigen	5.893	0.985	pistol	cleaning	cleaning a gun

voetbalplaatjes uitwisselen	5.911	0.859	soccer images	exchanging	trading soccer cards
hout zagen	5.911	0.959	wood	sawing	sawing wood
das strikken	5.911	1.164	tie	tying	tying a tie
modeltreinen besturen	5.929	0.931	model trains	driving	playing with model trains
bekabeling controleren	5.929	0.912	wiring	checking	check the wiring
borstspieren trainen	5.946	0.883	chest muscles	training	training one's chest muscles
tafel timmeren	5.946	0.903	table	woodworking	building a table
haargel indoen	5.964	0.894	hair gel	putting in	putting in hair gel
muur afbreken	5.982	0.904	wall	tearing down	tearing down a wall
bier brouwen	5.982	0.924	beer	brewing	brewing beer
scooter opvoeren	6.000	0.874	scooter	tuning	tuning a scooter
sigaar roken	6.000	0.934	cigar	smoking	smoking a cigar
pak aandoen	6.000	0.831	suit	putting on	putting on a suit
bouwklus afronden	6.018	0.798	building job	finishing	finishing a building job
bierbuik wegwerken	6.018	1.018	beer belly	getting rid of	getting rid of one's beer belly
hout hakken	6.018	0.820	wood	chopping	chopping wood
Formule 1 kijken	6.036	0.873	Formula 1	watching	watching Formula 1
auto repareren	6.054	0.903	car	repairing	repairing a car
tanks bewonderen	6.071	0.783	tanks	admiring	admiring army tanks
tractor repareren	6.089	0.978	tractor	repairing	repairing a tractor
sloopwerk doen	6.125	0.896	demolition work	doing	doing demolition work
pijp roken	6.161	0.949	pipe	smoking	smoking a pipe
dak repareren	6.179	0.855	roof	repairing	repairing the roof
beton gieten	6.214	0.868	concrete	pouring	pouring concrete
borst scheren	6.304	0.851	chest	shaving	shaving one's chest
snor scheren	6.393	0.846	moustache	shaving	shaving one's moustache
Playboy lezen	6.411	0.733	Playboy	reading	reading the Playboy
mannenavond plannen	6.804	0.553	men's night	planning	planning a guys' night out

Table A7. Activities used for stimuli with mean rating and standard deviation on a 7-point scale (1=female, 7=male).

Female stereotype	*M*	*SD*	Male stereotype	*M*	SD	Neutral stereotype	*M*	SD
breiwerk afmaken 'finishing the knitwork'	1.71	0.73	*dak repareren* 'repairing the roof'	6.18	0.86	*gordel vastmaken* 'fastening the seat belt'	3.80	0.48
wenkbrauwen epileren 'plucking one's eyebrows'	1.77	0.85	*pijp roken* 'smoking a pipe'	6.16	0.95	*schoenen aandoen* 'putting on shoes'	3.84	0.68
oorbellen indoen 'putting on earrings'	1.91	0.90	*auto repareren* 'repairing a car'	6.05	0.90	*jas aandoen* 'putting on a coat'	3.88	0.54
balletschoenen aantrekken 'putting on ballet shoes'	1.93	0.78	*bouwklus afronden* 'finishing a building job'	6.02	0.80	*lunch eten* 'having lunch'	3.88	0.54
naam borduren 'needlepointing a name'	1.93	0.83	*pak aandoen* 'putting on a suit'	6.00	0.83	*telefoon opladen* 'charging one's phone'	3.88	0.54
sieraden opbergen 'putting away jewelry'	1.98	0.90	*sigaar roken* 'smoking a cigar'	6.00	0.93	*bagage inchecken* 'checking in luggage'	3.89	0.95
roddelblad lezen 'reading a gossip magazine'	2.09	0.75	*borstspieren trainen* 'training one's chest muscles'	5.95	0.88	*cijfers bekijken* 'checking one's grades'	3.89	0.73
naaimachine klaarzetten 'setting up a sewing machine'	2.11	0.89	*autobanden verwisselen* 'changing car tires'	5.89	0.80	*rooster samenstellen* 'putting together a schedule'	3.89	0.93
pirouettes oefenen 'practicing pirouettes'	2.11	0.78	*pistool reinigen* 'cleaning a gun'	5.89	0.98	*tanden poetsen* 'brushing one's teeth'	3.89	0.37
haar verven 'dyeing one's hair'	2.13	0.92	*voetbaltrucs oefenen* 'practicing soccer tricks'	5.89	0.82	*tentamen maken* 'taking an exam'	3.89	0.49
cupcakes versieren 'decorating cupcakes'	2.16	0.87	*bouwhelm vastmaken* 'fastening a construction helmet'	5.80	0.84	*antwoord opschrijven* 'writing down the answer'	3.91	0.48
oksels scheren 'shaving one's armpits'	2.16	0.91	*oliepeil controleren* 'checking the oil level'	5.80	0.94	*rijlessen inplannen* 'scheduling driving lessons'	3.93	0.81

dagcrème aanbrengen 'applying day cream'	2.27	1.00	*gereedschap klaarleggen* 'laying out tools'	5.79	0.97	*paspoort zoeken* 'looking for one's passport'	4.00	0.97
dagboek bijhouden 'keeping a diary'	2.30	0.87	*motorvakantie plannen* 'planning a motorcycle vacation'	5.71	0.91	*neus snuiten* 'blowing one's nose'	4.02	0.45
paard borstelen 'grooming a horse'	2.32	0.86	*geweer laden* 'loading a gun'	5.70	0.93	*stembiljet invullen* 'marking a ballot'	4.02	0.77
yogaoefeningen doen 'doing yoga exercises'	2.36	0.88	*sportauto parkeren* 'parking a sports car'	5.61	0.97	*wachtwoord wijzigen* 'changing one's password'	4.02	0.84
horoscoop lezen 'reading the horoscope'	2.38	0.84	*bokshandschoenen aandoen* 'putting on boxing gloves'	5.57	0.91	*CV opstellen* 'drafting a resume'	4.04	0.91
calorieën opschrijven 'writing down calories'	2.45	0.97	*hengel uitwerpen* 'casting out a fishing rod'	5.54	0.97	*patiënten behandelen* 'treating patients'	4.07	0.76
hart uitstorten 'pouring one's heart out'	2.50	0.91	*mountainbike afstellen* 'adjusting a mountain bike'	5.52	0.97	*veters strikken* 'tying one's shoelaces'	4.07	0.50
kaarsen aansteken 'lighting candles'	2.59	0.91	*voetbalschoenen aandoen* 'putting on soccer shoes'	5.52	0.91	*ski's aandoen* 'putting on skis'	4.16	0.53
relatieproblemen bespreken 'discussing relationship problems'	2.63	0.93	*krachtoefeningen doen* 'doing strength exercises'	5.45	0.91	*koffie opdrinken* 'finishing the coffee'	4.18	0.74
thee drinken 'drinking tea'	2.82	0.86	*blikje adten* 'chugging a can'	5.36	0.92	*laptop opstarten* starting up a laptop'	4.18	0.69
outfit samenstellen 'putting together an outfit'	2.86	0.77	*tent opzetten* 'pitching a tent'	5.07	0.93	*werkmails beantwoorden* 'answering work e-mails'	4.20	0.70
was doen 'doing laundry'	2.88	0.95	*inzet verhogen* 'increasing the bet'	5.05	0.84	*fiets stallen* 'storing a bike'	4.25	0.77
TOTAL	2.26	0.33	*TOTAL*	5.73	0.3	*TOTAL*	3.99	0.1

Pre-tests

Pre-test 1: Plausibility

The goal of this pre-test was to test the plausibility of the scenarios described in all potential stimuli and to select those with the highest plausibility rating for the eye-tracking experiment. Put differently, we wanted to avoid that some stimuli described situations which were deemed unlikely – as opposed to others – and this in turn leading to increased reading times.

Twenty-four native Dutch speakers (three male) completed the online questionnaire. They ranged in age from 18 to 29 (M = 21.1). Nineteen participants could be recruited from the Radboud Research Participation System SONA and received credit for participation. The remaining five participants had responded to a participant call on *Facebook* and did not receive any reimbursement.

In order for the pronoun *zijn* 'his' not to bias participants, all stimuli were presented in the control condition. Furthermore, stimuli featuring male stereotype contexts made reference to *a few men* performing the action, while stimuli featuring female stereotype contexts referred to *a few women* performing the action. This was done to make sure that participants rated the context itself and not a potential gender mismatch. Half of the stimuli with neutral stereotype contexts featured male referents and female referents, respectively. Participants were evenly distributed across two lists, which were created so that each potential neutral stimulus occurred with a female and a male continuation half of the time. This design would allow to adapt or exclude neutral stimuli from the eye-tracking experiment for which a female or male referent was perceived as more plausible regardless of the experimental manipulation.

In addition, 30 control items were created, which were intentionally implausible. Half of the controls featured stereotypically female contexts with female continuations and stereotypically male contexts with male continuations, respectively. The stereotype contexts were taken from the rating study above, but were different from the contexts used in the experimental stimuli. All items had to be rated on a 7-point Likert scale. Participants were instructed to indicate for each stimulus how likely they thought the described situation was to occur. *1* stood for *very unlikely*, while *7* stood for *very likely*. The pre-test was administered through Qualtrics (2018).

Results and selection of experimental stimuli

The average rating of the neutral stimuli ranged between 4.38 (SD = 1.91) and 5.96 (SD = 1). Out of the 32 potential neutral stimuli, the 24 best were selected for the eye-tracking experiment. These 24 neutral stimuli all had received an overall average plausibility rating higher than 4.5. Furthermore, the mean plausibility of all chosen stimuli

considering only female continuations or only male continuations exceeded 4.5 as well. The only exception is the stimulus featuring the activity *tanden poetsen* 'brushing teeth', which only received a rating of 4 when featuring the female continuation, but a rating of 5.08 when featuring the male continuation. The sentence refers to men or women who had not been to the dentist *in years*. This was thought to be the source of the generally low rating, as well as the even lower rating for the stimulus variant featuring women, and was therefore changed to *one year* - an arguably more plausible scenario.

Stereotypically female and male contexts were only presented with gender-congruent continuations. The average rating for male stimuli ranged from 4.2 (*SD* = 1.47) to 6.13 (*SD* = 1.12). For female stimuli, ratings ranged from 4.25 (*SD* = 1.98) to 6.42 (*SD* = 0.76). As with the neutral contexts, 24 out of the 32 potential male and 24 out of the potential female stimuli with an average plausibility rating above 4.5 were chosen for the eye-tracking experiment. The overall item means can be seen in the table below.

Table A8. Mean plausibility rating, standard deviation and range per stereotype context for all 96 possible stimuli and the final selection of 72 stimuli with highest ratings.

	Data set					
	96 stimuli			*72 stimuli*		
Stereotype	*M*	*SD*	range	*M*	*SD*	range
female	5.42	1.44	[4.25; 6.42]	5.49	1.40	[4.67; 6.42]
male	5.24	1.48	[4.21; 6.13]	5.36	1.47	[4.54; 6.13]
neutral	5.39	1.45	[4.38; 5.96]	5.52	1.36	[4.54; 5.96]

As intended, the controls were judged as less plausible than the (potential) stimuli and stimulated participants to use the low extreme of the scale, with ratings ranging from 1.13 (*SD* = 0.45) to 3.04 (*SD* = 1.83).

Pre-test 2: Membership

The aim of this pre-test was to determine whether the noun phrases *enkele mannen* 'some men' and *enkele vrouwen* 'some women' would actually be interpreted as being part of the group previously introduced by *iedereen* 'everyone'. If this were not the case, no valid conclusions regarding the effect of the pronoun *zijn* 'his' could be drawn based on the eye-tracking data. Thus, as the pronoun *zijn* 'his' is introduced in reference to *iedereen* 'everyone', the pronoun would not be interpreted as relating to the men or women referred to in the second sentence *if* a membership reading had not been established. Therefore, the grammatically masculine gender of *zijn* 'his' would not be expected to affect the processing of the noun phrases *enkele mannen* 'some men' and *enkele vrouwen* 'some women'. We tested three possible connectives: *zo ook* 'also' (literally 'so also') versus *waaronder* 'among whom' versus *net als* 'just like'. *Net als*

'just like' served as a baseline as its semantics should evoke a membership reading only to a limited extent, but introduce a new set of people instead.

Twenty-four participants (four male) completed this online pre-test. They were between 18 and 22 years old ($M = 19.8$). Participants were recruited through the Radboud Research Participation System SONA and received credit for participation.

The pre-test was carried out with 32 potential stimuli (24 of which would be used in the eye-tracking experiment), which were all neutral to make sure that the participants' ratings are not influenced by their knowledge of stereotypes. The possessive pronouns *zijn* and *hun* were removed from the stimuli and – depending on what sounded natural – a determiner was inserted instead, or the position was left unfilled. This was to make sure that the membership reading would not be influenced by the masculine gender of the pronoun *zijn* 'his'. Several characteristics of the stimuli were varied, resulting in four lists; across all lists, twelve of the stimuli featured the connective *zo ook* 'also' , twelve featured *waaronder* 'among whom' and eight featured *net als* 'just like'. For each participant, half the sentences were presented in the experimental condition, in which the group was introduced by *iedereen* 'everyone', while the other half was presented in the control condition, in which the group was introduced by *ze* 'they'.

