Language Background and Violation of (Lexical) Gender Expectancy

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Word count: 14,433
Date of submission: 17/07/2018
Acknowledgements

To all the experiment participants, who very generously donated their time.

To the English native speaker, who provided the list of gender-neutral nouns which I used for my questionnaire to English native speakers, and also for helping me share it.

To all the friends and family who also helped me share the questionnaire and for having shown me their support.

To everybody who answered my questionnaire and showed an interest in my thesis.

And last but not least, to my supervisor for her invaluable support and knowledge.

You have helped me immensely.
Abstract

Studies show that most personal nouns, and predominantly those referring to occupations that are most stereotypically associated with males (e.g., surgeon) or with females (e.g., nurse), activate automatically world knowledge related to gender information. However, very few have studied the potential effects of gender expectancies when the sentences present so-called gender-neutral nouns (e.g., friend, colleague). Therefore, using a self-paced reading paradigm, the aim of this study was to compare the reading times of English sentences with gender-neutral nouns with sentences with nouns that refer to stereotypically male or female jobs in an attempt to compare gender expectancies based on these two types of nouns. Additionally, the study tried to find out whether the presence or absences of a grammatical gender system in the L1 of the participants (English and Portuguese) further affects gender expectancies. The results seem to suggest that indeed both between groups and within groups the three different types of nouns (i.e., neutral, stereotypically male, and stereotypically female) used in this experiment activate different expectations. This suggests that gender expectancies depend both on the type of noun as well as the language background of the participant. The data further suggest there seems to be no unmarked nouns and the expectancies seem to depend on each participant experience, including their social network, the way they were taught English and the contexts surrounding the participants.
# Table of Contents

Acknowledgements..................................................................................................................2

Abstract..................................................................................................................................3

Tables and Figures....................................................................................................................5

1. Introduction.............................................................................................................................6

2. Background literature..............................................................................................................8
   2.1 Gender.................................................................................................................................8
      2.1.1 “Lexical Gender” and “Referential Gender” .................................................................8
      2.1.2 “False generics”............................................................................................................9
   2.2 Gender in Portuguese and in English..................................................................................10
   2.3 Grammatical gender and its effects on the second language of bilinguals..........................11
   2.4 Gender stereotyping...........................................................................................................12
      2.4.1 Violation of gender expectancy.....................................................................................12
   2.5 Research Questions...........................................................................................................17

3. Methodology...........................................................................................................................19
   3.1 Participants........................................................................................................................19
   3.2 Materials............................................................................................................................19
   3.3 Procedure..........................................................................................................................21
   3.4 Data Analysis......................................................................................................................22

4. Results....................................................................................................................................23
   4.1 Effects of L1 on gender expectancies of nouns that do or do not refer to a stereotypical male or female gender..........................................................................................23
   4.2 Gender-neutral nouns vs. nouns that refer to jobs...............................................................26
   4.3 Impact of English proficiency and use for Portuguese native speakers.............................28

5. Discussion..................................................................................................................................31
   5.1 Effects of L1 on gender expectancies of nouns that do or do not refer to a stereotypical male or female gender..........................................................................................31
   5.2 Gender-neutral nouns vs. nouns that refer to jobs...............................................................32
   5.3 Impact of English proficiency and use for Portuguese native speakers.............................33
   5.4 Recommendations for further research..............................................................................33

6. Conclusion.................................................................................................................................35

References......................................................................................................................................36

Appendix A - Sentences used in the experiment........................................................................39
Appendix B - Nouns used in the online pre-test questionnaire on the gender-neutral nouns........43
Appendix C - Questionnaire on the languages of the participants..............................................44
Tables and Figures

List of tables

Table 1. Nouns Used in the Experiment..............................................................20
Table 2. Mean scores and standard deviations for each type of noun, for congruency and incongruency and for each language group..........................................................................................23
Table 3. Regression coefficients for the linear model of reading times in the critical region as a function of language background, type of noun and congruency.................................................................24
Table 4. Regression coefficients for the linear model of reading times in the spillover region as a function of language background, type of noun and congruency.................................................................25
Table 5. Regression coefficients for the linear model of reading times in the critical region as a function of level of English proficiency, amount of English used, type of noun and congruency........................29
Table 6. Regression coefficients for the linear model of reading times in the spillover region as a function of level of English proficiency, amount of English used, type of noun and congruency......29

List of figures

Figure 1. The effect of congruency and language background for the critical region..................24
Figure 2. Boxplot showing the reading times in the critical region of both English and Portuguese native speakers for all three types of nouns by congruency. The legend on the right of the boxplot specifies which colors correspond to which type of noun.................................................................25
Figure 3. The effect of congruency and language background for the spillover region...............26
Figure 4. Boxplot showing the reading times in the spillover region of both English and Portuguese native speakers for all three types of nouns by congruency. The legend on the right of the boxplot specifies which colors correspond to which type of noun.................................................................26
Figure 5. Effect of type of noun (gender-neutral, stereotypically female job or stereotypically male job) and congruency for the critical region..................................................................................27
Figure 6. Effect of type of noun (gender-neutral, stereotypically female job or stereotypically male job) and language background for the critical region........................................................................27
Figure 7. Effect of type of noun (gender-neutral, stereotypically female job or stereotypically male job) and congruency for the spillover region..................................................................................28
Figure 8. Effect of type of noun (gender-neutral, stereotypically female job or stereotypically male job) and language background for the spillover region..................................................................................28
1. Introduction

In recent years there has been a collective effort to increase gender equality, particularly in the workplace, and to encourage people to be more politically correct and to use more “gender-fair” language. In Portugal, for example, there is the V Plano Nacional para a Igualdade, Género, Cidadania e Não Discriminação (2013) [V National Plan for Equality, Gender, Citizenship and Non Discrimination]¹ which recognizes that people’s word choice reflects the socially expected representations of gender predominant in a particular historical and cultural context. This Resolution from the Council of Ministers acknowledges that because of these social expectations there might be, admittedly, actual discriminatory practices in society, and therefore this plan aims to guarantee that all documents written, edited and distributed by Public Administration Organs adopt written and visual language which gives the same status and visibility to women as it usually gives to men (Presidência do Conselho de Ministros, 2013). For example, this plan says it is necessary to explicitly use os/as estudantes [theM.PL/theF.PL studentsPL], o/a funcionário/a [theM.S./theF.S. employeeM.S./employeeF.S.]. These are, then, nondiscriminatory forms to address both men and women which respect the right to linguistic representation of their identity and which recognize that neither of the genders should be used as the general representative of humanity.

Nonetheless, there are linguists, such as Câmara Jr. (1966) who believe that using the masculine gender in Portuguese to denote both men and women is not a form of discrimination. Câmara Jr. believes that what is usually seen as the masculine form is actually a neutral gender, which would mean that using the masculine gender does not necessarily mean one is referring to male people. In fact, this author believes that the only gender which is marked is the feminine one, which he considers is a ‘particularization’² of the neutral gender. This ‘particularization’ is then done with the grammatical gender suffix ‘-a’, instead of the neutral ending ‘-o’ (oM.S. médicoM.S. -> aF.S. médicaF.S. [theM.S. doctorM.S. -> aF.S. médicaF.S.]).

In English, there has also been a trend towards more “gender-fair” language. Garner (2016), for example, says that the use of masculine pronouns as “false generics” (see Section 2.1.2) is a no more than tradition and is now considered sexist to do it. Fowler (2015) explains that until the 1960s it was without a doubt acceptable to use the pronoun he to refer to a person of any gender, particularly when following indefinite pronouns and determiners like, for example, anybody, or after gender-neutral nouns such as person. The author also says that nowadays other alternatives are used to refer to both men and women such as the singular they or both pronouns are expressed: he or she.

However, studies show that most personal nouns, and predominantly those referring to occupations that are most stereotypically associated with males or with females, automatically activate world knowledge related to gender information. This means that when people encounter nouns which carry a gender stereotype they immediately make assumptions about the gender of the referent (e.g. a surgeon is expected to be male while a nurse is expected to be female). Researchers have also demonstrated, however, that the grammatical gender system of the dominant language of the participants affects the activation of gender-related information even in their other languages (see Section 2.3).

In English, a language which has no grammatical gender, there are nouns that should not prompt a gender stereotype, since there is no reason to expect or to associate them with a specific gender. That is, there is no stereotype that would lead one to activate gender-related information when reading

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¹ Translation from the original Portuguese is mine.
² Single quotation marks are also mine.
these words. Examples of this type of nouns are friend, colleague, baby, partner, etc. In Portuguese, a language with a two-way grammatical gender system, these nouns would be specified for female or male (o/a amigo/a [theM.S./theF.S. friendM.S./friendF.S.], o/a colega [theM.S./theF.S. colleagueF.S.], o/a bebé [theM.S./theF.S. babyF.S.], o/a parceiro/a [theM.S./theF.S. partnerM.F.]). As far as this researcher is aware, very few studies have been done with these types of nouns in English to see if in fact there is no gender expectancy triggered by them.

This research project intends, then, to see if there is any gender expectancy activated towards nouns such as the ones mentioned in the previous paragraph when reading sentences in English. It also aims at comparing these with nouns stereotypically associated with either males or females, which have been proved to carry a gender expectancy. Furthermore, the study aims at comparing the gender expectancies while reading English of speakers of two languages with different types of gender systems: English native speakers, whose language does not have grammatical gender (Bussmann & Hellinger, 2001) and Portuguese native speakers, whose language has a two-way grammatical gender system. In this way we will try to see if gender expectancies might be further influenced by the gender system of the participant’s native language.

In the next section literature background on gender will be reviewed. The terms used in this thesis will be determined: the key concepts of “lexical gender”, “referential gender”, “gender-neutral” nouns, “false generics”, “generic masculines” and “male generics” will be defined. Furthermore, an overview of gender in English and Portuguese will be provided. Next, grammatical gender, which some languages have and some do not, will be discussed as well as how the presence or absence of it affects the processing of nouns even in the second language of bilinguals. Lastly, there will be a section on gender stereotyping and a review of the findings of several different studies on violation of gender expectancies.

After that, in the methodology section, the participants tested, the methodology of the experiment and the design of the questionnaire used to create the sentences for this study will be discussed in Section 3. In Section 4, the results found in this study will be presented on the basis of different statistical analyses used to interpret different aspects of the data. The findings will then be discussed in Section 5, following the same order of presentation as in Section 4. Finally, in Section 7 this study will attempt to draw conclusions from the results found and will put forward some suggestions as to what possible interesting matters should be researched next.
2. Literature Background

2.1 Gender

Gender is a property of nouns which, according to Hockett (1958, in Corbett, 1991, p.1), is “reflected in the behavior of associated words”. That is each different class of nouns that determines a different agreement of the words associated with it can be considered to have a different gender. Languages can have no gender system, or two, three or even more genders (Corbett, 1991). Often this class differentiation has a correspondence to the distinction of sex, meaning that in most cases there is a concurrence between the “masculine” gender class and the lexical specification of a noun as having the semantic property [+male] and the “feminine” gender class and the lexical specification of a noun as having the semantic property [+female], particularly in the context of personal/animate nouns (Corbett, 1991; Bussmann & Hellinger, 2001). However, this is not always the case, and just as often there is no such a correspondence (Corbett, 1991).