The second pre-test was also administered through Qualtrics (2018). Participants were asked to rate the 32 items on a 7-point Likert scale and to indicate their interpretation of each stimulus: is the group of women or men mentioned later on in the sentence part of the group mentioned at the very beginning? *1* meant that they surely were not part of this group, *7* meant that they surely were part of this group. Table A9 shows the results, based on which we were confident that a membership reading could best be achieved by means of *waaronder* 'among whom'.

Table A9. Mean membership ratings and standard deviations per connective.

Connective	***M***	***SD***
net als	4.93	1.98
zo ook	5.29	1.67
waaronder	5.71	1.27

Additional plot Experiment 1

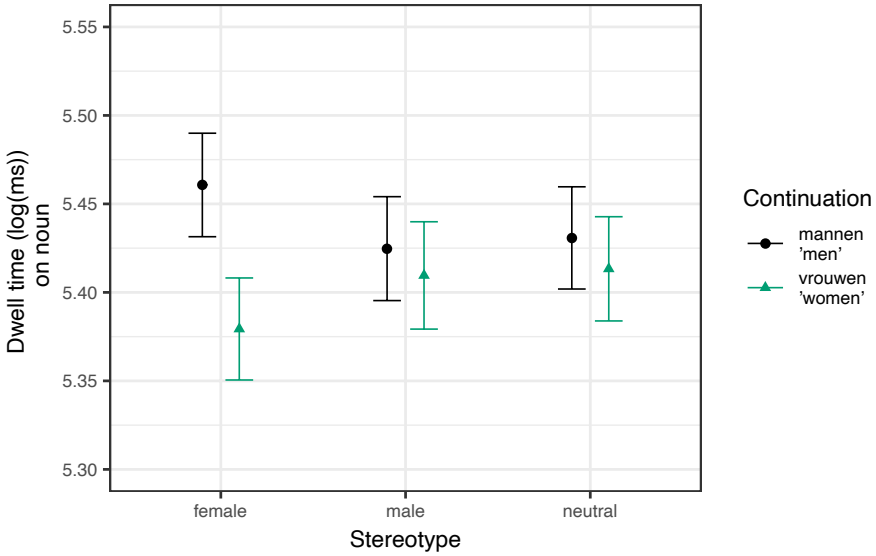

Figure A1. Mean log-transformed first run dwell time on Region 2 (noun) with 95% within-subject confidence intervals based on Morey (2008).

Model summaries Experiment 1 & 2

Table A10. Experiment 1: Fixed-effect coefficients β, their t-scores, uncorrected p-values and the FDR threshold for the fixed effect in question. P-values which fall below the FDR threshold are in bold.

Region 1: Quantifier - first run dwell time				
	β	t	p	FDR threshold
Intercept	5.37	395.66	**<0.001**	0.050
Pronoun	0.01	0.42	0.678	0.006
Continuation	0.00	0.37	0.710	0.006
Participant gender	-0.03	-1.05	0.296	0.006
Pronoun * Continuation	-0.04	-1.51	0.131	0.006
Pronoun * Participant gender	0.04	1.23	0.220	0.006
Continuation * Participant gender	-0.03	-1.11	0.279	0.006
Pronoun * Continuation * Participant gender	0.16	3.07	**0.002**	0.006

Region 1: Quantifier - regression path duration				
	β	t	p	FDR threshold
Intercept	5.53	320.90	**<0.001**	0.050
Pronoun	0.03	1.53	0.140	0.006
Continuation	0.01	0.71	0.478	0.006
Participant gender	-0.07	-1.97	0.052	0.006
Pronoun * Continuation	-0.04	-1.06	0.292	0.006
Pronoun * Participant gender	0.02	0.40	0.690	0.006
Continuation * Participant gender	-0.05	-1.26	0.222	0.006
Pronoun * Continuation * Participant gender	0.17	2.06	0.042	0.006

Region 1: Quantifier - dwell time				
	β	t	p	FDR threshold
Intercept	5.56	327.62	**<0.001**	0.050
Pronoun	0.01	0.38	0.705	0.006
Continuation	0.00	-0.01	0.990	0.006
Participant gender	-0.12	-3.41	**0.001**	0.006
Pronoun * Continuation	0.06	1.54	0.125	0.006
Pronoun * Participant gender	0.01	0.21	0.838	0.006
Continuation * Participant gender	-0.10	-2.50	0.014	0.006
Pronoun * Continuation * Participant gender	0.08	1.05	0.294	0.006

Region 2: Noun - first run dwell time				
	β	*t*	*p*	FDR threshold
Intercept	5.27	403.57	**<0.001**	0.050
Pronoun	0.02	1.44	0.149	0.006
Continuation	-0.04	-2.13	0.043	0.006
Participant gender	-0.05	-1.96	0.053	0.006
Pronoun * Continuation	-0.02	-0.64	0.528	0.006
Pronoun * Participant gender	0.00	0.02	0.982	0.006
Continuation * Participant gender	-0.02	-0.49	0.627	0.006
Pronoun * Continuation * Participant gender	0.03	0.49	0.624	0.006

Region 2: Noun - regression path duration				
	β	*t*	*p*	FDR threshold
Intercept	5.38	255.91	**<0.001**	0.050
Pronoun	0.03	1.40	0.161	0.006
Continuation	-0.04	-1.61	0.111	0.006
Participant gender	-0.06	-1.57	0.120	0.006
Pronoun * Continuation	0.03	0.73	0.475	0.006
Pronoun * Participant gender	-0.04	-1.10	0.271	0.006
Continuation * Participant gender	-0.08	-1.51	0.142	0.006
Pronoun * Continuation * Participant gender	-0.05	-0.60	0.551	0.006

Region 2: Noun - dwell time				
	β	*t*	*p*	FDR threshold
Intercept	5.42	284.89	**<0.001**	0.050
Pronoun	0.00	-0.12	0.904	0.006
Continuation	-0.02	-0.69	0.494	0.006
Participant gender	-0.09	-2.55	0.013	0.006
Pronoun * Continuation	-0.01	-0.13	0.897	0.006
Pronoun * Participant gender	0.00	0.05	0.960	0.006
Continuation * Participant gender	-0.04	-0.74	0.467	0.006
Pronoun * Continuation * Participant gender	-0.04	-0.50	0.620	0.006

Region 3: Spillover - first run dwell time				
	β	*t*	*p*	FDR threshold
Intercept	5.40	359.54	**<0.001**	0.050
Pronoun	0.02	1.15	0.263	0.006
Continuation	0.03	1.55	0.137	0.006

Participant gender	-0.01	-0.43	0.667	0.006
Pronoun * Continuation	-0.04	-1.17	0.245	0.006
Pronoun * Participant gender	0.03	0.99	0.324	0.006
Continuation * Participant gender	-0.04	-1.41	0.163	0.006
Pronoun * Continuation * Participant gender	-0.03	-0.33	0.741	0.006

Region 3: Spillover - regression path duration

	β	*t*	*p*	FDR threshold
Intercept	5.47	331.77	**<0.001**	0.050
Pronoun	0.01	0.54	0.597	0.006
Continuation	0.03	1.42	0.167	0.006
Participant gender	-0.02	-0.51	0.611	0.006
Pronoun * Continuation	-0.03	-0.87	0.386	0.006
Pronoun * Participant gender	0.01	0.25	0.802	0.006
Continuation * Participant gender	-0.08	-1.93	0.054	0.006
Pronoun * Continuation * Participant gender	-0.02	-0.26	0.797	0.006

Region 3: Spillover - dwell time

	β	*t*	*p*	FDR threshold
Intercept	5.55	287.58	**<0.001**	0.050
Pronoun	0.02	1.12	0.267	0.006
Continuation	0.02	0.65	0.520	0.006
Participant gender	-0.07	-1.93	0.056	0.006
Pronoun * Continuation	0.00	-0.06	0.950	0.006
Pronoun * Participant gender	0.01	0.21	0.835	0.006
Continuation * Participant gender	-0.01	-0.32	0.753	0.006
Pronoun * Continuation * Participant gender	0.03	0.25	0.805	0.006

Table A11. Experiment 1: Extended analysis to all stereotype contexts for male participants only. Fixed-effect coefficients β, their t-scores, uncorrected p-values and the FDR threshold for the fixed effect in question. The FDR threshold was calculated by ordering the p-values of the three effects of interest (shown in bold). P-values which fall below the FDR threshold are in bold.

Region 1: Quantifier - first run dwell time				
	β	t	p	FDR threshold
Intercept	5.38	293.58	**<0.001**	NA
Pronoun	0.002	0.15	0.884	NA
Continuation	0.01	0.47	0.642	NA
Stereotype (*female* vs. *neutral*)	-0.01	-0.48	0.634	NA
Stereotype (*male* vs. *neutral*)	-0.002	-0.14	0.891	NA
Pronoun * Continuation	-0.03	-1.07	0.285	0.017
Pronoun * Stereotype (*female* vs. *neutral*)	0.01	0.27	0.786	NA
Pronoun * Stereotype (*male* vs. *neutral*)	0.03	0.77	0.443	NA
Continuation * Stereotype (*female* vs. *neutral*)	-0.06	-1.89	0.059	NA
Continuation * Stereotype (*male* vs. *neutral*)	0.01	0.46	0.644	NA
Pronoun * Continuation * Stereotype (*female* vs. *neutral*)	0.15	2.37	0.018	0.017
Pronoun * Continuation * Stereotype (*male* vs. *neutral*)	0.12	1.91	0.059	0.017

Table A12. Experiment 2: Fixed-effect coefficients *β*, their *t*-scores and *p*-values shown for response type and response time.

Response			
	β	*z*	*p*
Intercept	2.90	17.07	**<0.001**
Stereotype (*female* vs. *neutral*)	-0.24	-1.25	0.210
Stereotype (*male* vs. *neutral*)	-0.36	-1.87	0.061
Continuation	-0.02	-0.10	0.921
Participant gender	0.38	1.24	0.214
Continuation * Stereotype (*female* vs. *neutral*)	0.11	0.36	0.718
Continuation * Stereotype (*male* vs. *neutral*)	-0.06	-0.20	0.845
Stereotype (*female* vs. *neutral*) * Participant gender	0.27	1.05	0.296
Stereotype (*male* vs. *neutral*) * Participant gender	0.26	1.04	0.297
Continuation * Participant gender	0.17	0.49	0.626
Continuation * Stereotype (*female* vs. *neutral*) * Participant gender	-0.22	-0.45	0.655
Continuation * Stereotype (*male* vs. *neutral*) * Participant gender	-0.39	-0.78	0.434

Response time			
	β	*t*	*p*
Intercept	7.72	208.75	**<0.001**
Stereotype (*female* vs. *neutral*)	-0.03	-0.94	0.351
Stereotype (*male* vs. *neutral*)	-0.04	-1.21	0.230
Continuation	0.00	0.12	0.905
Participant gender	0.03	0.47	0.642
Continuation * Stereotype (*female* vs. *neutral*)	-0.05	-1.83	0.072
Continuation * Stereotype (*male* vs. *neutral*)	0.02	0.78	0.435
Stereotype (*female* vs. *neutral*) * Participant gender	0.00	0.16	0.873
Stereotype (*male* vs. *neutral*) * Participant gender	0.02	0.74	0.460
Continuation * Participant gender	-0.04	-1.84	0.066
Continuation * Stereotype (*female* vs. *neutral*) * Participant gender	0.01	0.20	0.840
Continuation * Stereotype (*male* vs. *neutral*) * Participant gender	0.00	-0.05	0.961

Chapter 4

Stimuli

Table A13. Stimuli for the experiment reported in Chapter 4. All stimuli are provided in the conceptually singular experimental condition featuring *iemand* 'someone' with a female continuation.

Nr.	Stimulus
1	Iemand met een verlopen bankpas moet opnieuw zijn pasje aanvragen, zo ook de vrouw bij de pinautomaat die op dit moment geen geld kan opnemen.
2	Iemand met een gebroken duim kan slecht zijn veters strikken, zo ook de vrouw op de stoep die hulp krijgt van een voorbijganger.
3	Iemand met een zware koffer moet voorzichtig zijn bagage tillen, zo ook de vrouw op de roltrap die geen rugklachten wil krijgen.
4	Iemand met een fulltime baan zal altijd zijn weekend waarderen, zo ook de vrouw in het kopieerhok die alweer uitkijkt naar komende zaterdag.
5	Iemand met een grote mond moet soms zijn woorden inslikken, zo ook de vrouw op de verjaardag die zich nog net in wist te houden.
6	Iemand met een slechte rug zal regelmatig zijn stoel verstellen, zo ook de vrouw op het werk die maar geen fijne houding kan vinden.
7	Iemand met een langdurige blessure moet zorgvuldig zijn oefeningen doen, zo ook de vrouw op het kantoor die al wekenlang last heeft van een opgerekte enkelband.
8	Iemand met een ernstige aandoening moet geregeld zijn medicijnen innemen, zo ook de vrouw in het ziekenhuis die last heeft van een hartritmestoornis.
9	Iemand met een goede talenkennis kan makkelijk zijn teksten schrijven, zo ook de vrouw achter de computer die moeiteloos een Engels artikel in elkaar zet.
10	Iemand met een persoonlijke OV-chipkaart moet eenmalig zijn pasfoto uploaden, zo ook de vrouw voor de webcam die hiervoor een geschikte foto probeert te maken.
11	Iemand met een eigen auto moet regelmatig zijn brandstof bijvullen, zo ook de vrouw bij het tankstation die maandelijks veel geld kwijt is aan benzine.
12	Iemand met een vrije dag kan zelf zijn tijd indelen, zo ook de vrouw in de stad die al twintig minuten koffie zit te drinken.
13	Iemand met een slechte knie moet soms zijn krachten sparen, zo ook de vrouw in het bos die al na een kwartiertje lopen toe is aan een pauze.
14	Iemand met een briljante uitvinding moet snel zijn idee patenteren, zo ook de vrouw in het lab die net een baanbrekende ontdekking heeft gedaan.
15	Iemand met een heftige voedselallergie moet vaak zijn dieetwensen toelichten, zo ook de vrouw in het restaurant die overgevoelig is voor melkproducten.

16 Iemand met een slecht gehoor zal meestal zijn gehoorapparaat dragen, zo ook de vrouw in het café die moeite heeft om anders gesprekken te volgen.

17 Iemand met een belangrijke functie mag vaak zijn kosten declareren, zo ook de vrouw in de lobby die alweer voor het werk naar het buitenland moet.

18 Iemand met een lichte huid moet vaak zijn lichaam insmeren, zo ook de vrouw op het strand die nu al erg rode schouders heeft.

19 Iemand met een eigen bedrijf moet regelmatig zijn e-mail checken, zo ook de vrouw achter de laptop die al vijf jaar een goedlopende webwinkel beheert.

20 Iemand met een drukke briefwisseling zal geregeld zijn brieven versturen, zo ook de vrouw in het postkantoor die deze maand al drie keer iets heeft gepost.

21 Iemand met een kunstzinnige hobby zal vaak zijn schetsblok meenemen, zo ook de vrouw op de camping die twee uur lang aan een tekening heeft gewerkt.

22 Iemand met een druk schema zal vaak zijn agenda bijwerken, zo ook de vrouw op het station die al voor het middaguur drie afspraken heeft gehad.

23 Iemand met een goede feitenkennis kan goed zijn mening onderbouwen, zo ook de vrouw op de radio die geïnterviewd wordt over de kabinetsplannen.

24 Iemand met een zware depressie kan moeilijk zijn bed uitkomen, zo ook de vrouw uit de straat die vandaag helaas een bijzonder slechte dag heeft.

25 Iemand met een winnend lot zal snel zijn prijs ophalen, zo ook de vrouw in de Primera die al voor de derde keer dit jaar geld heeft gewonnen.

26 Iemand met een besmettelijke ziekte moet grondig zijn handen wassen, zo ook de vrouw in de toiletten die al voor de derde keer deze ochtend staat te schrobben.

27 Iemand met een decadente levensstijl zal vaak zijn salaris verbrassen, zo ook de vrouw in de bistro die al het vierde glas dure wijn bestelt.

28 Iemand met een dure smaak zal vaak zijn bankrekening plunderen, zo ook de vrouw op de woonboulevard die voor veel te veel geld een mooie leren bank koopt.

29 Iemand met een extravert karakter zal gemakkelijk zijn wensen uiten, zo ook de vrouw aan de bar die de ober om een specifieke tafel heeft gevraagd.

30 Iemand met een absoluut gehoor kan snel zijn instrument stemmen, zo ook de vrouw op het conservatorium die nog nooit een stemvork nodig heeft gehad.

31 Iemand met een grote schuld moet uiteindelijk zijn rekeningen betalen, zo ook de vrouw in de bijstand die al jarenlang te maken heeft met incassobureaus.

32 Iemand met een hoge hypotheek wil graag zijn rente verlagen, zo ook de vrouw bij de bank die de beschikbare opties komt bespreken.

33 Iemand met een klein pensioen zal tijdig zijn belastingaangifte doen, zo ook de vrouw in het bejaardentehuis die hier hulp bij krijgt van een van de verzorgers.

34 Iemand met een laag inkomen moet zorgvuldig zijn uitgaven plannen, zo ook de vrouw bij de voedselbank die deze maand nauwelijks geld meer heeft voor boodschappen.

35 Iemand met een moeilijke achternaam moet regelmatig zijn naam spellen, zo ook de vrouw bij de balie die een groot pakket komt afhalen.

36 Iemand met een onzichtbare handicap moet vaak zijn beperking uitleggen, zo ook de vrouw in de bus die al door twee ouderen gevraagd is om op te staan.

37 Iemand met een rijke fantasie zal weleens zijn omgeving vergeten, zo ook de vrouw in de trein die door het dagdromen het station gemist heeft.

38 Iemand met een kapot toetsenbord kan slecht zijn documenten typen, zo ook de vrouw in de Mediamarkt die daarom een nieuwe laptop aan het uitzoeken is.

39 Iemand met een slecht gebit moet grondig zijn tanden poetsen, zo ook de vrouw in de tandartsstoel die alweer enkele gaatjes heeft.

40 Iemand met een slechte reputatie zal hopelijk zijn gedrag veranderen, zo ook de vrouw in de discotheek die vaak te veel alcohol drinkt.

41 Iemand met een officieel huurcontract moet op tijd zijn huur overmaken, zo ook de vrouw in het flatgebouw die al eerder problemen heeft gehad met de huisbaas.

42 Iemand met een wild verleden moet eigenlijk zijn facebookpagina afschermen, zo ook de vrouw op het sollicitatiegesprek die al vaker is afgewezen vanwege foto's op internet.

43 Iemand met een zeldzame bloedgroep moet vaker zijn bloed doneren, zo ook de vrouw bij de bloedbank die daar al jarenlang een trouw bezoeker is.

44 Iemand met een grote ambitie wil graag zijn bekendheid vergroten, zo ook de vrouw in het atelier die al sinds de middelbare school een beroemd kunstenaar wil worden.

45 Iemand met een geweldig zangtalent moet goed zijn stem opwarmen, zo ook de vrouw in de kleedkamer die voor het concert een aantal stemoefeningen doet.

46 Iemand met een chronische ziekte mag altijd zijn recept herhalen, zo ook de vrouw bij de apotheek die al sinds de basisschool kampt met hevige astma.

47 Iemand met een fysieke beperking moet vaak zijn huis aanpassen, zo ook de vrouw in de rolstoel die een aannemer heeft ingehuurd om de drempels te verwijderen.

48 Iemand met een beperkte woordenschat zal vaker zijn woordenboek gebruiken, zo ook de vrouw bij het examen die al voor de vijfde keer een woord opzoekt.

49 Iemand met een belangrijke deadline moet op tijd zijn verslag afmaken, zo ook de vrouw achter het bureau die al de hele week verwoed zit te tikken.

50 Iemand met een groot verantwoordelijkheidsgevoel zal bijtijds zijn taken afronden, zo ook de vrouw in de werkkamer die tot diep in de nacht bezig is geweest.

51 Iemand met een heftig stotterprobleem moet regelmatig zijn spraakoefeningen doen, zo ook de vrouw voor de spiegel die moeite heeft met praten in alledaagse situaties.

52 Iemand met een gedeelde oprit moet weleens zijn auto verplaatsen, zo ook de vrouw voor de garage die vanochtend in alle haast dubbel geparkeerd heeft.

53 Iemand met een zittend beroep moet regelmatig zijn benen strekken, zo ook de vrouw op de promenade die iedere dag in de lunchpauze een ommetje maakt.

54 Iemand met een prille relatie kan plotseling zijn verkering uitmaken, zo ook de vrouw in het park die na twee maanden besloten heeft de relatie te beëindigen.

55 Iemand met een elektrische fiets moet bijtijds zijn accu opladen, zo ook de vrouw op het fietspad die door een lege accu alsnog hard moet trappen.

56 Iemand met een ongelukkig huwelijk wil graag zijn relatie verbeteren, zo ook de vrouw bij de therapiepraktijk die sinds een paar maanden professionele hulp zoekt.

57 Iemand met een flexibel contract kan zelf zijn uren indelen, zo ook de vrouw op het balkon die vanochtend lekker vrij heeft genomen.

58 Iemand met een kleine voorraadkast moet vaker zijn boodschappen doen, zo ook de vrouw in het winkelcentrum die dagelijks naar de supermarkt gaat.

59 Iemand met een sportieve instelling zal vaak zijn sportschool bezoeken, zo ook de vrouw op de loopband die minimaal twee keer per week traint.

60 Iemand met een groot acteertalent kan goed zijn leugens verbloemen, zo ook de vrouw aan de telefoon die wegkomt met het vertellen van een verzonnen verhaal.

61 Iemand met een laag gemiddelde wil graag zijn cijfers verbeteren, zo ook de vrouw bij de avondcursus die er alles aan doet om alsnog te slagen.

62 Iemand met een leuke bijbaan zal graag zijn diensten draaien, zo ook de vrouw op het terras die al jaren met plezier werkzaam is in de horeca.

63 Iemand met een lange vakantie kan even zijn stress vergeten, zo ook de vrouw in de duinen die er drie weken tussenuit is met het hele gezin.

64 Iemand met een trage computer zal weleens zijn geduld verliezen, zo ook de vrouw in de computerwinkel die een sneller model wil aanschaffen.

65 Iemand met een nieuwe pinpas kan tegenwoordig zijn pincode overslaan, zo ook de vrouw bij de kassa die alleen het pasje langs het apparaat hoeft te halen.

66 Iemand met een jonge hond moet zorgvuldig zijn huisdier africhten, zo ook de vrouw op de puppycursus die na weken intensief oefenen eindelijk vooruitgang boekt.

67	Iemand met een vast theaterabonnement zal hiermee zijn geld besparen, zo ook de vrouw in de schouwburg die haast elke maand een toneelstuk bezoekt.
68	Iemand met een drukke chatgroep zal regelmatig zijn telefoon negeren, zo ook de vrouw in de vergadering die al voor de tiende keer deze ochtend berichtjes binnenkrijgt.
69	Iemand met een eigen printer kan makkelijk zijn boardingpass printen, zo ook de vrouw bij de gate die nooit van de mobiele versie gebruik maakt.
70	Iemand met een minimale oogafwijking zal weleens zijn bril vergeten, zo ook de vrouw op kantoor die alleen tijdens het lezen een bril nodig heeft.
71	Iemand met een eigen parkeerplaats kan makkelijk zijn auto wegzetten, zo ook de vrouw in de Citroën die zo toch iedere dag een paar minuten bespaart.
72	Iemand met een vroege afspraak zal weleens zijn ontbijt overslaan, zo ook de vrouw op de snelweg die soms nog voor de ochtendspits de deur uit moet.

Pre-tests

Pre-test 1: Plausibility

The stimuli in this eye-tracking experiment feature generic statements made about groups of people sharing a certain feature (e.g., *having a fulltime job*). We wanted to test whether our stimuli were perceived as implausible, as this could have otherwise affected their generalizability and ultimately reading times.

A total of 24 participants (11 male) completed the plausibility pre-test. They were between 18 and 21 years old (M = 18.8) and native speakers of Dutch. They were all students at Radboud University and received course credit for their participation. The pre-test was distributed through Qualtrics (2018).

All 120 possible experimental items were presented in the control condition, so that the stimuli would not be rated as more or less plausible based on a (mis)match of the continuation (i.e., *de man* 'the man' or *de vrouw* 'the woman') with the masculine generic pronoun. Participants were asked to rate the plausibility of all items on a 7-point Likert scale ranging from very implausible to very plausible (Dutch *(on)waarschijnlijk*). Two versions of each item were created, one with the male and the other with the female continuation. This was done to make sure that the statements were considered equally plausible when made about men or women. Two lists were created and distributed evenly across female and male participants. These lists further included 30 filler items (half with a male continuation), which were designed to be rated as highly implausible, for example:

1. *Mensen met een grote plant kunnen moeilijk hun kat aaien, zo ook de man bij de varen die de poes maar niet kon vinden.*
   'People with a large plant have troubles petting their cat, such as the man next to the fern who just could not find the cat.'

The order of presentation was fully randomized for all participants.

Results

The mean ratings of all experimental and filler items can be seen below. On average, the items were rated approximately equally plausible when presented with a female or male continuation. However, individual items did show differences. For example, the stimulus below was rated less plausible when featuring a male continuation (M = 5.08, SD = 1.16) than when featuring a female continuation (M = 6.17, SD = 1.11).