2.1.1 “Lexical Gender” and “Referential Gender”

Bussmann and Hellinger (2001) consider grammatical gender to be an intrinsic feature of all nouns of languages that have gender systems, which determines the agreement between the noun and other words, such as articles, pronouns, verbs, adjectives, prepositions and numerals (depending on the language). On the other hand, they state that, lexical gender, which is present in all languages, depends on the semantic property of the noun. That means that, for example in English, a language without grammatical gender but with lexical gender, personal nouns like girl, daughter, man and brother are lexically specified as having the semantic property [+female] in the case of the first two examples and the semantic property [+male] for the last two. This type of nouns can, thus, be defined as “gender-specific”. Nouns such as participant, client and human, on the other hand, can be described as “gender-neutral” or “gender-indefinite” (Bussmann & Hellinger, 2001).

Therefore, “gender-specific” nouns call for the use of the appropriate agreement with the other elements of the sentence, with which it may agree. In English, as an example, these would be the anaphoric pronouns he and she. In contrast, “gender-neutral” nouns may not require a specific corresponding pronoun, and the choice of which to use would fall to the speaker. This choice may be constricted due to the grammatical gender of that noun in a specific language (if that language has a grammatical gender system). However, it can also be made in relation to a referent (if the speaker knows or wants to clarify whether they are referring to a male or a female person), due to tradition (the use of “false generics”; see Section 2.1.2) or due to speaker attitude – the use, for example, of “gender-fair” language (Bussmann & Hellinger, 2001).

For Bussmann and Hellinger (2001), nouns might be or might not be morphologically marked for lexical gender. That is nouns may not display overt gender marking. Languages with grammatical gender systems usually have a great number of ways of overt gender marking, but in English, most common nouns referring to humans are not marked for lexical gender (e.g., doctor), barring examples such as actor – actress or waiter – waitress (Bussmann & Hellinger, 2001).

On the other hand, these authors define “referential gender” as establishing a connection between linguistic expressions and the non-linguistic reality. That is, for example, idiomatic expressions such as the German set phrase Mädchen für alles, which agrees with the neuter grammatical gender but can also be used with feminine pronouns due to its semantic property [+female], can carry a gendered message nonetheless. Even though this expression is mostly used to refer to females, when used to refer to males it conveys an explicitly derogatory meaning (Bussmann & Hellinger, 2001).
It should be noted, nonetheless, that other authors such as Dahl (2000), however, use this term slightly differently. Dahl gives the example, among others, of the German word *Mädchen*, which, as explained above, has neuter gender but can take agreement also with feminine pronouns to explain the difference between the way he uses the terms “lexical gender” and “referential gender”. For Dahl, lexical gender is determined by the lexically stored properties of the noun, that is whether the noun is masculine, feminine or neuter does not depend on the context or the sex of the referent, rather it is a fixed feature of the noun. On the contrary, “referential gender” is determined by the biological gender associated with the referent of the noun, i.e. that with referential gender agreement it is not the noun that determines the pronominal agreement but the referent (Dahl, 2000).

For the purpose of this thesis, the terms as defined by Bussmann and Hellinger (2001) will be used.

2.1.2 “False generics”

Numerous languages use what Bussmann and Hellinger (2001) call “false generics”, which is to use what the authors refer to as “generic masculines” – if the language being referred to has grammatical gender – or what the authors designate by “male generics” – if the language does not have grammatical gender – to refer to both males and females. While grammatically feminine nouns which are used to refer to people are generally used to refer only to females (except in very few cases), grammatically masculine nouns can and are frequently used in a wider lexical and referential way. Grammatically masculine nouns can be used with male referents, when the gender of the group of people being referred to is not known or irrelevant in the context, or even with female referents. It is rare to use grammatically feminine nouns with gender-indefinite reference (Bussmann & Hellinger, 2001).

Languages which do not have grammatical gender, but which have a “pronominal gender system” (cf. Corbett, 1991, p.5) “male generics” is the common androcentric rule with gender-indefinite reference. For example, in English, the use of “generic he” is the prescriptive preference with gender-indefinite reference. Language which do not have grammatical gender or a “pronominal gender system” usually the use of “male generics” is seen in the nouns themselves. For instance, in Finnish, nouns which refer to occupations and end in -mies (‘man’) are used for both men and women and are officially claimed to be gender-neutral. However, studies such as the one by Engelberg (2002) have shown that such claims may not be believable (Bussmann & Hellinger, 2001).

The preference for masculine/male expressions to denote the “normal” or “unmarked” case leads to great asymmetries –masculine/male pronouns occur three times more often than the equivalent feminine/female pronouns, in languages such as English and Russian (Graham, 1975; Francis & Kučera, 1967, respectively; as referenced in Bussmann & Hellinger, 2011)– and to the invisibility of feminine/female expressions. This potentially reflects the hidden gender belief system and may contribute to the expectations of what is suitable behavior for males and females. These expectations will impede a truly generic interpretation of gender-indefinite personal nouns. In fact, there is data indicating that in English, as well as in Turkish, Finnish and German, most nouns used to refer to humans are indeed not neutral and do activate gender-related information (Bussmann & Hellinger, 2001).

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3 In the so-called “generic masculines” used in languages which have grammatical gender “masculine” denotes grammatical gender (Bussmann & Hellinger, 2001), while in the term “male generics” used in languages without grammatical gender “male” means the lexical-semantic property.
2.2 Gender in Portuguese and in English

English and Portuguese have quite different gender systems. Portuguese has a two-way grammatical gender system while English does not have gender.

In Portuguese, nouns can be sorted into two classes: those which take the definite article *o*, which represents masculine nouns and the definite article *a*, which expresses feminine nouns. Adjectives, pronouns, determiners and some numerals all must agree with the gender of the noun they refer to (Choupina, 2011). In general, nouns used to refer to humans most of the time are distinguished between masculine and feminine and there is a clear link between masculine nouns and the male sex and between feminine nouns and the female sex. However, there are a few exceptions: certain words such as *a criança* [the F.S. child F.S.], *a testemunha* [the F.S. witness F.S.] or *o ídolo* [the M.S. idol M.S.] are epicene nouns. That is, these words can be used to refer to male and female people, but the grammatical gender of the word always remains the same. There is also another type of epicene words like *o diplomata/a diplomata* [the M.S. diplomat F.S./the F.S. diplomat S.], *a modelo/a modelo* [the M.S. model F.S./the F.S. model S.] or *o adolescente/a adolescente* [the M.S. teenager F.S./the F.S. teenager S.], which have the same form but can have different grammatical genders depending on whether they are referring to a male or a female person (Villalva & Mateus, 2007).

The masculine is considered to be the unmarked gender, that is the masculine is used when the gender of the referent is not established or to refer to groups of both males and females (Choupina, 2011). Furthermore, more and more, there is a preference to use the masculine form of a noun referring to an occupation traditionally held by men, even when the referent is a female person. This is due to the fact that most times when there is a feminine form it is connected to derogatory connotations (Villalva & Mateus, 2007).

Despite the fact that there are some researchers who consider English to have a “pronominal gender system”, since anaphoric, personal, possessive and reflexive pronouns in the English language do show agreement in gender with their antecedent (Corbett, 1991), most of the time, English is considered to no longer have a grammatical gender system (Bussmann & Hellinger, 2001). Nowadays gender in English is mostly a semantic category, with only very few nouns with lexical gender (that is, nouns that have the property [+female] or [+male]). This property will control which anaphoric pronoun is necessary: *she* for nouns with the property [+female] and *he* for nouns with the property [+male].

Nonetheless, many English nouns can be used for both females and males and depending on the referent the pronouns *she* or *he* can be chosen, or, in neutral situations, the singular *they* (Bussmann & Hellinger, 2001). In fact, Gerner (2000) found by examining the British National Corpus which was published in 1998 that British speakers, irrespective of their age, gender, social status or region, used the singular *they* quite more frequently than the male generic *he*. Pauwels (2003) found similar results in a corpus of spontaneous speech compiled in Australia in the 1990s: singular *they* was the most often used gender-neutral pronoun.

However, in most cases, when the gender of the referent is unknown, high-status jobs, generally associated with men, are pronominalized by *he*, while lower-status professions, associated mostly with females, are pronominalized by *she*. And in general human nouns that can be used for both males and females (e.g., *pedestrian, driver*) and indefinite pronouns, such as *somebody* are also accompanied by *he* (Bussmann & Hellinger, 2001).
2.3 Grammatical gender and its effects on the second language of bilinguals

Studies have shown that knowing more than one language might lessen the effects of grammatical gender on the second language of bilingual speakers, in contrast to monolingual speakers of the same language. This decrease of the effect of grammatical gender has been seen both in early bilinguals and later learners. Furthermore, the effects of bilingualism are dependent on the gender system of each language which the speaker knows. When the speaker knows two languages with grammatical gender, there is a positive effect in that there is a reduced effect of the speaker’s native language’s gender assignments on nouns with different assignments in the two languages. When the speaker’s native language has grammatical gender, but the second language they know has no gender, there is no effect in that the gender assignments of their mother tongue still has an effect on their assignments in the second language. When the speaker’s native language has no grammatical gender and they learn a language which has grammatical gender, there may be effects in that they may begin assigning gender according to the second language they have learnt (Bassetti & Nicoladis, 2016).

Furthermore, most studies show that the direction of influence between the two (or more) languages is usually predictable by language dominance. That is, generally the native language – frequently the dominant one – has more effect than the other languages a speaker knows. In fact, various researchers have found that the gender of a word in the native language of the speaker is automatically activated when the translation of that word is accessed in a second language of the speaker (Cook, 2018). For example, in a neurolinguistic study using Event Related Potentials (ERPs), Boutonnet, Athanasopoulos and Thierry (2012) also found that Spanish-English bilinguals automatically activate Spanish grammatical gender even when performing a task in English in an English setting.

As mentioned above, there do not seem to be any reduced effects of gender assignment according to the native language’s gender system, when the second language acquired does not have grammatical gender, such as for instance when participants are tested in English. For example, Boroditsky, Schmidt and Phillips (2003) found that both German and Spanish native speakers who had acquired English still exhibited effects of the gender assignments of their mother tongues. The participants Boroditsky et al. (2003) tested remembered the names better when learning the proper names given to the objects when the name was of the same gender as the grammatical gender of that word in their first language, even though the whole task was in English and the names given to the objects were also English names. Forbes, Poulin-Dubois, Rivero and Sera (2008) obtained similar results when testing French and Spanish native speakers. In the study of Forbes et al. (2008), participants’ native language influenced the gender they chose to assign to animals and objects in English. Nicoladis and Foursa-Stevenson (2012) reported that simultaneous French-English bilingual children showed effects of assignment according to the French gender system in a task in which they had to classify objects as either boys or girls, and these effects were significantly different when compared to those of their monolingual English peers.