2. *Mensen met een geldig paspoort mogen vanzelfsprekend hun stem uitbrengen, zo ook de man in het stemhokje die zich vooraf goed heeft ingelezen.*
   'People with a valid passport are naturally allowed to cast their vote, such as the man in the voting booth who had done a lot of research beforehand.'

Such discrepancies were taken into consideration when selecting 72 out of the 120 potential stimuli for the eye-tracking experiment. As described above, we selected items with a relatively high plausibility rating. All final items had an average rating of at least 4.5 on a 7-point scale. We further selected items for which the difference in plausibility rating between female and male continuations was as low as possible. This difference was 0.34 (SD = 0.27) on average.

Table A14. Mean plausibility rating (from 1-very implausible to 7-very plausible) of the experimental items, and range and standard deviation of the item means, shown separately for the 120 initial and final 72 experimental items and 30 pre-test filler items. Values were calculated separately for items presented with a female and male continuation, as well as for female and male continuations together.

	Experimental items						**Filler items**		
	120 items			*72 items*			*30 items*		
Continuation	*M*	*SD*	range	*M*	*SD*	range	*M*	*SD*	range
female	5.25	0.55	[3.67; 6.17]	5.40	0.41	[4.50; 6.17]	2.04	0.64	[1.33; 4.33]
male	5.28	0.57	[3.67; 6.33]	5.38	0.50	[4.33; 6.33]	1.97	0.47	[1.42; 3.25]
female + *male*	5.26	0.50	[4.00; 6.17]	5.39	0.40	[4.50; 6.17]	2.01	0.50	[1.42; 3.67]

Pre-test 2: Stereotypicality

The goal of this pre-test was to ensure that the stimuli did not convey any stereotype information. In other words, the pre-test allowed us to select stimuli for which the only gender cue would be the masculine generic pronoun.

A total of 44 participants (16 male) completed the pre-test. They were all native speakers of Dutch and ranged in age from 18 to 29 (*M* = 20.7). Thirty-four participants were students at Radboud University and received course credit. The remaining ten participants (five of whom were students at other universities) were recruited through *Facebook* and received no reimbursement. The pre-test was distributed through Qualtrics (2018).

All items were presented in the control condition, so that the presence of the masculine generic pronoun would not affect the results. The stimuli were presented with an underlined blank space instead of the word *vrouw* ‘woman’ or *man* ‘man’. We asked participants to rate on a 7-point Likert scale which of the two nouns best fit in the blank space, and to what extent. See Figure A2 below for an example.

Figure A2. Example of an item in the stereotype pre-test with the left end of the scale corresponding to *vrouw* 'woman'.

In addition to 120 potential stimulus items, we included 40 fillers in the pre-test. Half of these fillers was stereotypically male, while the other half was stereotypically female. We provide a female filler below. These were included to make sure that participants would use the whole scale. The scale direction was counterbalanced, with *vrouw* 'woman' corresponding to the left end of the scale for half the participants and to the right of the scale for the other half of the participants. These two lists were further distributed equally across male and female participants. All 160 items were presented in a different random order for each participant.

3. *Mensen met een grote handtas kunnen al hun spullen meenemen, zo ook de _____ in de trein die werkelijk alles wat nodig zou kunnen zijn bij zich heeft.*
   'People with a big purse can carry all their stuff with them, such as the _____ on the train who really has everything that one could need in the bag.'

Results

The scores were (re)coded so that a score of 1 corresponded to *vrouw* 'woman' being the best fit. We calculated the mean participant rating to all 120 experimental items. We further calculated the participant means for the stereotypically female and male fillers. The data of two female participants were excluded as their ratings of stereotypically female and male fillers were highly similar. All further item-based calculations were thus done based on the data of 40 participants. Table A15 below shows the means and standard deviations for experimental items and fillers.

Table A15. Mean rating on a 7-point scale from *vrouw* 'woman' to *man* 'man', standard deviations and range of means for the 72 versus 120 experimental items, and 40 stereotypically female and male fillers across participants.

	Experimental items		**Filler items**	
	120 items	*72 items*	*40 items*	
	stereotypically neutral		stereotypically female	stereotypically male
M	4.03	4.00	1.94	5.64
SD	0.96	0.25	0.68	0.91
range	[2.90; 5.19]	[3.52; 4.48]	[1.10; 3.31]	[3.90; 6.88]

Model summaries

Table A16. Fixed-effect coefficients β, their t-scores, uncorrected p-values and the FDR threshold for the fixed effect in question. P-values which fall below the FDR threshold are in bold.

Region 1: *zo ook* 'such as' - first run dwell time				
	β	t	p	FDR threshold
Intercept	5.45	216.36	**<0.001**	0.050
Continuation	-0.02	-1.40	0.167	0.006
Number (*someone* vs. *people*)	0.01	0.59	0.558	0.006
Number (*everyone* vs. people)	0.00	0.29	0.773	0.006
Participant gender	-0.02	-0.36	0.723	0.006
Continuation * Number (*someone* vs. *people*)	0.06	2.23	0.026	0.006
Continuation * Number (*everyone* vs. *people*)	-0.02	-0.53	0.594	0.006
Continuation * Participant gender	-0.03	-1.18	0.242	0.006
Number (*someone* vs. *people*) * Participant gender	0.00	0.09	0.928	0.006
Number (*everyone* vs. *people*) * Participant gender	-0.05	-1.71	0.089	0.006
Continuation * Number (*someone* vs. *people*) * Participant gender	-0.20	-3.52	**<0.001**	0.011
Continuation * Number (*everyone* vs. *people*) * Participant gender	-0.14	-2.49	0.013	0.006

Region 1: *zo ook* 'such as' - regression path duration				
	β	t	p	FDR threshold
Intercept	5.67	194.70	**<0.001**	0.050
Continuation	0.00	0.27	0.788	0.006
Number (*someone* vs. *people*)	-0.01	-0.32	0.746	0.006
Number (*everyone* vs. people)	-0.02	-0.98	0.326	0.006
Participant gender	-0.06	-1.17	0.247	0.006
Continuation * Number (*someone* vs. *people*)	0.02	0.52	0.606	0.006
Continuation * Number (*everyone* vs. *people*)	0.02	0.47	0.637	0.006
Continuation * Participant gender	-0.09	-2.19	0.033	0.006
Number (*someone* vs. *people*) * Participant gender	0.04	1.12	0.264	0.006
Number (*everyone* vs. *people*) * Participant gender	-0.06	-1.50	0.137	0.006

Continuation * Number (*someone* vs. *people*) * Participant gender	-0.12	-1.57	0.116	0.011
Continuation * Number (*everyone* vs. *people*) * Participant gender	-0.14	-1.90	0.057	0.006

Region 1: *zo ook* 'such as' - dwell time

	β	*t*	*p*	FDR threshold
Intercept	5.65	194.27	**<0.001**	0.050
Continuation	-0.03	-1.79	0.077	0.006
Number (*someone* vs. *people*)	0.03	1.67	0.100	0.006
Number (*everyone* vs. people)	-0.01	-0.69	0.491	0.006
Participant gender	-0.09	-1.58	0.118	0.006
Continuation * Number (*someone* vs. *people*)	0.04	1.13	0.260	0.006
Continuation * Number (*everyone* vs. *people*)	-0.01	-0.25	0.804	0.006
Continuation * Participant gender	-0.05	-1.67	0.099	0.006
Number (*someone* vs. *people*) * Participant gender	0.00	0.01	0.990	0.006
Number (*everyone* vs. *people*) * Participant gender	-0.04	-1.29	0.201	0.006
Continuation * Number (*someone* vs. *people*) * Participant gender	-0.18	-2.57	**0.010**	0.011
Continuation * Number (*everyone* vs. *people*) * Participant gender	-0.10	-1.47	0.142	0.006

Region 2: *de vrouw* 'the woman'/*de man* 'the man' - first run dwell time

	β	*t*	*p*	FDR threshold
Intercept	5.38	289.44	**<0.001**	0.050
Continuation	-0.02	-1.71	0.090	0.006
Number (*someone* vs. *people*)	-0.01	-0.91	0.363	0.006
Number (*everyone* vs. people)	-0.02	-1.60	0.110	0.006
Participant gender	0.01	0.40	0.688	0.006
Continuation * Number (*someone* vs. *people*)	0.01	0.56	0.574	0.006
Continuation * Number (*everyone* vs. *people*)	-0.02	-0.71	0.479	0.006
Continuation * Participant gender	0.00	0.03	0.979	0.006

Number (*someone* vs. *people*) * Participant gender	-0.01	-0.28	0.783	0.006
Number (*everyone* vs. *people*) * Participant gender	0.02	0.84	0.402	0.006
Continuation * Number (*someone* vs. *people*) * Participant gender	0.07	1.32	0.186	0.011
Continuation * Number (*everyone* vs. *people*) * Participant gender	0.05	0.94	0.348	0.006

Region 2: *de vrouw* 'the woman'/*de man* 'the man' - regression path duration

	β	*t*	*p*	FDR threshold
Intercept	5.65	215.18	**<0.001**	0.050
Continuation	0.01	0.38	0.703	0.006
Number (*someone* vs. *people*)	0.00	-0.08	0.936	0.006
Number (*everyone* vs. people)	-0.01	-0.64	0.520	0.006
Participant gender	-0.05	-0.98	0.331	0.006
Continuation * Number (*someone* vs. *people*)	0.04	1.07	0.287	0.006
Continuation * Number (*everyone* vs. *people*)	-0.02	-0.53	0.594	0.006
Continuation * Participant gender	-0.07	-2.33	0.020	0.006
Number (*someone* vs. *people*) * Participant gender	0.03	0.75	0.458	0.006
Number (*everyone* vs. *people*) * Participant gender	0.06	1.67	0.096	0.006
Continuation * Number (*someone* vs. *people*) * Participant gender	0.08	1.09	0.276	0.011
Continuation * Number (*everyone* vs. *people*) * Participant gender	-0.01	-0.13	0.896	0.006

Region 2: *de vrouw* 'the woman'/*de man* 'the man' - dwell time

	β	*t*	*p*	FDR threshold
Intercept	5.60	235.44	**<0.001**	0.050
Continuation	0.00	0.20	0.845	0.006
Number (*someone* vs. *people*)	0.00	-0.12	0.905	0.006
Number (*everyone* vs. people)	-0.03	-1.70	0.093	0.006
Participant gender	-0.06	-1.38	0.172	0.006
Continuation * Number (*someone* vs. *people*)	0.07	1.98	0.052	0.006

Continuation * Number (*everyone* vs. *people*)	-0.02	-0.53	0.594	0.006
Continuation * Participant gender	-0.02	-0.55	0.587	0.006
Number (*someone* vs. *people*) * Participant gender	0.01	0.29	0.769	0.006
Number (*everyone* vs. *people*) * Participant gender	0.05	1.49	0.140	0.006
Continuation * Number (*someone* vs. *people*) * Participant gender	-0.06	-0.86	0.395	0.011
Continuation * Number (*everyone* vs. *people*) * Participant gender	0.05	0.72	0.473	0.006

Region 3: prepositional phase - first run dwell time

	β	*t*	*p*	FDR threshold
Intercept	5.68	215.42	**<0.001**	0.050
Continuation	0.05	4.85	**<0.001**	0.006
Number (*someone* vs. *people*)	0.00	-0.19	0.849	0.006
Number (*everyone* vs. people)	0.00	0.25	0.803	0.006
Participant gender	-0.07	-1.64	0.106	0.006
Continuation * Number (*someone* vs. *people*)	0.02	0.70	0.485	0.006
Continuation * Number (*everyone* vs. *people*)	0.01	0.22	0.822	0.006
Continuation * Participant gender	-0.06	-2.66	0.008	0.006
Number (*someone* vs. *people*) * Participant gender	-0.04	-1.18	0.241	0.006
Number (*everyone* vs. *people*) * Participant gender	-0.04	-1.53	0.128	0.006
Continuation * Number (*someone* vs. *people*) * Participant gender	0.04	0.75	0.457	0.011
Continuation * Number (*everyone* vs. *people*) * Participant gender	0.06	1.10	0.271	0.006

Region 3: prepositional phase - regression path duration

	β	*t*	*p*	FDR threshold
Intercept	5.84	196.56	**<0.001**	0.050
Continuation	0.00	0.19	0.847	0.006
Number (*someone* vs. *people*)	0.00	-0.25	0.799	0.006
Number (*everyone* vs. people)	-0.04	-2.33	0.021	0.006

Participant gender	-0.12	-2.58	0.012	0.006
Continuation * Number (*someone* vs. *people*)	0.06	1.74	0.081	0.006
Continuation * Number (*everyone* vs. *people*)	0.03	0.82	0.414	0.006
Continuation * Participant gender	0.00	0.01	0.994	0.006
Number (*someone* vs. *people*) * Participant gender	-0.04	-1.07	0.288	0.006
Number (*everyone* vs. *people*) * Participant gender	-0.01	-0.20	0.838	0.006
Continuation * Number (*someone* vs. *people*) * Participant gender	-0.01	-0.20	0.843	0.011
Continuation * Number (*everyone* vs. *people*) * Participant gender	0.07	0.97	0.332	0.006

Region 3: prepositional phase - dwell time				
	β	*t*	*p*	FDR threshold
Intercept	5.93	184.51	**<0.001**	0.050
Continuation	0.02	1.84	0.066	0.006
Number (*someone* vs. *people*)	0.00	0.21	0.837	0.006
Number (*everyone* vs. people)	-0.03	-1.84	0.067	0.006
Participant gender	-0.15	-2.93	**0.004**	0.006
Continuation * Number (*someone* vs. *people*)	0.07	2.15	0.031	0.006
Continuation * Number (*everyone* vs. *people*)	0.04	1.19	0.238	0.006
Continuation * Participant gender	-0.02	-0.85	0.396	0.006
Number (*someone* vs. *people*) * Participant gender	-0.02	-0.62	0.539	0.006
Number (*everyone* vs. *people*) * Participant gender	-0.01	-0.18	0.855	0.006
Continuation * Number (*someone* vs. *people*) * Participant gender	0.01	0.21	0.833	0.011
Continuation * Number (*everyone* vs. *people*) * Participant gender	0.07	1.01	0.313	0.006

Chapter 5

Stimuli

Table A17. Stimuli for the experiment reported in Chapter 5. All stimuli are provided in Dutch.

Nr.	Stereotype	Sentence
1	Male	Thomas heeft zijn dak gerepareerd.
		Sanne heeft zijn dak gerepareerd.
2	Male	Kevin heeft zijn pijp gerookt.
		Lisa heeft zijn pijp gerookt.
3	Male	Jelle heeft zijn auto gerepareerd.
		Demi heeft zijn auto gerepareerd.
4	Male	Dennis heeft zijn bouwklus afgerond.
		Amber heeft zijn bouwklus afgerond.
5	Male	Sander heeft zijn pak aangedaan.
		Romy heeft zijn pak aangedaan.
6	Male	Jeroen heeft zijn scooter opgevoerd.
		Lotte heeft zijn scooter opgevoerd.
7	Male	Ruben heeft zijn sigaar gerookt.
		Anna heeft zijn sigaar gerookt.
8	Male	Martijn heeft zijn borstspieren getraind.
		Anouk heeft zijn borstspieren getraind.
9	Male	Jordy heeft zijn autobanden verwisseld.
		Tessa heeft zijn autobanden verwisseld.
10	Male	Wouter heeft zijn biceps getraind.
		Denise heeft zijn biceps getraind.
11	Male	Jasper heeft zijn bouwhelm vastgemaakt.
		Femke heeft zijn bouwhelm vastgemaakt.
12	Male	Willem heeft zijn oliepeil gecontroleerd.
		Eline heeft zijn oliepeil gecontroleerd.
13	Male	Thomas heeft zijn gereedschap klaargelegd.
		Sanne heeft zijn gereedschap klaargelegd.
14	Male	Kevin heeft zijn barbecue aangestoken.
		Lisa heeft zijn barbecue aangestoken.
15	Male	Jelle heeft zijn motorvakantie gepland.
		Demi heeft zijn motorvakantie gepland.
16	Male	Dennis heeft zijn geweer geladen.
		Amber heeft zijn geweer geladen.

17	Male	Sander heeft zijn sportauto geparkeerd.
		Romy heeft zijn sportauto geparkeerd.
18	Male	Jeroen heeft zijn bokshandschoenen aangedaan.
		Lotte heeft zijn bokshandschoenen aangedaan.
19	Male	Ruben heeft zijn hengel uitgeworpen.
		Anna heeft zijn hengel uitgeworpen.
20	Male	Martijn heeft zijn voetbalschoenen aangedaan.
		Anouk heeft zijn voetbalschoenen aangedaan.
21	Male	Jordy heeft zijn mountainbike afgesteld.
		Tessa heeft zijn mountainbike afgesteld.
22	Male	Wouter heeft zijn krachtoefeningen gedaan.
		Denise heeft zijn krachtoefeningen gedaan.
23	Male	Jasper heeft zijn golfclubs gepoetst.
		Femke heeft zijn golfclubs gepoetst.
24	Male	Willem heeft zijn tent opgezet.
		Eline heeft zijn tent opgezet.
25	Female	David heeft zijn legging ingepakt.
		Emma heeft zijn legging ingepakt.
26	Female	Justin heeft zijn wenkbrauwen geëpileerd.
		Maria heeft zijn wenkbrauwen geëpileerd.
27	Female	Pieter heeft zijn nagels gevijld.
		Sophie heeft zijn nagels gevijld.
28	Female	Theo heeft zijn oorbellen ingedaan.
		Merel heeft zijn oorbellen ingedaan.
29	Female	Joey heeft zijn balletschoenen aangetrokken.
		Kelly heeft zijn balletschoenen aangetrokken.
30	Female	Danny heeft zijn naam geborduurd.
		Vera heeft zijn naam geborduurd.
31	Female	Bert heeft zijn sieraden opgeborgen.
		Esther heeft zijn sieraden opgeborgen.
32	Female	Lucas heeft zijn yogabroek aangedaan.
		Fleur heeft zijn yogabroek aangedaan.
33	Female	Gijs heeft zijn roddelblad gelezen.
		Ilse heeft zijn roddelblad gelezen.
34	Female	Joris heeft zijn pirouettes geoefend.
		Lieke heeft zijn pirouettes geoefend.
35	Female	Niek heeft zijn naaimachine klaargezet.

		Joyce heeft zijn naaimachine klaargezet.
36	Female	Jacob heeft zijn haar geverfd.
		Judith heeft zijn haar geverfd.
37	Female	David heeft zijn cupcakes versierd.
		Emma heeft zijn cupcakes versierd.
38	Female	Justin heeft zijn oksels geschoren.
		Maria heeft zijn oksels geschoren.
39	Female	Pieter heeft zijn dagcrème aangebracht.
		Sophie heeft zijn dagcrème aangebracht.
40	Female	Theo heeft zijn dagboek bijgehouden.
		Merel heeft zijn dagboek bijgehouden.
41	Female	Joey heeft zijn paard geborsteld.
		Kelly heeft zijn paard geborsteld.
42	Female	Danny heeft zijn yogaoefeningen gedaan.
		Vera heeft zijn yogaoefeningen gedaan.
43	Female	Bert heeft zijn horoscoop gelezen.
		Esther heeft zijn horoscoop gelezen.
44	Female	Lucas heeft zijn calorieën opgeschreven.
		Fleur heeft zijn calorieën opgeschreven.
45	Female	Gijs heeft zijn soap gekeken.
		Ilse heeft zijn soap gekeken.
46	Female	Joris heeft zijn hart uitgestort.
		Lieke heeft zijn hart uitgestort.
47	Female	Niek heeft zijn relatieproblemen besproken.
		Joyce heeft zijn relatieproblemen besproken.
48	Female	Jacob heeft zijn outfit samengesteld.
		Judith heeft zijn outfit samengesteld.

Model summary

Table A18. Fixed-effect coefficients β, their t-scores and p-values.

Ratings			
	β	t	p
Intercept	0.26	8.75	<0.001
Language	-0.18	-4.85	<0.001
Proper name	-0.26	-3.51	<0.001
Stereotype	0.17	4.05	<0.001
Language * Proper name	-0.35	-2.05	0.043
Language * Stereotype	0.08	0.97	0.333
Proper name * Stereotype	0.20	4.20	<0.001
Language * Proper name * Stereotype	-0.07	-0.70	0.485

Chapter 6

Stimuli

Table A19. Stimuli for the experiment reported in Chapter 6. All stimuli are provided in the experimental and control condition with a female continuation.

Nr.	Stimulus
1	Iemand die vurig hoopt ooit naar Washington te mogen gaan, bijvoorbeeld mevrouw Berkhout, zal zich graag verdiepen in de Amerikaanse politiek.
1	Iemand die vurig hoopt dat hij ooit naar Washington mag gaan, bijvoorbeeld mevrouw Berkhout, zal zich graag verdiepen in de Amerikaanse politiek.
2	Iemand die snel leert eigen initiatief te mogen tonen, bijvoorbeeld mevrouw Blom, zal hierdoor steeds zelfverzekerder worden.
2	Iemand die snel leert dat hij eigen initiatief mag tonen, bijvoorbeeld mevrouw Blom, zal hierdoor steeds zelfverzekerder worden.
3	Iemand die regelmatig vergeet een belafspraak te hebben, bijvoorbeeld mevrouw Boom, zal anderen hiermee vaak irriteren.
3	Iemand die regelmatig vergeet dat hij een belafspraak heeft, bijvoorbeeld mevrouw Boom, zal anderen hiermee vaak irriteren.
4	Iemand die heilig gelooft compleet transparant te moeten zijn, bijvoorbeeld mevrouw Verberne, zal dit meestal ook verwachten van anderen.
4	Iemand die heilig gelooft dat hij compleet transparant moet zijn, bijvoorbeeld mevrouw Verberne, zal dit meestal ook verwachten van anderen.
5	Iemand die vaak zegt welgemeend advies op prijs te stellen, zoals mevrouw Stekelenburg, zal collega's regelmatig om feedback vragen.
5	Iemand die vaak zegt dat hij welgemeend advies op prijs stelt, zoals mevrouw Stekelenburg, zal collega's regelmatig om feedback vragen.
6	Iemand die onterecht denkt goed verstaanbaar te zijn, zoals mevrouw Krol, zal niet goed articuleren.
6	Iemand die onterecht denkt dat hij goed verstaanbaar is, zoals mevrouw Krol, zal niet goed articuleren.
7	Iemand die telkens toont een vriendelijk karakter te hebben, zoals mevrouw Kwant, zal ook een grote vriendenkring hebben.
7	Iemand die telkens toont dat hij een vriendelijk karakter heeft, zoals mevrouw Kwant, zal ook een grote vriendenkring hebben.
8	Iemand die geregeld verklaart grote interesse te hebben voor politiek, zoals mevrouw Brons, zal altijd op de hoogte zijn van nieuwe ontwikkelingen.
8	Iemand die geregeld verklaart dat hij grote interesse heeft voor politiek, zoals mevrouw Brons, zal altijd op de hoogte zijn van nieuwe ontwikkelingen.
9	Iemand die altijd besluit lokale delicatessen te gaan proeven, zo ook mevrouw Buitenhuis, zal weleens insecten hebben gegeten.

9 Iemand die altijd besluit dat hij lokale delicatessen gaat proeven, zo ook mevrouw Buitenhuis, zal weleens insecten hebben gegeten.

10 Iemand die vooraf bedenkt alle lokale musea te willen bezoeken, zo ook mevrouw Dijkstra, zal van tevoren een route uitstippelen.

10 Iemand die vooraf bedenkt dat hij alle lokale musea wil bezoeken, zo ook mevrouw Dijkstra, zal van tevoren een route uitstippelen.

11 Iemand die consequent zegt vroeg op te zullen staan, zo ook mevrouw Griffioen, zal op een dag veel willen doen.

11 Iemand die consequent zegt dat hij vroeg op zal staan, zo ook mevrouw Griffioen, zal op een dag veel willen doen.

12 Iemand die overal eist onmiddellijk geholpen te worden, zo ook mevrouw Groeneveld, zal regelmatig teleurgesteld worden.

12 Iemand die overal eist dat hij onmiddellijk geholpen wordt, zo ook mevrouw Groeneveld, zal regelmatig teleurgesteld worden.

13 Iemand die eerlijk toegeeft weleens een spelfout te maken, bijvoorbeeld mevrouw Versteeg, zal de spellingscontrole meestal aanzetten.

13 Iemand die eerlijk toegeeft dat hij weleens een spelfout maakt, bijvoorbeeld mevrouw Versteeg, zal de spellingscontrole meestal aanzetten.

14 Iemand die trots verkondigt een boek te gaan publiceren, bijvoorbeeld mevrouw Stok, zal hier veel moeite in hebben gestopt.

14 Iemand die trots verkondigt dat hij een boek gaat publiceren, bijvoorbeeld mevrouw Stok, zal hier veel moeite in hebben gestopt.

15 Iemand die blij vertelt nooit geldzorgen te hebben, bijvoorbeeld mevrouw Hiemstra, zal anderen misschien jaloers maken.

15 Iemand die blij vertelt dat hij nooit geldzorgen heeft, bijvoorbeeld mevrouw Hiemstra, zal anderen misschien jaloers maken.

16 Iemand die openlijk toegeeft soms een schrijfblokkade te hebben, bijvoorbeeld mevrouw Kivits, zal kunnen rekenen op steun van lotgenoten.

16 Iemand die openlijk toegeeft dat hij soms een schrijfblokkade heeft, bijvoorbeeld mevrouw Kivits, zal kunnen rekenen op steun van lotgenoten.

17 Iemand die snel meent veel te weinig betaald te krijgen, zoals mevrouw Hoekstra, zal regelmatig klagen over het salaris.

17 Iemand die snel meent dat hij veel te weinig betaald krijgt, zoals mevrouw Hoekstra, zal regelmatig klagen over het salaris.