Even though most studies report no reduced effects of grammatical gender assignment when the second language acquired is English, a language with no grammatical gender, there are a few exceptions. Sato, Gygax and Gabriel (2013) observed that the effects of French grammatical gender in the understanding of English role nouns as male or female by French-English bilingual adults lessened with higher levels of English proficiency. This finding has been observed in very few other studies (e.g., Ervin, 1962). Morales, Paolieri, Cubelli and Bajo (2014) found similar results, but depending on the immersion environment rather than level of English proficiency, when testing Spanish-English bilinguals. The participants were asked to name the picture in English, while ignoring a word written in Spanish, which appeared on top of the image. These participants were either immersed in a context where their mother tongue was the dominant language or in a context where their second language
was the dominant one. The authors found an effect of the grammatical gender system of the participants’ native language in the non-immersed group, even though the language they were being tested in – English – does not have a grammatical gender system. Yet they did not find a similar influence of the grammatical gender system of Spanish in the group of immersed bilinguals. The authors conclude that this lack of effect on immersed bilinguals might be due either to a L1 inhibition (that is, the L1 becomes less active) or to a decrease in use of the L1 (which leads to the L1 becoming less accessible) when the participant is in an L2 immersion context.

2.4 Gender stereotyping

Stereotypes are a type of social knowledge that leads us to expect and associate certain attributes to specific groups of people. Gender stereotypes are, therefore, expectancies which people have regarding what is either a typically male or female activity, ability, behavior, attitude or characteristic (Proverbio, Orlandi, & Bianchi, 2017). Studies such as the ones of Kuhn, Nash and Brucken (1978) and O’Brien, Huston and Risley (1983) have shown that stereotypes can be formed as early as when a child is 3 years old as they learn to make the connection between certain activities and behaviors with a specific gender. In fact, Liben, Bigler and Krogh (2002), who tested children between the ages of 6 and 11 by showing them pictures of certain professions with titles and asking them to decide whether men or women could have each of the occupations, concluded that children do not show the ability to grasp that occupations (such as doctor or nurse) can indicate both women and men, as these children were quite inflexible as to whether each of the jobs was performed by women or men.

Furthermore, Sato, Gygax and Gabriel (2016) found that gender-related information is automatically activated when reading nouns that refer to roles expected to be either male or female. These authors concluded that this activation occurs at the lexical level as soon as the reader comes across a noun referring to either stereotypically male or stereotypically female roles. Studies have demonstrated that gender stereotypes are the product of reinforcement of which behaviors are appropriate for each gender, learning through the observation of others’ actions and socialization with family and friends (e.g., Poulin-Dubois, Serbin, Eichstedt, Sen, & Beissel, 2002).

2.4.1 Violation of gender expectancy

This section will review several studies done with different techniques and testing participants of different language backgrounds which have all found evidence that sentences or pairs of words that present gender stereotype incongruence (for example, female engineer/male teacher) take longer to process than congruent ones – e.g. male engineer/female teacher.

Carreiras, Garnham, Oakhill and Cain (1996) conducted a self-paced reading task, which is a technique in which participants determine the pace at which the written stimuli are presented. The participants are asked to click on a key to indicate they have read and understood what they have been presented and the next part is then shown. The reading time of each part is recorded. Self-paced reading tasks might require the participant to read sentence by sentence, phrase by phrase or word by word. This type of technique has been frequently used to study resolution of anaphors, as it gives good evidence of when the participant experiences difficulty in comprehension (Garrod, 2006).

In the experiment carried out by Carreiras et al. (1996), the participants, who were English native speakers, were shown a short text composed of two sentences. The subject of the first sentence was always composed by a noun which referred to a job. These nouns could be stereotypically male, stereotypically female or not carry a gender stereotype. The second sentence presented an anaphoric pronoun which referred to the subject of the previous sentence (e.g., The electrician examined the light fitting. He/She needed a special attachment to fix it.). The reading times for the second sentence
were recorded. They found that when the nouns referred to stereotypically male or female jobs, if there was an incongruency between the noun and the pronoun, reading times of the second sentence were slower than when there was congruency between the noun and the pronoun. However, no effect of gender of the pronoun was found when the noun did not carry any gender expectancy. That is, there was no difference in reading times between the sentences with this type of noun which were followed by a male anaphoric pronoun and those followed by a female anaphoric pronoun.

Kennison and Trofe (2003) found similar results when they employed a reading experiment to investigate violations of gender stereotypes in English, with a similar paradigm as Carreiras et al. (1996). However, in this experiment, in contrast with the study of Carreiras et al., reading times were measured in each region of the sentence, as the experiment was done using a self-paced phrase-by-phrase moving window. Like Carreiras et al., Kennison and Trofe reported that the reading times significantly increased when the sentence displayed an incongruency between the gender of the pronoun and the expectancy activated by the noun. These authors found this effect of gender incongruency in the two regions immediately after the region showing the pronoun.

Duffy and Keir (2004) analyzed the eye movements of English participants while they read sentences which contained a role noun stereotypically associated with either males or females and a reflexive pronoun which referred to the role noun. The authors aimed to test whether having discourse context affects the activation of gender-related information. There were three types of context: sentences without context, e.g., *The babysitter found herself/himself humming while walking up to the door;* paragraphs with neutral context, e.g., *Jeff’s/Lucy’s power had been unreliable ever since the tornado. The electrician was cautious and carefully secured the ladder to the side of the house before checking the roof. Jeff/Lucy suspected that high winds had loosened the connection to the power lines. The electrician taught herself/himself a lot while fixing the problem;* and paragraphs which expressed the gender of the referent, e.g., *Jeff’s/Lucy’s power had been unreliable ever since the tornado. The electrician was a cautious woman/man who carefully secured her/his ladder to the side of the house before checking the roof. Jeff/Lucy suspected that high winds had loosened the connection to the power lines. The electrician taught herself/himself a low while fixing the problem.*

When the participants were not shown a paragraph context or when the paragraph context was of neutral discourse context (that is, the context discourse did not state right away whether the referent was a woman or a man), then fixation times on the reflexive pronoun and the region following the pronoun were inflated if the sentence displayed an incongruency between noun and reflexive pronoun. If the discourse context paragraph already expressed the gender of the referent then there was no inflation of the fixation times even in incongruent sentences. Therefore, the authors concluded that gender stereotypes are activated automatically when there is no previous information regarding the gender of the referent.

Irmen (2007) conducted two eye-tracking experiments to study the effects of grammatical gender and stereotypical gender expectancies in the processing of generic role names. German participants were asked to read short paragraphs which started with a role noun referring to a social or occupational group. In the first experiment these role nouns were presented in the masculine plural form as this form can be used to denote both males and females, while in the second one the role nouns used were grammatically unmarked for gender as they had the same forms for the masculine and feminine plurals. Later in the passage an anaphoric expression (*diese Männer/these men or diese Frauen/these women*) specified the gender of the group mentioned previously. Experiment 1 demonstrated that participants took significantly longer to read the determiner of the anaphoric expression as well as the word right after the pronoun when there was an incongruency between the gender stereotype carried by the role noun and the anaphoric expression. It also showed that in sentences with a feminine
anaphoric pronoun, there was an effect of the incongruency between the antecedent’s grammatical gender and the pronoun, which made the reading of the anaphoric pronoun itself slower. Experiment 2 revealed a male bias in relation to gender-unmarked nouns, regardless of stereotypical gender expectancies or the lack of grammatical gender marking. That is participants seem to expect that even plural nouns that do not have a grammatical gender marking are mostly used to refer to males, as is evidenced by the fact that they took longer to read the determiner of the anaphoric expression in sentences with feminine anaphoric pronouns.

Lassonde and O’Brien (2013) tested whether gender-neutral language, which has now been increasingly used to replace male-biased language, still activates an implicit male bias. Participants were asked to read short paragraphs in English. In both experiments the target noun could be either male-biased (for example, fireman) or gender-neutral (for example, firefighter). A target sentence later in the paragraph specified the gender of the subject to which the target noun referred. In experiment 2 another sentence was added which defined the gender of the subject before the target sentence. The results of experiment 1 showed that participants read sentences with a female anaphoric pronoun slower than sentences with a male anaphoric pronoun, regardless of whether the occupation had been introduced by a male-biased noun or a gender-neutral noun. However, in experiment 2, only sentences containing male-biased nouns followed by female anaphoric pronouns showed an effect of incongruency. In sentences with gender-neutral nouns, the added information about the gender of the subject, weakened the activation of gender stereotypes and eliminated the difficulty in reading the sentences with female anaphoric pronouns.

Gygax, Gabriel, Sarrasin, Garnham and Oakhill (2008) tested English (a language which has no grammatical gender), French (a language with a two-way grammatical gender system) and German (which has a three-way grammatical gender system) native speakers in their respective languages to see if grammatical gender (in this particular case, the use of a “generic masculine”) or social stereotypes influence more the activation of gender when reading role nouns. The authors used a sentence evaluation paradigm, in which participants were first shown a sentence which contained a noun in its plural form referring to a group of people (these nouns could be stereotypically female roles, stereotypically male or considered neutral). The participants were then shown a second sentence which stated that some (but not all) of the referents were either men or women. After each sentence, the participants were asked if the second sentence was a sensible continuation of the first. The authors found that German and French participants were biased towards a male representation when seeing nouns in the masculine plural form, irrespective of the stereotype associated with the noun. English participants, on the other hand, activated the gender socially connected to each specific noun. This lead the authors to conclude that the effect of grammatical gender overrides the effect of gender stereotypes, which means that the use of “generic masculines” is indeed discriminatory to women, as “generic masculines” seem to always activate a male representation and not a neutral one.

Sato et al. (2016) used a linguistic-visual paradigm to study if there is an effect of the grammaticization of gender information on the participants’ gender representations. They tested French and German bilingual speakers, so they could compare these two languages as both languages have a male gender bias but also because the plural determiners in these languages (les [generic] in French vs. die [morphologically feminine] in German) should prompt different gender biases. Participants were asked to judge whether each pair of faces (which could be of either two men or of a man and a woman) could embody the noun prime which represented either stereotypically male or stereotypically female roles. The prime was shown in the masculine plural form and could be shown either with or without the plural determiner. The authors found that participants responded faster to pairs of faces showing two men than showing a man and a woman, which they interpret as the fact that participants...
understand role nouns, which can be used in a generic manner to mean both men and women, as actually being male-specific rather than generic. There was, however, no effect of the determiner, which the authors consider is because only gender information linked with the role noun had been activated.

Furthermore, it is interesting to note that similar results have also been found in neurolinguistics studies using EEGs, which means that these effects can also been found measuring brain activity. Osterhout, Bersick and McLaughlin (1997), Siyanova-Chanturia et al. (2012), Molinaro, Su and Carreiras (2016) and Proverbio et al. (2017) have all found proof of disruption in the brain activity of participants who are shown sentences which present violations of gender expectancies.

While in the studies reviewed above there does not seem to be a difference between the two types of incongruencies possible (stereotypically male noun followed by a feminine anaphoric pronoun or stereotypically female noun followed by a masculine anaphoric pronoun), there have been several other different studies which have found asymmetries in the acceptability of males in stereotypically female activities and of females in stereotypically male roles.

Three different psycholinguistics studies by Cacciari and Padovani (2007), Reali, Esaulova and von Stockhausen (2015) and Reali, Esaulova, Öttl and von Stockhausen (2015), as well as a neurolinguistic study by Siyanova-Chanturia, Pesciarelli and Cacciari (2012) testing participants of different language backgrounds with different techniques all found the same type of asymmetry. Cacciari and Padovani showed Italian native speakers pairs of stimuli, of which the first was a prime word and the second a target pronoun (lui or lei). The participants were asked to decide the grammatical gender of the pronoun without paying attention to the prime word. The prime words were nouns referring to roles which could be stereotypically female, stereotypically male or have no associated gender stereotype. In experiment 1 the authors did not find an effect of stereotypes on the decision times. That is, there was no significant difference between congruent and incongruent pairs, in relation to the control prime (with role nouns that do not prompt a stereotype). Yet, in experiment 2, after increasing the interval between the presentation of the prime word and the target pronoun, results showed a gender stereotype priming effect. The authors found that both types of congruent pairs (stereotypically female occupations followed by feminine pronouns and stereotypically male followed by masculine pronouns) show a facilitation of the decision times, in comparison with the control (i.e, when the prime words were nouns which have no associated gender stereotype).

Reali, Esaulova and von Stockhausen (2015) used a priming paradigm and an eye-tracking experiment to try to separate the effects of gender stereotypes from those of grammatical gender. In the first experiment the authors primed German participants with descriptions of stereotypically male or female jobs as well as occupations that do not prompt the activation of gender-related information. Then participants had to decide as fast and accurately as possible if the noun which followed the description corresponded to that description or not. These nouns could appear in the grammatical gender form which matched the gender stereotype of the job described or not. In the second experiment, participants were asked to read a sentence with a description of an occupation which was followed by a sentence with an anaphoric personal pronoun, which revealed the gender of the referent. They found that jobs that did not carry a stereotype showed no priming effect.

Reali, Esaulova, Öttl and von Stockhausen (2015) also used an eye-tracking experiment, similar that of the second experiment in Reali, Esaulola and von Stockhausen (2015). However, Reali, Esaulova, Öttl and von Stockhausen tested English native speakers. Furthermore, the authors tested both highly stereotyped and moderately stereotyped jobs: the jobs used in the first experiment were rated as being very stereotypically male or very stereotypically female, while the ones used in the second
experiment were rated as being only slightly stereotypical. Surprisingly, since Reali, Esaulova and von Stockhausen found no priming effect of the jobs which do not carry a stereotype, Reali, Esaulova, Öttl and von Stockhausen reported that participants seem to find it easier to integrate a masculine rather than a feminine in the sentences with jobs that do not carry a stereotype.

Siyanova-Chanturia et al. (2012) used ERPs to test Italian native speakers. Participants were implicitly primed by definitional (passagereF.S. [passenger], pensionatoM.S. [pensioner]) or stereotypical antecedents (insegnantes, [teacher], conducentes, [driver]) and the brain response to third-person pronouns (lei [she], lui [he]), which followed the primes, was measured.

Furthermore, all three studies found an asymmetry in the acceptability of males in stereotypically female jobs and of females in stereotypically male jobs in the same direction. Cacciari and Padovani (2007) found that the decision times for feminine pronouns were the same regardless of whether the prime had been incongruent or neutral, while for the masculine pronouns there was an inhibitory effect when the prime was incongruent. That is, participants took longer to make the decision after an incongruent prime than a neutral one for masculine pronouns. Like Cacciari and Padovani, Reali, Esaulova and von Stockhausen (2015), Reali, Esaulova, Öttl and von Stockhausen (2015) and Siyanova-Chanturia et al. (2012) all found that the participants were more likely, as well, to accept females in stereotypically male roles than males in stereotypically female roles in both of their experiments. However, Reali, Esaulova, Öttl and von Stockhausen did not find this asymmetry in the results of the second experiment (which had sentences with jobs which had been rated as only moderately stereotypical), as there was an effect of incongruency both when the sentence had with a male anaphoric pronoun and when it was with a female anaphoric pronoun.

Siyanova-Chanturia, Warren, Pesciarelli and Cacciari (2015) tested Italian participants of different age groups to compare the activation of gender-related information at different ages. The authors tested children in third and fifth grade, young adults (mean age of 24) and older adults (mean age of 77). Participants heard two words, the first of which was a noun referring to a stereotypically male or stereotypically female role and the second of which was a kinship term. They were asked to decide whether these two words could depict the same person. Participants of all age groups were significantly more prone to answer “yes” and to do it faster when there was a congruency between the kinship noun and the role noun than when there was an incongruency. Older adults, as well as the two groups of children, when compared to younger adults, show a lower flexibility to stereotypes, which means they seem to be less likely to adjust the connections that activate automatically when prompted with a stereotypical role. That is, they are less likely to respond “yes” and will do it slower when presented with an incongruent pair of words.

Unlike in the three studies reviewed above, Siyanova et al. (2015) found that the asymmetries in the acceptability of the incongruent pairs went in a different direction, particularly in the results of the two children’s groups and the older adults. Contrary to the studies above, the participants were more likely to accept male kinship nouns in typically female activities. In addition, they also found an asymmetry in the congruent pairs. The participants were more likely to answer “yes” and to do it faster in the word-pairs with stereotypically male occupations and masculine pronouns. Furthermore, they found that the males of the two children’s groups as well as the male older adults were less likely to respond “yes” to female kinship terms than their female counterparts, but more likely to answer “yes” to male kinship nouns. They also found that female’s decision times did not vary between the two genders of the kinship terms, but male’s decision times were faster for male kinship terms. Looking at the fact that both in congruent and incongruent sentences, male participants were more likely to answer “yes” and to do it faster to male kinship nouns, together with the fact that female participants took the same amount of time for any of the kinship nouns, these authors concluded this
is due to the use of “male generics”. That is, the use of masculine nouns as the unmarked gender, leads males (particularly those of the older adults and children’s groups), who are part of the unmarked normative group, to be less able to inhibit stereotypical expectancies, while females, being part of the unmarked normative group, are more sensitive and better able to correct for this bias. Results show, then, that people across all ages are influenced by gender stereotypes when trying to decide the probable gender of a person in a certain activity, and that there are asymmetries not only in the acceptability of congruent and incongruent pairs but also between female and male participants and between the age groups.

Thus, it can be seen that studies using a variety of diverse methodologies, including self-paced reading tasks, eye-tracking and priming paradigms, and testing in languages with different grammatical gender systems (two-way grammatical gender system, three-way grammatical gender system, and no grammatical gender system), have all found that the presence of incongruency between a stereotypically female or a stereotypically male noun and the gender of its referent (e.g. a female surgeon/a male nurse) leads to a difficulty in processing. Some studies have shown, though, that if there is contextualizing information, which specifies the gender of the referent, then this difficulty in processing is reduced. Moreover, a few studies have found an asymmetry in the acceptability of females in stereotypically male activities and males in stereotypically female activities. In fact, most of these reveal that participants some to find it easier to accept females in stereotypically male occupations. Finally, studies focusing on languages with grammatical gender have found evidence that “generic masculines” often activate a male representation.

2.5 Research Questions

Many studies have looked at gender stereotype incongruencies in regards expectancies of what is considered a typically female or a typically male activity, job or behavior. However, very few have studied the potential differences of the effect of gender expectancies when the sentences present gender-neutral nouns. This experiment compares the reaction times of sentences with incongruent information to those with congruent information to investigate whether there is a male expectancy, a female expectancy or no expectancy at all. If a sentence has a noun which activates a connection with masculine attributes, then the reader will assume the noun refers to a male. If then the second part of the sentence displays, the anaphoric pronoun she, an increase can be expected in the reading times. And the same will happen, if the sentence has a noun which activates a connection with feminine attributes and the anaphoric pronoun he (Lassonde & O’Brien, 2013). Therefore, the aim of this study is to compare the reading times of English sentences with gender-neutral nouns and with nouns that refer to jobs in an attempt to compare gender expectancies in regards these two types of words. It will also try to find out if the type of gender system (i.e., English vs. Portuguese) of the L1 of the participants further affects gender expectancies.

That is, what are effects of the L1 (whether it has a grammatical gender system or not) on gender expectancies, as seen by the reading times of sentences containing nouns that do or do not refer to a stereotypical male or female gender?

Furthermore, is there any gender expectancy when participants read sentences with a gender-neutral noun? In other words, is there any difference in reading times between sentences presenting a gender-neutral noun and a male anaphoric pronoun and sentences presenting a gender-neutral noun and a female anaphoric pronoun?

Finally, is there an impact of English proficiency of Portuguese native speakers, as well as amount of use, on the reading times of the three types of sentences?
Thus, this study hypothesized that both English and Portuguese native speakers should take longer reading English sentences that present an incongruency between the job and the gender socially associated with it than sentences that are congruent. As most studies show, regardless of whether the language has a grammatical gender system or not, incongruent sentences are processed with more difficulty than congruent one. Secondly, this project hypothesized that there might be an asymmetry in the acceptability of females in stereotypically male roles and of males in stereotypically female activities, as has been found in the studies of Cacciari and Padovani (2007), Reali, Esaulova and von Stockhausen (2015), Reali, Esaulova, Öttl and von Stockhausen (2015), Siyanova-Chanturia et al. (2012) and Siyanova-Chanturia et al. (2015).

Thirdly, this project hypothesized that English native speakers should read all sentences with gender-neutral nouns similarly regardless of the gender of the anaphoric pronoun presented in the sentence, since Carreiras et al. (1996) found that reading times for English nouns that did not carry a gender expectancy did not change, regardless of the anaphoric pronoun present in the sentence.