18 Iemand die steeds belooft echt op tijd te zullen komen, zoals mevrouw Knoop, zal alsnog soms te laat zijn.

18 Iemand die steeds belooft dat hij echt op tijd zal komen, zoals mevrouw Knoop, zal alsnog soms te laat zijn.

19 Iemand die vurig hoopt binnenkort eindelijk promotie te maken, zoals mevrouw Langenberg, zal vaak tot laat op kantoor zijn.

19 Iemand die vurig hoopt dat hij binnenkort eindelijk promotie maakt, zoals mevrouw Langenberg, zal vaak tot laat op kantoor zijn.

20 Iemand die duidelijk zegt 's avonds geen mail te beantwoorden, zoals mevrouw Loos, zal minder stress ervaren.

20 Iemand die duidelijk zegt dat hij 's avonds geen mail beantwoordt, zoals mevrouw Loos, zal minder stress ervaren.

21 Iemand die oprecht hoopt een nieuwe plantensoort te kunnen ontdekken, zo ook mevrouw De Winter, zal vaak in het bos te vinden zijn.

21 Iemand die oprecht hoopt dat hij een nieuwe plantensoort kan ontdekken, zo ook mevrouw De Winter, zal vaak in het bos te vinden zijn.

22 Iemand die goed weet erg gewild te zijn voor lezingen, zo ook mevrouw Spaargaren, zal alleen naar de leukste evenementen gaan.

22 Iemand die goed weet dat hij erg gewild is voor lezingen, zo ook mevrouw Spaargaren, zal alleen naar de leukste evenementen gaan.

23 Iemand die altijd meent handmatig aantekeningen te moeten maken, zo ook mevrouw Pronk, zal meestal pen en papier bij zich hebben.

23 Iemand die altijd meent dat hij handmatig aantekeningen moet maken, zo ook mevrouw Pronk, zal meestal pen en papier bij zich hebben.

24 Iemand die zelden zegt even de aandacht te willen, zo ook mevrouw Zwaan, zal goede ideeën meestal voor zich houden.

24 Iemand die zelden zegt dat hij even de aandacht wil, zo ook mevrouw Zwaan, zal goede ideeën meestal voor zich houden.

25 Iemand die heilig gelooft uiteindelijk volledig te kunnen herstellen, bijvoorbeeld mevrouw Steen, zal tijdens therapiesessies erg hard werken.

25 Iemand die heilig gelooft dat hij uiteindelijk volledig kan herstellen, bijvoorbeeld mevrouw Steen, zal tijdens therapiesessies erg hard werken.

26 Iemand die telkens eist een second opinion te krijgen, bijvoorbeeld mevrouw Stoop, zal weinig vertrouwen hebben in artsen.

26 Iemand die telkens eist dat hij een second opinion krijgt, bijvoorbeeld mevrouw Stoop, zal weinig vertrouwen hebben in artsen.

27 Iemand die steevast denkt onvoldoende zorg en aandacht te krijgen, bijvoorbeeld mevrouw Strik, zal vaak klagen.

27 Iemand die steevast denkt dat hij onvoldoende zorg en aandacht krijgt, bijvoorbeeld mevrouw Strik, zal vaak klagen.

28 Iemand die onterecht volhoudt geen gehoorproblemen te hebben, bijvoorbeeld mevrouw Veenstra, zal de tv vaak hard zetten.

28 Iemand die onterecht volhoudt dat hij geen gehoorproblemen heeft, bijvoorbeeld mevrouw Veenstra, zal de tv vaak hard zetten.

29 Iemand die echt denkt alles al te hebben gezien, zoals mevrouw Verschuren, zal slechts zelden verrast zijn.

29 Iemand die echt denkt dat hij alles al heeft gezien, zoals mevrouw Verschuren, zal slechts zelden verrast zijn.

30 Iemand die goed beseft een volle agenda te hebben, zoals mevrouw Verhoeven, zal alle afspraken efficiënt inplannen.

30 Iemand die goed beseft dat hij een volle agenda heeft, zoals mevrouw Verhoeven, zal alle afspraken efficiënt inplannen.

31 Iemand die stellig ontkent moeilijk in de omgang te zijn, zoals mevrouw Verburg, zal niet voldoende zelfkennis hebben.

31 Iemand die stellig ontkent dat hij moeilijk in de omgang is, zoals mevrouw Verburg, zal niet voldoende zelfkennis hebben.

32 Iemand die altijd hoopt relevante conferenties te kunnen bezoeken, zoals mevrouw Verkerk, zal alle ontwikkelingen willen volgen.

32 Iemand die altijd hoopt dat hij relevante conferenties kan bezoeken, zoals mevrouw Verkerk, zal alle ontwikkelingen willen volgen.

33 Iemand die trots vertelt een volgestempeld paspoort te hebben, zo ook mevrouw Hoogendoorn, zal vaak buiten de Schengenlanden reizen.

33 Iemand die trots vertelt dat hij een volgestempeld paspoort heeft, zo ook mevrouw Hoogendoorn, zal vaak buiten de Schengenlanden reizen.

34 Iemand die enthousiast zegt altijd te willen blijven reizen, zo ook mevrouw Huls, zal op hoge leeftijd nog op avontuur gaan.

34 Iemand die enthousiast zegt dat hij altijd wil blijven reizen, zo ook mevrouw Huls, zal op hoge leeftijd nog op avontuur gaan.

35 Iemand die onbevreesd zegt graag alleen rond te trekken, zo ook mevrouw Winkel, zal vaak zonder reisgenoten op pad gaan.

35 Iemand die onbevreesd zegt dat hij graag alleen rondtrekt, zo ook mevrouw Winkel, zal vaak zonder reisgenoten op pad gaan.

36 Iemand die veelal vermijdt het vliegtuig te moeten nemen, zo ook mevrouw Beukema, zal vaak met de trein reizen.

36 Iemand die veelal vermijdt dat hij het vliegtuig moet nemen, zo ook mevrouw Beukema, zal vaak met de trein reizen.

37 Iemand die structureel vermijdt politiek gemotiveerde keuzes te maken, bijvoorbeeld mevrouw Versteeg, zal integriteit hoog in het vaandel dragen.

37 Iemand die structureel vermijdt dat hij politiek gemotiveerde keuzes maakt, bijvoorbeeld mevrouw Versteeg, zal integriteit hoog in het vaandel dragen.

38 Iemand die angstvallig vermijdt een presentatie te moeten geven, bijvoorbeeld mevrouw Vonk, zal persoonlijke gesprekken prefereren.

38 Iemand die angstvallig vermijdt dat hij een presentatie moet geven, bijvoorbeeld mevrouw Vonk, zal persoonlijke gesprekken prefereren.

39 Iemand die moeilijk toegeeft een fout te hebben gemaakt, bijvoorbeeld mevrouw Groen, zal nogal snel in de verdediging schieten.

39 Iemand die moeilijk toegeeft dat hij een fout heeft gemaakt, bijvoorbeeld mevrouw Groen, zal nogal snel in de verdediging schieten.

40 Iemand die stilletjes hoopt ooit een vaste aanstelling te krijgen, bijvoorbeeld mevrouw Wijnhoven, zal de vacatures goed in de gaten houden.

40 Iemand die stilletjes hoopt dat hij ooit een vaste aanstelling krijgt, bijvoorbeeld mevrouw Wijnhoven, zal de vacatures goed in de gaten houden.

41 Iemand die altijd meent alle kwaaltjes te kunnen verhelpen, zoals mevrouw Bosch, zal steeds een remedie paraat hebben.

41 Iemand die altijd meent dat hij alle kwaaltjes kan verhelpen, zoals mevrouw Bosch, zal steeds een remedie paraat hebben.

42 Iemand die trots vertelt elke ochtend te gaan hardlopen, zoals mevrouw Verbeek, zal een uitstekende conditie hebben.

42 Iemand die trots vertelt dat hij elke ochtend gaat hardlopen, zoals mevrouw Verbeek, zal een uitstekende conditie hebben.

43 Iemand die vurig hoopt snel een baan te vinden, zoals mevrouw Kroon, zal op alle relevante vacatures reageren.

43 Iemand die vurig hoopt dat hij snel een baan vindt, zoals mevrouw Kroon, zal op alle relevante vacatures reageren.

44 Iemand die onbedoeld suggereert bepaalde vooroordelen te hebben, zoals mevrouw Struik, zal weleens in ongemakkelijke situaties terechtkomen.

44 Iemand die onbedoeld suggereert dat hij bepaalde vooroordelen heeft, zoals mevrouw Struik, zal weleens in ongemakkelijke situaties terechtkomen.

45 Iemand die serieus meent uitzonderlijk goed te kunnen schilderen, zo ook mevrouw Zijlstra, zal schilderijen proberen te slijten aan grote musea.

45 Iemand die serieus meent dat hij uitzonderlijk goed kan schilderen, zo ook mevrouw Zijlstra, zal schilderijen proberen te slijten aan grote musea.

46 Iemand die makkelijk toegeeft moeite te hebben met een project, zo ook mevrouw Vermeulen, zal openstaan voor de hulp van anderen.

46 Iemand die makkelijk toegeeft dat hij moeite heeft met een project, zo ook mevrouw Vermeulen, zal openstaan voor de hulp van anderen.

47 Iemand die vurig hoopt tot de kunstacademie te worden toegelaten, zo ook mevrouw Klein, zal al een uitgebreid portfolio hebben.

47 Iemand die vurig hoopt dat hij tot de kunstacademie wordt toegelaten, zo ook mevrouw Klein, zal al een uitgebreid portfolio hebben.

48 Iemand die erg hoopt subsidie toegewezen te krijgen, zo ook mevrouw Kamphuis, zal zich veel zorgen maken over de uitslag.

48 Iemand die erg hoopt dat hij subsidie toegewezen krijgt, zo ook mevrouw Kamphuis, zal zich veel zorgen maken over de uitslag.

Model summaries

Table A20. Fixed-effect coefficients β, their t-scores and uncorrected p-values.

Region 1: *mevrouw* 'Ms' / *meneer* 'Mr'			
	β	t	p
Intercept	5.85	282.72	**<0.001**
Stimulus type	-0.02	-1.34	0.186
Continuation	0.01	1.23	0.224
Participant gender	0.02	0.58	0.564
Stimulus type * Continuation	-0.06	-3.00	**0.004**
Stimulus type * Participant gender	0.00	0.14	0.891
Continuation * Participant gender	0.00	0.26	0.794
Stimulus type * Continuation * Participant gender	0.02	1.11	0.266

Spillover region: Last name			
	β	t	p
Intercept	5.90	227.21	**<0.001**
Stimulus type	-0.02	-1.12	0.271
Continuation	0.03	1.91	0.061
Participant gender	0.05	0.92	0.362
Stimulus type * Continuation	-0.08	-3.58	**<0.001**
Stimulus type * Participant gender	-0.01	-0.75	0.455
Continuation * Participant gender	0.01	0.36	0.720
Stimulus type * Continuation * Participant gender	0.01	0.58	0.564

Nederlandse samenvatting

Zogenaamde *generische masculina* zijn alomtegenwoordig – niet alleen in de Nederlandse taal, maar in vrijwel alle talen die op grammaticaal niveau onderscheid maken tussen het mannelijk en het vrouwelijk geslacht. Het mannelijk grammaticaal geslacht wordt dan niet alleen voor mannen, maar voor alle genders gebruikt. Dit gebeurt wanneer het gender van een persoon onbekend of irrelevant is, of wanneer er sprake is van een groep bestaande uit mensen die niet allemaal hetzelfde gender hebben. Dit gebruik wordt dus *generisch* genoemd. Soms gaat de universaliteit van het mannelijk geslacht zover dat het zelfs in contexten wordt gebruikt die duidelijk alleen naar vrouwen verwijzen. Zo kun je bijvoorbeeld over een vrouwelijk elftal lezen dat *iedereen **zijn** plaats in de ploeg heeft.*[20] Het mannelijk grammaticaal geslacht wordt in dergelijke contexten dus voor alle genders gebruikt – en soms zelfs alléén voor vrouwen, zoals het bezittelijk voornaamwoord *zijn* in het voorbeeld. Maar is deze universaliteit van het mannelijk geslacht ook terug te vinden in de taalverwerking? Met andere woorden, worden generische masculina als gender-neutraal verwerkt? Het doel van dit proefschrift is om deze vraag te beantwoorden. Aan de hand van het persoonlijk voornaamwoord *hij* en het bezittelijk voornaamwoord *zijn*, probeer ik in dit proefschrift te verduidelijken of deze generische masculina als gender-neutraal kunnen worden beschouwd wat betreft hun verwerking, of dat ze tot een specifiek mannelijke interpretatie – en dus tot een *male bias* – leiden.

Het eerste hoofdstuk biedt als inleiding van dit proefschrift een overzicht van talen waarin generisch-mannelijke voornaamwoorden voorkomen. Ze zijn wijdverspreid in Germaanse, Romaanse en Slavische talen, en ook in het Arabisch en Hebreeuws heeft het mannelijk grammaticaal geslacht een speciale status.

In het tweede hoofdstuk van dit proefschrift wordt het – voor zover bekend – eerste experiment beschreven waarmee specifiek onderzoek wordt gedaan naar de verwerking van generisch-mannelijke voornaamwoorden. Nederlandse moedertaalsprekers lazen zinnen terwijl een eye-tracker (d.w.z. met een speciale camera) hun oogbewegingen opnam. *Iedereen was zijn tanden aan het poetsen* is een van de zinnen die in het experiment zijn gebruikt. Deze zinnen gingen dus over een bepaalde groep mensen die allemaal hetzelfde doen. Vervolgens werd in een tweede zin een van deze mensen bij de voornaam genoemd, die ook het gender van deze persoon aanduidde. De leestijden op de voornamen zijn onderzocht. Langere leestijden worden over het algemeen geïnterpreteerd als teken voor moeite in de taalverwerking. Als het nu langer duurt om

[20]Dit voorbeeld komt uit het SoNaR corpus en is hier te vinden: http://opensonar.inl.nl

een vrouwelijke voornaam te lezen dan die van een man, is dit een teken dat de proefpersoon zich een groep mannen voorstelde tijdens het lezen van een zin als *Iedereen was zijn tanden aan het poetsen*. Dit zou betekenen dat generisch-mannelijke voornaamwoorden niet als generisch maar als specifiek mannelijk worden geïnterpreteerd. De resultaten van het experiment laten dit echter niet zien. Het experiment in Hoofdstuk 2 leverde geen bewijs voor de hypothese dat generisch-mannelijke voornaamwoorden zoals *zijn* leiden tot een bij voorkeur mannelijke interpretatie in de taalverwerking. Wel werd er een ander interessant effect gevonden. Zo werden langere leestijden gemeten op mannelijke voornamen wanneer de eerder geïntroduceerde groep een stereotiep vrouwelijke activiteit uitvoerde (bijv. *yogaoefeningen doen*). Er is uit eerder onderzoek bekend dat mannen die zich niet gedragen zoals op basis van hun gender van hen wordt verwacht, sociaal meer worden buitengesloten dan vrouwen die dat doen. Uit deze resultaten blijkt dat dit verschil ook terug te zien is in de taalverwerking.

In het derde hoofdstuk worden twee experimenten gepresenteerd met opnieuw de onderzoeksvraag uit Hoofdstuk 2. Experiment 1 maakt opnieuw gebruik van eye-tracking en een vergelijkbare, maar verbeterde opzet. In dit eye-tracking-experiment worden bijvoorbeeld geen voornamen gebruikt. In plaats daarvan is ervoor gekozen om de naamwoordgroepen *enkele vrouwen* en *enkele mannen* te gebruiken om het gender van de individuen aan te geven. Dit is gedaan om individuele verschillen tussen de proefpersonen wat betreft hun kennis van en ervaring met voornamen weg te nemen. In dit eye-tracking-experiment werd er in tegenstelling tot het experiment in Hoofdstuk 2 duidelijk bewijs voor gevonden dat het bezittelijk voornaamwoord *zijn* als specifiek mannelijk wordt verwerkt – maar alleen door mannelijke proefpersonen en alleen in neutrale contexten zoals *tanden poetsen*, en niet in stereotiepe contexten zoals *yogaoefeningen doen* en *voetbaltrucs oefenen*. Experiment 2 gebruikte dezelfde zinnen, maar een andere onderzoeksmethode. De taak van de proefpersonen was om de zinnen te beoordelen en te bepalen of het tweede gedeelte, dat *enkele vrouwen* of *enkele mannen* bevat, een goede voortzetting is van het eerste gedeelte van de zin met het mannelijke voornaamwoord. In dit tweede experiment, dat de taalverwerking op een indirectere manier onderzoekt dan eye-tracking, werd geen bewijs gevonden dat het generisch-mannelijk voornaamwoord *zijn* als specifiek mannelijk wordt geïnterpreteerd. De resultaten van de twee experimenten in Hoofdstuk 3 suggereren dat mannelijke lezers generisch-mannelijke voornaamwoorden zoals *zijn* in eerste instantie als specifiek mannelijk interpreteren tijdens hun verwerking in neutrale contexten, maar dat mannelijke lezers deze interpretatie snel kunnen aanpassen wanneer vrouwen expliciet worden genoemd.

In het vierde hoofdstuk heb ik opnieuw *zijn* onderzocht, weer in een eye-tracking-experiment, maar in geheel andere contexten. Terwijl in de Hoofdstukken 2 en 3 het voornaamwoord werd gebruikt in zogenaamde episodische contexten, d.w.z. om een specifieke groep mensen te beschrijven die op dat moment bezig zijn met een activiteit, werden in Hoofdstuk 4 contexten gebruikt die daadwerkelijk generiek zijn, bijv. *Iemand met een absoluut gehoor kan snel zijn instrument stemmen*. Deze zin verwijst niet naar een specifieke persoon, maar naar alle mensen op wie deze beschrijving van toepassing is. Generisch-mannelijke voornaamwoorden komen in dergelijke contexten vaak van pas. De interessante, psycholinguïstische vraag hier is of het voornaamwoord leidt tot een specifiek mannelijke interpretatie, ook al wordt het niet gebruikt in relatie tot een specifieke persoon of groep, maar voor mensen in het algemeen. In dit eye-tracking-experiment zijn twee soorten generieke uitspraken getest: enerzijds zinnen in conceptueel enkelvoud met *iemand*, zoals in het bovenstaande voorbeeld, anderzijds werden dezelfde zinnen gepresenteerd in conceptueel meervoud, waarbij *iedereen* de zin introduceerde i.p.v. *iemand*. De hypothese was dat lezers eerder geneigd zijn om het generisch-mannelijk voornaamwoord als specifiek mannelijk te interpreteren wanneer het wordt gebruikt in relatie tot een persoonsbeschrijving in conceptueel enkelvoud. Het is cognitief eenvoudiger en wellicht ook relevanter om het gender van een enkeling in te vullen in tegenstelling tot het samengestelde gender van een groep. Deze hypothese werd in dit experiment bevestigd. Net als in Hoofdstuk 3 vertoonden alleen mannelijke proefpersonen een *male bias*, en alleen met zinnen in het conceptuele enkelvoud (d.w.z. met *iemand*, maar niet met *iedereen*). De resultaten suggereren dat zelfs bij afwezigheid van een expliciete referent, het generisch-mannelijke voornaamwoord wordt gebruikt als een indicatie van iemands gender. Vrouwen verwerkten *zijn* opnieuw zoals bedoeld, namelijk als gender-neutraal.

Het vijfde hoofdstuk kijkt een laatste keer naar *zijn*, maar niet in de functie als generisch-mannelijk voornaamwoord. Dit hoofdstuk belicht een ander fenomeen waarbij mannelijke voornaamwoorden worden gebruikt voor vrouwen. In het Limburgse dialect dat in het zuiden van Nederland wordt gesproken, wordt het voornaamwoord *zijn* op een systematische manier gebruikt voor vrouwen. *Flora heeft zijn yogabroek aangedaan* kan niet alleen betekenen dat Flora de yogabroek van een man heeft aangedaan, maar ook dat Flora haar eigen yogabroek heeft aangedaan. Studies over het Limburgs en over gerelateerde verschijnselen in andere talen zoals in het Luxemburgs en in Poolse dialecten laten zien dat het hier niet om het mannelijke *zijn* gaat, maar dat het onzijdig voornaamwoord in deze contexten wordt gebruikt. In het Nederlands is deze lezing niet mogelijk. Hoofdstuk 5 presenteert een experiment waarbij Limburgse en Nederlandse proefpersonen de natuurlijkheid van zinnen zoals het voorbeeld hierboven moesten beoordelen in hun moedertaal. Deze onderzoeksopzet is gebaseerd op het idee dat zinnen

met een voornaamwoord dat aan het onderwerp van de zin kan worden gekoppeld over het algemeen als beter en natuurlijker worden ervaren. De gepresenteerde zinnen waren ofwel stereotiep vrouwelijk – zoals het voorbeeld hierboven – of stereotiep mannelijk; het onderwerp was of een vrouw of een man. Zoals verwacht bleek uit de resultaten dat Nederlandse proefpersonen duidelijk de voorkeur gaven aan zinnen met een mannelijk onderwerp. De Limburgse proefpersonen beoordeelden alle zinnen echter als natuurlijk, behalve zinnen met een vrouwelijk onderwerp gecombineerd met een mannelijk stereotype. Dit laat zien dat *zijn* in het Limburgs gemakkelijk kan worden gebruikt om aan vrouwen te refereren wanneer de context het toelaat.

Hoofdstuk 6 richt zich op een ander generisch-mannelijk voornaamwoord in het Nederlands: het persoonlijk voornaamwoord *hij*. Er is vanuit te gaan dat persoonlijke voornaamwoorden in de functie van generisch masculinum een fundamenteel ander effect hebben dan bezittelijke voornaamwoorden – niet alleen in het Nederlands, maar over talen heen. Een persoonlijk voornaamwoord is onafhankelijk. Daarentegen is het bezittelijk voornaamwoord in zelfstandig naamwoordgroepen slechts een lidwoord, net als *de* en *het,* en is het bezittelijk voornaamwoord dus afhankelijk van het zelfstandig naamwoord (zie *de broek* en *zijn broek*). In talen als Nederlands, Duits en Engels hoeft het bezittelijk voornaamwoord niet overeen te komen met het geslacht van het zelfstandig naamwoord (bijvoorbeeld *Herbert en zijn moeder*), aangezien het geslacht van het bezittelijk voornaamwoord is gebaseerd op dat van de eigenaar (bijvoorbeeld *Herbert*) – en niet op het gender of geslacht van het "bezit" (d.w.z. *moeder*). Het feit dat het bezittelijk voornaamwoord en het bijbehorend zelfstandig naamwoord vaak niet overeenkomen qua geslacht betekent dat het voornaamwoord als indicator van het gender van de eigenaar minder opvallend of prominent is. Hoofdstuk 6 test daarom de hypothese dat *hij* – vanwege dit belangrijke verschil met *zijn* – veel eerder tot een *male bias* leidt, mogelijk voor zowel vrouwelijke als mannelijke lezers. Dat blijkt ook uit de resultaten van het leesexperiment (oftewel: *self-paced reading*) in Hoofdstuk 6. Bij beschrijvingen als *Iemand die steeds belooft dat hij echt op tijd zal komen*, denken zowel mannelijke als vrouwelijke proefpersonen aan een man, en wordt het voornaamwoord *hij* dus niet als neutraal verwerkt.

Hoofdstuk 7 vat de resultaten van alle experimenten samen en concludeert dat – ook al lijkt de generische en dus neutrale interpretatie van het bezittelijk voornaamwoord *zijn* met name voor vrouwen vaak mogelijk te zijn – het risico van een specifiek mannelijke interpretatie van de generisch-mannelijke voornaamwoorden zeer aanwezig is. Dit werd het duidelijkst aangetoond met het persoonlijk voornaamwoord *hij*, waarbij de *male bias* ook bij vrouwen te zien was. Daarom kan het generische gebruik van mannelijke voornaamwoorden – in tegenstelling tot de huidige adviezen in Nederland – op basis van

deze resultaten niet worden aanbevolen en moet de voorkeur uitgaan naar de vermijding van generische masculina ten gunste van gender-neutrale alternatieven.

Deutsche Zusammenfassung

Sogenannte generische Maskulina sind allgegenwärtig – nicht nur im Deutschen und Niederländischen, sondern tatsächlich in so gut wie allen Sprachen, welche auf grammatischer Ebene zwischen dem männlichen und dem weiblichen Geschlecht unterscheiden. Das männliche grammatische Geschlecht wird dann *generisch* verwendet. Das bedeutet, dass in Situationen, in welchen das Geschlecht einer Person unbekannt oder irrelevant ist, oder aber wenn von einer Gruppe gemischten Geschlechts die Rede ist, das männliche grammatische Geschlecht herangezogen wird, um diese Menschen zu beschreiben. Frauen werden dann nicht explizit genannt, sondern sind mitgemeint. Manchmal geht die Universalität des generischen Maskulinums in seiner Verwendung so weit, dass es selbst in Kontexten, in denen eindeutig nur Frauen gemeint sind, verwendet wird. So liest man zum Beispiel über die Antibabypille, dass, wer das gerne möchte, sie ohne Probleme nach einer längeren Pause wieder einnehmen kann – auch „ohne Rücksprache mit dem Arzt – vorausgesetzt, er hat die Pille vorher gut vertragen".[21] Sowohl *Arzt* als auch das Pronomen *er* fungieren hier als generische Maskulina. Das männliche grammatische Geschlecht wird in solchen Kontexten also für alle Geschlechter – und manchmal auch nur für Frauen – verwendet. Aber spiegelt sich diese Universalität auch in der Sprachverarbeitung wider? Mit anderen Worten: Werden generische Maskulina in der unmittelbaren Sprachverarbeitung tatsächlich als genderneutral interpretiert? Während man dies in Bezug auf Substantive wie *Arzt* auf Grund der Forschungslage eindeutig mit *nein* beantworten kann, so ist diese Frage für Pronomina nicht eingehend untersucht und daher auch nicht geklärt. Das Ziel dieser Dissertation ist, an Hand generisch-maskuliner Pronomina wie *hij* ‚er' und *zijn* ‚sein' im Niederländischen zu klären, ob diese in der Sprachverarbeitung als genderneutral erachtet werden können oder ob sie doch zu einer spezifisch männlichen Interpretation – und daher zu einer *male bias* – führen.