Fourthly, this study hypothesized that, in contrast with the English native speakers, sentences that present gender-neutral nouns should not all be read similarly by the Portuguese native speakers. In fact, this study predicted that sentences presenting a gender-neutral noun and a masculine anaphoric pronoun would be read faster than sentences with a gender-neutral noun and a feminine anaphoric pronoun, as Portuguese native speakers should expect the “unmarked form” to always be masculine, as has also been found in studies testing participants with other languages with grammatical gender – e.g., Gygax et al. (2008) and Sato et al. (2016). However, we also hypothesize that the more a Portuguese native speaker uses English the shorter the difference in reading times, therefore the more a Portuguese native speaker uses English the more similarly they should read all sentences with gender-neutral nouns.
3. Methodology

3.1 Participants

32 participants (19 females, mean age 34 (range 19-69), SD 11.8) volunteered to do the experiment. The participants belonged to two groups of 16 people each, one of English native speakers (9 females, mean age 38 (range 19-69), SD 14.3) and one of Portuguese native speakers (10 females, mean age 30 (range 23-43), SD 7.1).

Sixteen of the participants (8 from each language group) read the sentences of one of the lists (see Section 3.2 below) and the other sixteen were tested with the other list.

Participants were not informed of the purpose of the experiment, so they would not be primed to what it is being looked at. Instead, the participants were told that the aim of the experiment was to see how well Portuguese native speakers memorize information in English and English native speakers were needed as a control group.

Additionally, 62 English native speakers, who did not take part in the main self-paced reading task, were asked to fill in an online pre-test questionnaire to validate the nouns used in the present experiment.

3.2 Materials

The final self-paced reading experiment was composed of 52 critical sentences, of which 15 had nouns referring to stereotypically male jobs, 15 with nouns referring to stereotypically female jobs, and 22 containing neutral nouns. The nouns referring to jobs were chosen from the lists from Carreiras, Garnham, Oakhill and Cain (1996) and Molinaro, Su and Carreiras (2016). The gender-neutral nouns were chosen taking into account several criteria which will be discussed below.

In order to select the gender-neutral words, an online questionnaire was designed with 46 words provided by an English native speaker. Certain words were immediately discarded as the translated words in Portuguese are epicene nouns, in which the grammatical gender of the word is always the same, regardless of whether they refer to male or female people. Words that when translated to Portuguese were epicenes nouns that have the same form but have different grammatical genders depending on whom they refer to were kept in the list for the questionnaire.

The pre-test questionnaire asked participants some background questions, including their gender, age, whether English was their native language, whether they spoke other languages at home while growing-up and what these were, in case the answer was affirmative. The participants were, then, asked to rate the words on a 7-point Likert scale (1 = undoubtedly male, 7 = undoubtedly female). The 47 words were presented in 6 sections, with the headings “Family”, “Relations”, “Work”, “Roles”, “Activities” and “Life”, so as not to have a too long list of words.

The pre-test questionnaire, which was shared on social media, was filled in by 62 participants. Of these, 14 answers were rejected because the participant spoke another language at home while growing-up, which might bias their answer.

Of the 46 words included in the online questionnaire (see Table 1), 22 were selected to be used in the self-paced reading task as neutral nouns. In the experiment, only items with average ratings between 3.75 and 4.25 (with 4 being perfectly neutral) were used. Furthermore, words of which the score had a standard deviation above 1 were excluded to guarantee that items that were chosen in equal amounts in both extremes would not be used. The remaining words were checked for frequency in a word frequency data list based on the Corpus of Contemporary American English (Word frequency
data, n.a.) and only items which appeared in the list of the 5000 more frequent words were selected, so as to not affect reading speed. Furthermore, words which in Portuguese are epicene nouns unspecified for gender and end in -a, which is an ending that most frequently marks for feminine (Villalva & Mateus, 2007) were discarded. Lastly, sibling was discarded since in Portuguese there is no such a word that can represent both a brother and/or a sister. In fact, in Portuguese, when referring to both male and female siblings, one would use the word irmãosm.pl., which could bias the answers of Portuguese native speakers.

Table 1. Nouns Used in the Experiment.

<table>
<thead>
<tr>
<th>Noun</th>
<th>M</th>
<th>SD</th>
<th>Noun</th>
<th>M</th>
<th>SD</th>
<th>Noun</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td>4.15</td>
<td>0.80</td>
<td>Friend</td>
<td>3.79</td>
<td>0.77</td>
<td>Relative</td>
<td>4.15</td>
<td>0.62</td>
</tr>
<tr>
<td>Ally</td>
<td>3.83</td>
<td>0.91</td>
<td>Grandchild</td>
<td>4.04</td>
<td>0.65</td>
<td>Resident</td>
<td>4.06</td>
<td>0.73</td>
</tr>
<tr>
<td>Baby</td>
<td>4.02</td>
<td>0.48</td>
<td>Mentor</td>
<td>4.10</td>
<td>0.90</td>
<td>Speaker</td>
<td>4.13</td>
<td>0.57</td>
</tr>
<tr>
<td>Citizen</td>
<td>4.17</td>
<td>0.78</td>
<td>Neighbor</td>
<td>4.17</td>
<td>0.81</td>
<td>Student</td>
<td>3.94</td>
<td>0.56</td>
</tr>
<tr>
<td>Client</td>
<td>4.23</td>
<td>0.83</td>
<td>Partner</td>
<td>4.19</td>
<td>0.91</td>
<td>Teenager</td>
<td>3.96</td>
<td>0.74</td>
</tr>
<tr>
<td>Companion</td>
<td>3.98</td>
<td>0.73</td>
<td>Passenger</td>
<td>4.08</td>
<td>0.35</td>
<td>Traveler</td>
<td>4.23</td>
<td>0.66</td>
</tr>
<tr>
<td>Cousin</td>
<td>4.04</td>
<td>0.68</td>
<td>Patient</td>
<td>3.96</td>
<td>0.41</td>
<td>Twin</td>
<td>3.88</td>
<td>0.64</td>
</tr>
<tr>
<td>Employee</td>
<td>4.19</td>
<td>0.70</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

The experiment consisted, therefore, of 22 sentence pairs with gender-neutral nouns, 15 sentence pairs with nouns that refer to jobs stereotypically connoted with men and 15 sentence pairs with nouns of jobs which are socially associated with females. Each pair consisted of a congruent and an incongruent version of the sentence. 53 filler sentences were added, making a total of 105 sentences. The subjects of the filler sentences were nouns referring to animals, to distract the participants from noticing the goal of the study.

All sentences were made up of between 11 and 14 words and had about the same length. All 105 sentences had a similar syntactical structure: the sentences consisted of two clauses, linked by a connective (e.g., The plumber forgot the toolbox, so he had to go back to grab it.). The subject of the sentence appeared as the second word of the sentence, and the anaphoric pronoun which referred to it was located after the connective. The sentences were carefully constructed so that there was no indication of the gender of the subject until the anaphoric pronoun.

Using a Latin Square design, the sentences were presented in two counterbalanced lists. Each sentence appeared only once in each list, but in a different condition (congruent or incongruent) in each of the lists. The number of congruent and incongruent sentences, as well as the number of either of the pronouns (he or she) was balanced between lists. The sentences which appeared first in one of the lists were presented last in the other. Participants were also presented with questions (always the same questions in both lists) to make sure they were reading the sentences correctly and carefully,
and not simply advancing to the next word without processing the meaning of what they were reading. A question was presented every seven sentences. The number of answers “yes” and answers “no” was balanced within the presentation lists.

The participants were also asked to fill in a questionnaire on the languages they had some proficiency in, based on a questionnaire adapted from Loerts (2012). The participants were asked all languages in which they considered they had some proficiency, which language they considered their mother tongue, how often and in what context they used their native language and what they considered to be their level of proficiency in their mother tongue. They were also then asked in relation to their second language, third and so forth, for all the languages they had mentioned previously, at what age and where they learned it, how often and in what context they used it and what their considered to be their level in it. Proficiency was rated on a 5-point Likert scale – anchored at one extreme by 1 = Very bad, and at the other extreme by 5 = Very good. Finally, they were asked some background information, including their age, gender, place of birth, place of residence and how long they had lived there, among other information (see Appendix C).

3.3 Procedure

The experiment used in this study was based on the contradiction paradigm by Lassonde and O’Brien (2013), in which participants read congruent sentences and sentences which include information which displays incongruency with knowledge that the participations have in their long-term memory (that is, either previous knowledge of the world or from a previous part of the text). A considerable advantage of this paradigm is that it takes advantage of naturally occurring memory processes which happen during reading. For this reason, the contradiction paradigm does not need an explicit response, which is particularly useful as the aim is to test stereotypical expectations with an implicit test that prevents people from self-censoring due to social desirability (Lassonde & O’Brien, 2013).

The experiment lasted, on average, around 30 minutes, including the filling in of the questionnaire on the languages of the participants (see Appendix C). The participants were asked to read sentences one word at a time and their reading time was recorded, as well as their answers to the comprehension questions. The experiment was conducted on the researcher’s computer, using E-Prime software (Psychology Software Tools, Pittsburgh, PA; Schneider, Eschmann, & Zuccolotto, 2002), and the add-on Moving Window was used so the reading of the sentences was done left-to-right resembling the reading of a normal text, instead of having a word at a time showing up in the middle of the screen.

Each participant was tested individually in a quiet room. The participants were asked to read the sentences as fast as possible but still carefully. Before the experiment started the researcher explained how the experiment worked and stayed next to the participant while they did the practice run, but then moved away so as not to cause pressure on the participant. The experiment started with a screen with the instructions. Then there was a short practice run with only three sentences, followed by a question and feedback on the answer. Before the actual experiment started, there was another screen reminding participants of the instructions. Participants were not given feedback on their answers in the experiment itself, so they would not get distracted particularly in the case of a wrong answer.

Each sentence was presented in the center of the computer screen in black font (Courier New, font size 14) on a white background. The sentence appeared all at once, with the first word showing but the next words being replaced by dashes (e.g., The plumber forgot the toolbox, so he had to go back to grab it. would first appear -> The ------- ------- ------ ---- ---- ---- ---- ---- ---- ---- -- --. The participants were instructed to press the SPACE bar for the next word. When doing so they would uncover only the following word, while the previous word would also be replaced by dashes and the remaining would
still be masked (e.g., *The plumber forgot the toolbox, so he had to go back to grab it.* would then appear -> ***plumber*** ------ --- -------- -- -- -- ----- -- ---- -- -- ---- -- -- --__). The next word would only appear if the participant clicked on the SPACE bar and solely on that key. The participants were also reminded to also click on the SPACE bar after the very last word, so the next screen would appear. In between sentences there was a blank screen which had a duration of 2000 ms. The participants were instructed not to click on the SPACE bar during this screen, so they would not skip the first word of the following sentence by mistake.

The sentences were divided into 15 blocks of seven sentences each. The sentences inside each block were shown in a random order. Every 7 sentences, participants were asked a comprehension question, to which they had to answer “yes” or “no”, except in the case of the practice run which was composed of only 3 sentences. The participants were instructed to click on the “1” key in case the answer was “yes” and to click the “9” key if the answer was “no”. The question screen had no set duration and the next sentence would only appear after the participant gave an answer. The experiment was divided into 5 parts of 21 sentences and 3 questions each and 4 breaks. These breaks had no set duration and the participants were told they could take as long or as little as they needed. The participants were instructed to click on the SPACE bar to continue with the experiment.

After the experiment the participants had to fill in the questionnaire on the languages they spoke, which was answered in a Google form (see Appendix C).

### 3.4 Data Analysis

Data was analyzed using R (R Core Team, 2012). Only two parts of the sentence were analyzed: the **critical** region, which in this study is the pronoun, and the immediate **spillover** region (which in this experiment is the word right after the pronoun) in case of any delayed processing effects. These two regions were analyzed separately.

It is also important to note that for the purposes of this study, sentences displaying a gender-neutral noun and a female anaphoric pronoun were considered incongruent, while sentences displaying a gender-neutral noun and a male anaphoric pronoun were considered congruent.

A regression model was fit to each of the regions analyzed to determine if there was an effect of language, congruency or type of noun (gender-neutral, stereotypically female or stereotypically male) on reading times. Moreover, a contrast coding was performed to see if there is a difference between gender-neutral nouns and nouns which refer to jobs (both stereotypically male and stereotypically female). Furthermore, another separate regression analysis was carried out on each of the regions of the data of the Portuguese native speakers to determine if the level of English proficiency and the amount of English use influenced the gender expectancies of Portuguese native speakers.

For all analyses, the $\alpha$ level was set at 0.05, since this is the standard error level set for statistical tests in the field of linguistics.
4. Results

This chapter details the results of the statistical analyses carried out. The results will be divided into three different sections, according to the research questions.

Before proceeding with the analysis, all data points which were under 50 ms and 2 SD above each of the participant’s mean reading time (RT) were removed from further analyses for being outliers. This resulted in the loss of 4.4% of the data (4.2% of the data for the reading times in the critical region and 4.7% of the data for the reading times in the crossover region).

To get an overview of the data, descriptive statistics were performed in first place. As can be seen in Table 2, in the critical region nouns referring to jobs stereotypically connected to males ($M=404.44$) took the longest to read, followed by nouns referring to occupations stereotypically linked with females ($M=403.66$) and with gender-neutral nouns ($M=400.72$) taking the shortest amount of time to read. Pronouns embedded in sentences displaying congruency between the noun and the pronoun overall took longer ($M=408.35$) than in sentences which had an incongruency between the noun and the pronoun ($M=396.89$). English native speakers ($M=387.92$) read the sentences faster than Portuguese native speakers ($M=417.46$).

In the spillover region, sentences containing nouns referring to jobs stereotypically associated with males ($M=409.75$) took the least amount of time, while gender-neutral nouns ($M=416.96$) taking the longest, followed by female ($M=410.75$). Sentences which presented congruency between the noun and the pronoun ($M=417.82$) took longer than sentences exhibiting incongruency between the noun and the pronoun ($M=408.37$). English native speakers ($M=389.18$) took less time than Portuguese native speakers ($M=437.16$) reading the sentences.

Table 2. Mean scores and standard deviations for each type of noun, for congruency and incongruency and for each language group.

<table>
<thead>
<tr>
<th>Region</th>
<th>Statistic</th>
<th>Male</th>
<th>Female</th>
<th>Neutral</th>
<th>Congruent</th>
<th>Incongruent</th>
<th>English</th>
<th>Portuguese</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical</td>
<td>$M$</td>
<td>404.44</td>
<td>403.66</td>
<td>400.72</td>
<td>408.35</td>
<td>396.89</td>
<td>387.92</td>
<td>417.46</td>
</tr>
<tr>
<td></td>
<td>$SD$</td>
<td>148.98</td>
<td>156.92</td>
<td>148.79</td>
<td>149.8</td>
<td>152.41</td>
<td>145.46</td>
<td>155.39</td>
</tr>
<tr>
<td>Spillover</td>
<td>$M$</td>
<td>409.75</td>
<td>410.75</td>
<td>416.96</td>
<td>417.82</td>
<td>408.37</td>
<td>389.18</td>
<td>437.16</td>
</tr>
<tr>
<td></td>
<td>$SD$</td>
<td>167.49</td>
<td>164.42</td>
<td>173.22</td>
<td>168.24</td>
<td>169.68</td>
<td>150.38</td>
<td>182.82</td>
</tr>
</tbody>
</table>

4.1 Effects of L1 on gender expectancies of nouns that do or do not refer to a stereotypical male or female gender

A regression was calculated to predict the reading times based on the language background, the type of noun (nouns referring to jobs stereotypically male, nouns referring to occupations stereotypically female and gender-neutral nouns) and the congruency between the noun and the anaphoric pronoun for the critical region. A significant regression equation was found ($F(4, 1589)=4.429, p < 0.05$) with $R^2=0.011$. On average, English native speakers had significantly shorter reading times than the Portuguese native speakers, as can also be seen from the negative coefficient for ‘Language English’ in Table 3. There was no overall difference in reading times due
to incongruency, $p=0.141$ and also no significant influence was found for type of noun (see Table 3).

Table 3. Regression coefficients for the linear model of reading times in the critical region as a function of language background, type of noun and congruency.

<table>
<thead>
<tr>
<th>Predictor variable</th>
<th>Regression coefficient</th>
<th>SE</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>424.913</td>
<td>8.809</td>
<td>48.239</td>
<td>$&lt; 2^{-16}$</td>
</tr>
<tr>
<td>Language English</td>
<td>-29.402</td>
<td>7.541</td>
<td>-3.899</td>
<td>0.0001</td>
</tr>
<tr>
<td>Congruency incongruent</td>
<td>-11.117</td>
<td>7.541</td>
<td>-1.474</td>
<td>0.141</td>
</tr>
<tr>
<td>Word female</td>
<td>-1.137</td>
<td>9.904</td>
<td>-0.115</td>
<td>0.909</td>
</tr>
<tr>
<td>Word neutral</td>
<td>-3.970</td>
<td>9.109</td>
<td>-0.436</td>
<td>0.663</td>
</tr>
</tbody>
</table>

Then a regression was calculated to see if there is an interaction between language background, the type of noun and the congruency between the noun and the anaphoric pronoun for the critical region. A significant regression equation was found ($F(11, 1582)=2.307, p < 0.05$) with $R^2=0.016$. There was no significant effect of language background ($\beta=-25.558, p=0.197$) on reading times. There was no overall difference in reading times due to incongruency ($\beta=-32.161, p=0.108$). And no significant influence was found for type of noun (referring to a stereotypically female job ($\beta=-14.234, p=0.470$) or a gender-neutral noun ($\beta=-25.930, p=0.152$)). The interaction between variables is not significant at the chosen alpha-level (see Figures 1 and 2).

*Figure 1. The effect of congruency and language background for the critical region.*
Figure 2. Boxplot showing the reading times in the critical region of both English and Portuguese native speakers for all three types of nouns by congruency. The legend on the right of the boxplot specifies which colors correspond to which type of noun.

Another regression was carried out to predict the reading times based on the language background, the type of noun (nouns referring to jobs stereotypically male, nouns referring to occupations stereotypically female and gender-neutral nouns) and the congruency between the noun and the anaphoric pronoun for the spillover region. A significant regression equation was found ($F(4, 1580)=8.619, p < 0.05$) with $R^2=0.021$. On average, English native speakers had significantly shorter reading times than the Portuguese native speakers, as can also be seen from the negative coefficient for ‘Language English’ in Table 4. There was no overall difference in reading times due to incongruency, at $p=0.271$ and also no significant influence was found for type of noun (see Table 4).

Table 4. Regression coefficients for the linear model of reading times in the spillover region as a function of language background, type of noun and congruency.

<table>
<thead>
<tr>
<th>Predictor variable</th>
<th>Regression coefficient</th>
<th>SE</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>438.588</td>
<td>9.839</td>
<td>44.577</td>
<td>&lt;2^-16</td>
</tr>
<tr>
<td>Language English</td>
<td>-48.005</td>
<td>8.409</td>
<td>-5.709</td>
<td>1.36e-8</td>
</tr>
<tr>
<td>Congruency incongruent</td>
<td>-9.265</td>
<td>8.409</td>
<td>-1.102</td>
<td>0.271</td>
</tr>
<tr>
<td>Word female</td>
<td>0.588</td>
<td>11.037</td>
<td>0.053</td>
<td>0.957</td>
</tr>
<tr>
<td>Word neutral</td>
<td>7.335</td>
<td>10.138</td>
<td>0.724</td>
<td>0.469</td>
</tr>
</tbody>
</table>

Finally, a regression was calculated to see if there is an interaction between language background, the type of noun and the congruency between the noun and the anaphoric pronoun for the spillover region. A significant regression equation was found ($F(11, 1573)=3.76, p < 0.05$) with
$R^2=0.026$. There was no significant effect of language background ($\beta=-37.808$, $p=0.090$) on reading times. There was no overall difference in reading times due to incongruency ($\beta=-30.013$, $p=0.174$). And no significant influence was found for type of noun (referring to a stereotypically female job ($\beta=-18.348$, $p=0.408$) or a gender-neutral noun ($\beta=-12.947$, $p=0.528$)). The interaction between variables is not significant at the chosen alpha-level (as can be seen in Figures 3 and 4).

**Figure 3.** The effect of congruency and language background for the spillover region.

**Figure 4.** Boxplot showing the reading times in the spillover region of both English and Portuguese native speakers for all three types of nouns by congruency. The legend on the right of the boxplot specifies which colors correspond to which type of noun.

### 4.2 Gender-neutral nouns vs. nouns that refer to jobs

To determine if there is any difference in mean reading times between sentences with a gender-neutral noun and sentences which have nouns referring to jobs either stereotypically male or stereotypically female, a Dummy coding structure was used to run the regressions Dummy coding permits the researcher to compare group mean differences (Davis, 2010).
A regression was calculated to see if there are significant effects of each type of noun (gender-neutral, stereotypically male activity and stereotypically female activity) for the critical region. A significant regression equation was not found ($F(2, 1591)=0.097$, $p=0.907$) with $R^2<0.001$. There was no overall difference in reading times between gender-neutral nouns and nouns referring to jobs (see Figures 5 and 6).

**Figure 5.** Effect of type of noun (gender-neutral, stereotypically female job or stereotypically male job) and congruency for the critical region.

**Figure 6.** Effect of type of noun (gender-neutral, stereotypically female job or stereotypically male job) and language background for the critical region.

A regression was calculated to see if there are significant effects of each type of noun (gender-neutral, stereotypically male activity and stereotypically female activity) for the spillover region. A significant regression equation was not found ($F(2, 1582)=0.308$, $p=0.735$) with $R^2<0.001$. There was no overall difference in reading times between gender-neutral nouns and nouns referring to jobs (see Figures 7 and 8).
To determine if there is any difference in reading times between Portuguese native speakers depending on their level of English proficiency and the amount of English they speak, a subset was created with just the participants whose mother tongue was Portuguese.