Im ersten Kapitel dieser Dissertation findet sich eine Einleitung, die einen exemplarischen Überblick über Sprachen gibt, in welchen generisch-maskuline Pronomina verwendet werden. Generisch-maskuline Pronomina sind in germanischen, romanischen und slawischen Sprachen weitverbreitet, aber auch in afro-asiatischen Sprachen wie Arabisch und Hebräisch hat das männliche grammatische Geschlecht einen Sonderstatus.

Im zweiten Kapitel dieser Dissertation wird das erste Experiment, das sich gezielt mit der sprachlichen Verarbeitung von generisch-maskulinen Pronomina auseinandersetzt, beschrieben. Niederländische Muttersprachler*innen sahen im Zuge eines

[21] https://www.gofeminin.de/gesundheit/pille-absetzen-s1556366.html

Leseexperiments, bei welchem ihre Augenbewegungen mit einem Eye-Tracker (d.h. mit einer speziellen Kamera) aufgenommen wurden, Sätze wie *Jeder war gerade dabei seine Zähne zu putzen.* Hier geht es also um eine bestimmte Gruppe Menschen, die alle dasselbe tun. In solchen Kontexten wird das Pronomen *sein* (niederländisch *zijn*) verwendet.[22] In weiterer Folge wurde eine dieser Personen beim Vornamen genannt, wodurch dieses Individuum als Frau oder Mann zu erkennen war. Höhere Lesezeiten werden im Allgemeinen als Zeichen von einem erhöhten Aufwand in der Sprachverarbeitung gesehen. Dauert es nun länger, um einen weiblichen Vornamen zu lesen als einen männlichen, ist das ein Zeichen, dass die Versuchsperson sich während des Lesens des Satzes *Jeder war gerade dabei seine Zähne zu putzen* eine Gruppe Männer vorgestellt hat. Dies würde dann als Beweis dessen gewertet, dass das generische Maskulinum nicht als generisch, sondern als spezifisch männlich interpretiert wurde. Allerdings weisen die Ergebnisse des Experiments dies nicht aus. Das Experiment in Kapitel 2 findet also keinen Beweis dafür, dass generisch-maskuline Pronomina wie niederländisch *zijn* ‚sein' zu einer überwiegend männlichen Interpretation in der Sprachverarbeitung führen. Sehr wohl wurden höhere Lesezeiten für männliche Vornamen gemessen, wenn die Gruppe einer stereotyp weiblichen Beschäftigung nachging (z.B. Yogaübungen machen). Männer, die sich nicht stereotyp ihrem Geschlecht gemäß verhalten, werden gesellschaftlich stärker geächtet als Frauen, die selbiges tun – und dieser Unterschied zeigt sich – wie aus diesen Ergebnissen ersichtlich – auch in der Sprachverarbeitung.

Im dritten Kapitel werden zwei Experimente vorgestellt, die die Forschungsfrage aus Kapitel 2 erneut aufgreifen. Experiment 1 verwendet abermals Eye-Tracking und auch ein sehr ähnliches Forschungsdesign, allerdings mit einigen Verbesserungen. So werden in Kapitel 3 zum Beispiel keine Vornamen mehr verwendet, sondern die Substantivgruppen *einige Frauen* oder *einige Männer*, um das Geschlecht der Einzelpersonen anzugeben. Dies sollte dafür sorgen, dass individuelle Unterschiede der Versuchspersonen in ihrer Kenntnis und Erfahrung mit Vornamen eliminiert würden. In diesem Eye-Tracking-Experiment fand ich sehr wohl einen klaren Beweis dafür, dass das Possessivpronomen *zijn* ‚sein' als spezifisch männlich interpretiert wird – allerdings nur von männlichen Versuchspersonen und auch nur in neutralen Kontexten wie *Zähne putzen*, und nicht in stereotypen Kontexten wie *Yogaübungen* oder *Fußballtricks machen.* In Experiment 2 wurden dieselben Sätze, aber eine andere Forschungsmethode verwendet. So mussten Versuchspersonen die Sätze dahingehend bewerten, ob der zweite Teil, welcher *einige Frauen* oder *einige Männer* beinhaltet, denn eine gute Fortsetzung für den ersten Satzteil mit dem männlichen Pronomen ist. In diesem

[22] Es ist zu beachten, dass *jeder* im Niederländischen (*iedereen*) anders als im Deutschen nicht männlich ist und daher kein generisches Maskulinum darstellt.

Experiment, welches weniger direkt auf die Sprachverarbeitung abzielt als Eye-Tracking, wurde kein Beweis dafür gefunden, dass das generisch-maskuline Pronomen *zijn* ‚sein' als spezifisch männlich interpretiert wird. Die Ergebnisse der beiden Experimente in Kapitel 3 legen nahe, dass männliche Leser generisch-maskuline Pronomina wie *zijn* ‚sein' in der Sprachverarbeitung zunächst als spezifisch männlich interpretieren, diese Interpretation aber rasch anpassen, wenn Frauen explizit genannt werden.

Im vierten Kapitel habe ich wiederum *zijn* ‚sein' in einem Eye-Tracking-Experiment unter die Lupe genommen, allerdings in grundliegend anderen Kontexten. Während in Kapitel 2 und 3 das Pronomen in sogenannten episodischen Kontexten verwendet wurde, also um eine *spezifische* Gruppe Menschen zu umschreiben, die in diesem Moment eine Aktivität ausübt, so wurden in Kapitel 4 Kontexte verwendet, die tatsächlich generisch sind, z.B. *Jemand mit einem absoluten Gehör kann sein Instrument schnell stimmen.* Dieser Satz bezieht sich also nicht auf eine *bestimmte* Person, sondern auf *alle* Menschen, auf welche diese Beschreibung zutrifft. Auch in solchen Kontexten wird das generische Maskulinum häufig verwendet. Die interessante, psycholinguistische Frage ist hierbei, ob das Pronomen denn zu einer spezifisch männlichen Interpretation führt, obwohl es nicht in Bezug auf eine spezifische Person(engruppe) verwendet wird. Zwei Arten generischer Aussagen wurden in diesem Eye-Tracking-Experiment getestet: einerseits Sätze in konzeptueller Einzahl mit *jemand*, wie im Beispiel oben, andererseits wurden die Sätze leicht abgeändert und in konzeptueller Mehrzahl präsentiert, indem *jeder* den Satz einleitete. Die Idee dahinter war, dass Leser*innen eher geneigt sind, das generische Maskulinum als spezifisch männlich zu interpretieren, wenn dieses in Bezug auf eine Personenbeschreibung in konzeptueller Einzahl verwendet wird. Sich das Geschlecht einer einzelnen Person vorzustellen ist kognitiv einfacher und wohl auch relevanter als das zusammengestellte Geschlecht einer Gruppe. Diese Hypothese wurde bestätigt. Wie in Kapitel 3 zeigten nur männliche Versuchspersonen eine sogenannte *male bias* und interessanterweise lediglich mit Sätzen in konzeptueller Einzahl (d.h. mit *iemand* ‚jemand' aber nicht mit *iedereen* ‚jeder'). Das Experiment legt nahe, dass, selbst in Abwesenheit von explizit im Satz genannten Personen, das generische Maskulinum als Indikator für das Geschlecht eben jener Personen herangezogen wird. Frauen verarbeiteten und interpretierten *zijn* ‚sein' wiederum wie gemeint, nämlich als alle Geschlechter miteinbeziehend.

Das fünfte Kapitel wirft einen letzten Blick auf *zijn* ‚sein', allerdings nicht in der Funktion des generischen Maskulinums. Dieses Kapitel beleuchtet ein anderes Phänomen, bei welchem männliche Pronomina für Frauen verwendet werden. Im limburgischen Dialekt, der im Süden der Niederlande gesprochen wird, verwendet man das Pronomen *zijn* ‚sein' nämlich auf systematische Weise für Frauen. So kann zum

Beispiel *Flora hat seine Yogahose angezogen* nicht nur bedeuten, dass Flora die Yogahose eines Mannes angezogen hat, sondern auch, dass sie ihre eigene Yogahose angezogen hat. Untersuchungen des Limburgischen sowie verwandter Phänomene in anderen Sprachen wie dem Luxemburgischen und in polnischen Dialekten zeigen, dass es sich dabei nicht um das männliche *zijn* ‚sein' handelt, sondern um das Pronomen im Neutrum, wie es auch für sächliche Substantive verwendet wird. Im Niederländischen ist diese Lesart allerdings nicht möglich. Kapitel 5 präsentiert ein Experiment, in welchem limburgische und niederländische Versuchspersonen die Natürlichkeit von Sätzen wie im Beispiel oben in ihrer jeweiligen Muttersprache bewerten mussten. Diesem Forschungsdesign liegt die Idee zu Grunde, dass Sätze mit einem Pronomen, welches an das Subjekt des Satzes gekoppelt werden kann, allgemein als besser und natürlicher erfahren werden. Die präsentierten Sätze waren entweder stereotyp weiblich – wie das Beispiel oben – oder stereotyp männlich; das Subjekt war gleichfalls entweder weiblich oder männlich. Die Ergebnisse zeigten wie erwartet, dass niederländische Versuchspersonen die Sätze mit männlichem Subjekt eindeutig bevorzugten. Die limburgischen Versuchspersonen bewerteten allerdings alle Sätze als sehr natürlich, außer jene mit einem weiblichen Subjekt in Kombination mit einem männlichen Stereotyp. Das zeigt, dass *zijn* ‚sein' im Limburgischen ohne Weiteres für Frauen verwendet werden kann, wenn der Kontext dies zulässt.

Kapitel 6 wendet sich einem weiteren generisch-maskulinem Pronomen im Niederländischen zu: dem Personalpronomen *hij* ‚er'. Es ist anzunehmen, dass Personalpronomina in der Funktion des generischen Maskulinums grundsätzlich anders wirken als Possessivpronomina – nicht nur im Niederländischen, sondern über Sprachen hinweg. Während ein Personalpronomen als unabhängiges Pronomen fungiert, so ist das Possessivpronomen in Substantivgruppen lediglich ein Determinativ ähnlich wie *der, die* und *das* und somit vom Substantiv abhängig (vgl. *die Hose* und *ihre Hose*). In Sprachen wie dem Niederländischen, dem Deutschen und dem Englischen muss das Possessivpronomen nicht zwangsläufig mit dem Geschlecht des Substantivs übereinstimmen (z.B. *Herbert und seine Mutter*), da sich das Geschlecht des Possessivpronomens nach jenem der Besitzer*in (d.h. *Herbert*) richtet – und nicht nach dem Geschlecht des „Besitzes" (d.h. *Mutter*). Dieses oft nicht übereinkommende Geschlecht zwischen Possessivpronomen und seinem Substantiv muss dazu führen, dass auch das Pronomen als Indikator des Geschlechts der Besitzer*in weniger salient oder herausstechend ist. Kapitel 6 testete daher die Hypothese, ob *hij* ‚er' – wegen dieses wichtigen Unterschieds mit *zijn* ‚sein' – nicht viel eher zu einer *male bias* führt. Die Ergebnisse des Leseexperiments (*self-paced reading*) in Kapitel 6 zeigen genau das. Beschreibungen wie *Jemand, der immer verspricht, dass er pünktlich ist* ließen

männliche und weibliche Versuchspersonen gleichsam an einen Mann denken, wie sich in den Lesezeiten widerspiegelte.

Kapitel 7 fasst die Ergebnisse aller Experimente zusammen und konkludiert, dass – auch wenn die generische Interpretation des Possessivpronomens *zijn* ‚sein' gerade für Frauen oft möglich scheint – die Gefahr einer spezifisch männlichen Interpretation der generisch-maskulinen Pronomina durchaus gegeben ist. Am eindeutigsten zeigte sich dies beim Personalpronomen *hij* ‚er', dessen *male bias* auch für Frauen unumgänglich war. Daher kann auf Basis dieser Ergebnisse die Verwendung generisch-maskuliner Pronomina – entgegen der geltenden Richtlinien im Niederländischen – nicht empfohlen werden. Die Vermeidung generisch-maskuliner Pronomina zu Gunsten gender-neutraler Alternativen ist anzustreben.

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[23] If this reference to first sentences confuses you, go to page nine of this book, read the first paragraph of this dissertation, and then return to this very page for an emotional reward.

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Curriculum Vitae

Theresa Redl was born on August 31, 1991 in Vienna, Austria. She obtained her bachelor's degree in Linguistics from the University of Vienna in 2014, followed by a master's degree from Utrecht University in the same discipline. She was awarded an IMPRS for Language Sciences fellowship in 2016 and started her PhD project in September of the same year.

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