A regression was calculated to predict the reading times based on level of English proficiency, amount of English use, the type of noun (nouns referring to jobs stereotypically male, nouns referring to occupations stereotypically female and gender-neutral nouns) and the congruency between the noun and the anaphoric pronoun for the critical region. A significant regression equation was found \((F(5, 737) = 27.75, p < 0.05)\) with \(R^2 = 0.158\). On average, the higher the level of English proficiency the faster the participants read the critical region in the sentence, as is clear from the significant negative coefficient for ‘English Proficiency’ (‘English Use’ in Table 5). On average, the more the participant used English \((M = 37.6; SD = 5.68)\) the faster they also read the
sentences. There was no overall difference in reading times due to congruency and no significant influence was found for type of noun (see Table 5).

Table 5. Regression coefficients for the linear model of reading times in the critical region as a function of level of English proficiency, amount of English used, type of noun and congruency.

<table>
<thead>
<tr>
<th>Predictor variable</th>
<th>Regression coefficient</th>
<th>SE</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>1003.483</td>
<td>52.220</td>
<td>19.216</td>
<td>&lt; 2^{-16}</td>
</tr>
<tr>
<td>English Proficiency</td>
<td>-25.248</td>
<td>2.509</td>
<td>-10.061</td>
<td>&lt; 2^{-16}</td>
</tr>
<tr>
<td>English Use</td>
<td>-3.704</td>
<td>0.834</td>
<td>-4.441</td>
<td>1.03^{-05}</td>
</tr>
<tr>
<td>Incongruent</td>
<td>-8.233</td>
<td>9.337</td>
<td>-0.882</td>
<td>0.378</td>
</tr>
<tr>
<td>Female word</td>
<td>-2.193</td>
<td>12.262</td>
<td>-0.179</td>
<td>0.858</td>
</tr>
<tr>
<td>Neutral word</td>
<td>-3.939</td>
<td>11.327</td>
<td>-0.348</td>
<td>0.728</td>
</tr>
</tbody>
</table>

Second, a regression was calculated to see if there is an interaction between level of English proficiency, the type of noun and the congruency between the noun and the anaphoric pronoun for the critical region. A significant regression equation was found \( F(11, 731)=11.17, p < 0.05 \) with \( R^2=0.144 \), but this model revealed no significant interaction between the variables (all \( p>0.094 \)).

Third, a regression was calculated to see if there is an interaction between amount of English use, the type of noun and the congruency between the noun and the anaphoric pronoun for the critical region. A significant regression equation was found \( F(11, 731)=3.503, p < 0.05 \) with \( R^2=0.05 \), but again this model revealed no significant interaction between the variables (all \( p>0.363 \)).

Fourth, a regression was calculated to predict the reading times based on level of English proficiency, amount of English use, the type of noun (nouns referring to jobs stereotypically male, nouns referring to occupations stereotypically female and gender-neutral nouns) and the congruency between the noun and the anaphoric pronoun for the spillover region. A significant regression equation was found \( F(5, 736)=27.45, p < 0.05 \) with \( R^2=0.157 \). On average, the higher the level of English proficiency the faster the participants read the spillover region in the sentences, as is clear from the significant negative coefficient for ‘English Proficiency’ in Table 6. On average, the more the participant used English (\( M = 37.6; SD = 5.68 \)) the faster they also read the sentences (‘English Use’ in Table 6). There was no overall difference in reading times due to congruency and no significant influence was found for type of noun (see Table 6).

Table 6. Regression coefficients for the linear model of reading times in the spillover region as a function of level of English proficiency, amount of English used, type of noun and congruency.

<table>
<thead>
<tr>
<th>Predictor variable</th>
<th>Regression coefficient</th>
<th>SE</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
</table>

29
Fifth, a regression was calculated to see if there is an interaction between level of English proficiency, the type of noun and the congruency between the noun and the anaphoric pronoun for the spillover region. A significant regression equation was found \( F(11, 730) = 12.27, p < 0.05 \) with \( R^2 = 0.156 \), but this model revealed no significant interaction between the variables (all \( p > 0.557 \)).

Finally, a regression was calculated to see if there is an interaction between amount of English use, the type of noun and the congruency between the noun and the anaphoric pronoun for the critical region. A significant regression equation was found \( F(11, 730) = 2.374, p < 0.05 \) with \( R^2 = 0.03 \), but this model revealed no significant interaction between the variables (all \( p > 0.499 \)).

<table>
<thead>
<tr>
<th></th>
<th>Coefficients</th>
<th>Standard Error</th>
<th>t</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>973.889</td>
<td>51.396</td>
<td>18.949</td>
<td>&lt; 2-16</td>
</tr>
<tr>
<td>English Proficiency</td>
<td>-26.681</td>
<td>2.495</td>
<td>-10.693</td>
<td>&lt; 2-16</td>
</tr>
<tr>
<td>English Use</td>
<td>-2.210</td>
<td>0.853</td>
<td>-2.591</td>
<td>0.010</td>
</tr>
<tr>
<td>Congruency incongruent</td>
<td>-3.339</td>
<td>9.544</td>
<td>-0.350</td>
<td>0.727</td>
</tr>
<tr>
<td>Word female</td>
<td>-0.693</td>
<td>12.506</td>
<td>-0.055</td>
<td>0.956</td>
</tr>
<tr>
<td>Word neutral</td>
<td>10.969</td>
<td>11.520</td>
<td>-0.952</td>
<td>0.341</td>
</tr>
</tbody>
</table>
5. Discussion

This chapter will discuss the results found in this experiment, presented in the previous chapter. As the sample size of this study was rather small, most of the results turned out non-significant. However, it is possible to discern some potential trends, which will be discussed now. In addition, this chapter will also try to compare the results found in this study with the results of the studies reviewed in Section 2.4.1, where possible. It will also attempt to answer whether the type of gender system of the L1 of the participants affects gender expectancies, as seen by the reading times of sentences containing nouns that refer to a stereotypical male or female gender, as well as to gender-neutral nouns. It will also try to answer whether there is an impact of English proficiency and use on Portuguese native speakers reading times and comment on the findings in relation to the hypothesis detailed in Section 2.5. The order in which the results were presented will be followed.

5.1 Effects of L1 on gender expectancies of nouns that do or do not refer to a stereotypical male or female gender

No significant interactions were found between language background, congruency and type of word. However, the absence of a significant interaction does not necessarily mean that there is no difference between the populations (Faraway, 2015). This lack of a significant finding might be due to the fact that the number of participants tested was quite low. Therefore, this section will now be looking at some possible trends as can be seen in Figures 1 to 4.

The study had hypothesized that both English and Portuguese native speakers should take longer reading sentences presenting an incongruency between the occupation and the gender stereotypically connected with it than sentences which showed congruency, regardless of whether the job is stereotypically female or male.

In Figures 2 and 4 (for the critical and spillover regions, respectively), it is possible to see that English native speakers behaved differently from what was expected. The study had expected English native speakers to read sentences with nouns referring to jobs which showed congruency between the noun and the anaphoric pronoun faster than sentences showing incongruency. However, the participants in this study took, on average, very similar amounts of time reading sentences which displayed congruency and sentences which displayed incongruency in both regions analyzed. This might be due to the fact, that as can be seen in Figures 1 and 3 (for the critical and spillover regions, respectively), English native speakers, on average, seem to have read sentences containing jobs (whether stereotypically male or stereotypically female) which displayed incongruency at very similar speeds, while they took longer, on average, to read congruent sentences with stereotypically male occupation than those with stereotypically female occupations which displayed congruency. As for the Portuguese native speakers, it is possible to see in Figures 2 and 4, that, as had been hypothesized, Portuguese native speakers did read congruent sentences faster than incongruent ones.

It had also been hypothesized that there might be an asymmetry in the acceptability of females in stereotypically male roles and of males in stereotypically female activities, as has been found in a few other studies such as the ones by Cacciari and Padovani (2007), Reali, Esaulova and von Stockhausen (2015), Reali, Esaulova, Öttl and von Stockhausen (2015), Siyanova-Chanturia et al. (2012) and Siyanova-Chanturia et al. (2015). Even though, this has not been found in the present study for the English native speakers, it is possible to see such an asymmetry in the reading times of the Portuguese native speakers. Portuguese native speakers seem to find it easier to accept females in stereotypically male activities than males in stereotypically female activities, as can be seen in Figure 1 and 3. These results are in accordance with those found by Cacciari and Padovani (2007), Reali, Esaulova and von

In fact, in both regions analyzed, within the sentences containing nouns which referred to occupations, sentences with a stereotypically male job and an incongruent anaphoric pronoun (that is, these sentences presented the female pronoun she) were, on average, read faster by Portuguese participants than any other sentence with nouns referring to jobs, as can be seen in Figure 1 and 3. This may be explained by the fact that “false generics” can frequently be used to refer to both males and females, when the gender of the referent is not relevant or not known (see Section 2.1.2), which may lead to a lack of inhibition effect of the incongruency between the noun and the anaphoric pronoun, since participants may actually activate both concepts of male and female people. Stereotypically female professions, on the other hand, probably only activate the concept of female people, since they are marked for female only (Cacciari & Padovani, 2007; Reali, Esaulova, & von Stockhausen, 2015; Reali, Esaulova, Öttl, & von Stockhausen, 2015).

It is important to note, however, that in Figures 2 and 4, the averages of the reading times include both nouns referring to jobs and gender-neutral nouns. In this section, we have mostly focused on the nouns which refer to activities, as the results of the gender-neutral nouns will be interpreted more in depth in the next section.

5.2. Gender-neutral nouns vs. nouns that refer to jobs

No significant difference in mean reading times between sentences with a gender-neutral noun and sentences which have nouns referring to jobs either stereotypically male or stereotypically female was found.

It is interesting to note, first of all, that, as seen in Figure 5, which shows the reading times for the critical region, congruent sentences with gender-neutral nouns are, on average, read faster than incongruent ones. However, this cannot be seen in Figure 7, with the reading times for the spillover region. In fact, for this region, reading times seem to be, on average, quite similar.

As said before, for the purposes of this project, sentences with gender-neutral nouns and a male anaphoric pronoun were considered congruent while those with a female anaphoric pronoun were considered incongruent. This choice was motivated by the hypothesis that Portuguese native speakers should take longer reading sentences with gender-neutral nouns displaying a female anaphoric pronoun than reading sentences containing a male anaphoric pronoun, as they would expect that the unmarked form of a noun should always be masculine. Surprisingly, Figure 1 shows that Portuguese native speakers, in the critical region, took longer, on average, reading the sentences with male anaphoric pronouns than the sentences with female anaphoric pronouns, which seems to indicate that their gender expectancies regarding gender-neutral nouns is in the opposite direction of what had been expected. These results might be due to the social network of the participants and the fact that there is an imbalance of female and male participants, with a larger number of females. It is, nonetheless, important to keep in mind that these results might also be due to the small sample size and that it is necessary to interpret these results with caution. Particularly, when in Figure 3, it is possible to see that Portuguese native speakers, in the spillover region, on average, took longer reading the sentences with female anaphoric pronouns than those with male anaphoric pronouns. Though, it is also important to note that in this region the difference in reading times is smaller than in the previous region.

Furthermore, this study had hypothesized that English native speakers should read all sentences with gender-neutral nouns similarly regardless of the gender of the anaphoric pronoun presented in the
sentence. Figure 1 seems to indicate that, in the critical region, English native speakers, on average, read all sentences with gender-neutral nouns at similar speeds, regardless of the gender of the anaphoric pronoun. However, in Figure 3 it is possible to see that, in the spillover region, these participants read sentences with a gender-neutral noun and a female anaphoric pronoun slightly more slowly than those with a male anaphoric pronoun.

5.3 Impact of English proficiency and use for Portuguese native speakers

This study had predicted that the more a Portuguese native speaker uses English the more similarly they should read the sentences with gender-neutral nouns, regardless of the sentence showing a male anaphoric pronoun or a female anaphoric pronoun, as we had expected an English native speaker to do.

Significant results were found for both level of English proficiency and amount of English use in both regions analyzed. The higher the level of English proficiency and the more a participant used English the faster they read the critical words (i.e., the pronoun and the word immediately following it) in the sentences. However, it is important to note that as no interactions were found between these variables and congruency and type of word, it is impossible to know if participants do perceive these words as gender-neutral or if the faster reading times can be explained only as the fact that the more proficient and the more you use a language the faster you activate the words of that language (Groot, 2013).

5.4 Recommendations for further research

This study could not draw proper conclusions as to whether the level of proficiency in English and the amount of English use influences the gender expectancies of the Portuguese native speakers. Nonetheless, these variables should always be taken into account in any study regarding L2 reading. Even though no significant interaction was found, both English proficiency and use still had significant effects on reading times. Furthermore, a few studies have found that level of the second language (Sato et al., 2013) and immersion context (Morales et al., 2014) can have a subsiding effect on the influence of the participants’ native language’s gender system. Therefore, it could be interesting to test the differences in expectancies between Portuguese native speakers living outside of Portugal, which presumably would lead to an increase of their use of English, with those still living in Portugal, who presumably do not speak as much English. In fact, it might also be pertinent to compare these two groups with a group of Portuguese native speakers living in an environment where English is the dominant language. As the Portuguese native speakers tested in this study were living in the Netherlands at the time of the experiment and, as it is possible to see by looking at the language questionnaires they filled, most of them did actually speak Dutch as well as English, the results between these three different groups might be interesting to analyze.

Furthermore, a future project should also take into account the fact that some unexpected results might be due to the fact that participants were told that the aim of the study was to test how well Portuguese native speakers memorized information in English. As important as it is to get implicit measures of gender expectancies and, therefore, for participants not to know beforehand what the researcher intends to investigate, from feedback gotten from the participants after they performed the test, some of them seemed to have focused too much on memorizing the information. A few of the participants reported having taken some time to read each word, even though they were told they were to read each sentence as fast as possible without neglecting to read them carefully.

Though, other languages spoken by the participants (besides English and Portuguese) were not taken into account in this project, these might also have affected the results found in this experiment.
Replicating this study but with the use of EEGs might be an important experiment, as it has been demonstrated, for example in Osterhout (1997) and Proverbio et al. (2017), that these are also sensitive to violations of gender expectancies.

To conclude this section, the trends examined before do seem to show that Portuguese and English native speakers do have different gender expectancies regarding the different types of words (gender-neutral nouns, nouns referring to stereotypically male and to stereotypically female occupations), even if these were not as the study had hypothesized.

Surprisingly, English native speakers seem to have read sentences containing jobs which displayed incongruency at very similar speeds, while they took longer, on average, to read congruent sentences with stereotypically male occupation than those with stereotypically female occupations which displayed congruency. On the other hand, Portuguese native speakers did read congruent sentences faster than incongruent ones and, indeed, seem to find it easier to accept females in stereotypically male activities than males in stereotypically female activities. Furthermore, English native speakers seem to read sentences with gender-neutral nouns at very similar speeds, while, contrary to what had been hypothesized, Portuguese native speakers seem to have taken longer reading the sentences with male anaphoric pronouns than the sentences with female anaphoric pronouns. Finally, English use and proficiency were found to have a significant effect on reading times.
6. Conclusion

Effects of stereotypes and world knowledge on activation of gender-related information have been researched more and more because of the importance of using gender-fair and nondiscriminatory language and giving the same amount of visibility to women as it is normally given to men. However, not many studies have looked at the gender expectancies carried by gender-neutral nouns, which can be used to mean both females and males.

Therefore, the main aims of this research project were to, firstly, find out whether, in English, gender-neutral nouns activate any gender-related information and if so, how the gender expectancies triggered by these can be comparable to those carried by nouns referring to occupations socially associated with either males or females. Secondly, to test if the gender system of the participant’s mother tongue affected their gender expectancies further. That is, if the fact that the Portuguese native speakers know a language with a grammatical gender system influences their gender expectancies, even in a language that does not have a gender system.

The results seem to suggest that indeed both between groups and within groups the three different types of nouns used in this experiment are read differently, which may mean that the gender expectancies depend on the type of noun and the language background of the participant.

Although it was possible to see some potential trends in the results of this experiment, almost no significant results were found. This is possibly due to the fact that this study had a small sample size, and, if more participants had been tested, clearer and significant results might have been found. Therefore, it could be pertinent to repeat this study with a larger sample size. Perhaps it might also have been beneficial if a pilot study had been conducted to see if the nouns chosen as well as the sentences constructed for this experiment were the best, which could be done in case this study is repeated.

Nonetheless, some potential trends were discussed in the previous section, which might be interesting to explore in future studies. It seems like the reading times (in the critical region) of the sentences containing gender-neutral nouns of the Portuguese native speakers suggest a trend (Portuguese native speakers seem to find it easier to read sentences with a gender-neutral noun and with female anaphoric pronouns than those sentences with male anaphoric pronouns) which was explained, in this study, as a possible influence of the social networks of the participants. Therefore, a project which would take into account the social networks of the participants might find, for example, a correlation between a woman having more women friends and reading a sentence with the noun friend and a female anaphoric pronoun faster than a similar sentence with a male anaphoric pronoun.

Gender issues around language will continue to gain prominence in public debate and studies like this one may be essential to questioning long-held claims for unmarked forms of nouns. As seen in the trends of this study, there seems to be no unmarked nouns and the expectancies seem to depend on each participant’s experience, including their social network, the way they were taught English and the contexts surrounding the participants. English native speakers seem to have no gender expectancies regarding gender-neutral nouns, as seen by their reading times, while Portuguese seem to find it easier to integrate female pronouns with these type of nouns, which might be influenced by their social networks. As for the gender stereotypes activated by nouns which refer to jobs, Portuguese native speakers seem to find it easier to integrate females in stereotypically male jobs than males in stereotypically female jobs, while English native speakers seem to read both types of incongruent sentences very similarly.
References


Appendix A

Sentences used in the experiment

**Jobs**

**MALE**

The plumber forgot the toolbox, so he had to go back to grab it.
The firefighter put a helmet on before he entered the burning house.
The carpenter builds beautiful wooden furniture when he is on vacation.
My banker always takes several breaks because he smokes a lot.
The politician reads a lot of books when he goes on holidays.
The president has been a vegetarian since he was twenty years old.
My butler retired last year so he could travel around the world.
The butcher lives near a gym which he likes going to everyday.
The farmer loves animals and he has two dogs, three cats and five turtles.
The electrician has not worked in weeks because he has broken his arm.
The judge likes watching TV whenever he has a day off.
The pilot spends the entire day in bed after he has long flights.
The scientist often worked late and then he slept during the day.
The taxi driver listens to audiobooks while he waits for passengers.
The surgeon has a very stressful job and he works long hours.

**FEMALE**

The babysitter had just sat down when he heard the baby cry.
The cashier takes night classes after he works the whole day.
The fortune teller has great memory and he loves doing crosswords.
The secretary loves bright colors, but he always wears black to work.
The flight attendant likes painting, and he has just sold seven of his works.
My hairdresser has created a perfume which he has always dreamt of doing.
The librarian already speaks nine languages and he is now learning Korean.
My teacher always wakes up early even when he is on vacation.
The gynecologist goes running every day because he likes being outside.
The pharmacist is allergic to nuts, so he always carries antihistamines.
The biologist wrote a book about everything that he saw in his travels.
The veterinarian is very healthy, and he drinks a lot of water.
The dancer used to be afraid of heights until he went skydiving last week.
The choreographer always has a sunburn when he returns from holidays.
The nurse was very gentle when he took my blood for testing.

Neutral
The adult wrote everything down, so he would not forget anything.
The ally preferred to listen, so he rarely made his opinion known.
The baby laughs happily when he is given his plush toy.
The citizen waited in line, so he could take a picture for his passport.
The client printed the new contract because he needed to sign it.
My companion reads very fast and he tries to read a book a day.
My cousin is worried about school because he failed an exam.
The employee worked hard to finish all the tasks, so he could leave early.
My friend is buying a lot of food because he is throwing a party.
My grandchild loves going to the beach because he loves the sea.
The mentor gave very detailed advice because he cared about his students.
My neighbor had just left the apartment when he heard the alarm.
My partner always walks to work because he does not like to drive.
The passenger talked on the phone nonstop while he was in the car.
The patient waited for hours before he was called in for his appointment.
My relative loves cooking, and he always invites everybody for dinner.
The resident of apartment A is very friendly, and he talks to everyone.
The speaker was fascinating, and he explained things clearly and patiently.
The student was carefully writing down notes when he was called outside.
The teenager looked out the window while he was waiting for his parents.
The traveler frequently falls in love with the things which he sees abroad.
My twin liked sleeping with the lights on when he was alone.

Filler
My dog hates thunderstorms because he is scared of loud sounds.
My parrot repeats everything which he hears from the people around him.
The sheep eats all day in the sun until he is brought back inside.
My cat chases the ball around the room until he is tired.
My fish is really beautiful because he is extremely colorful and has large fins.
My rabbit likes playing in the morning and then he sleeps during the day.
The wolf howls at the moon and then he listens for an answer.
The squirrel sniffs around so he can find where he buried his food.
The dolphin jumps five meters, so he can touch the hanging ball.
The tiger likes to swim in the river when he is feeling very hot.
The bear can sleep for seven months a year when he hibernates.
The penguin swims a lot while he is looking for something to eat.
The toucan likes jumping from tree to tree when he looks for sun.
The swan flies down to the lake where he begins gliding gracefully.
The pig loves rolling around in the mud, so he can cool down.
The ant can carry very big things because he is very strong.
The deer jumps really high, so he can escape the hunter.
The zebra is very protective, and he will attack predators to save another zebra.
The giraffe has such a long neck that he needs to kneel to drink.
The cheetah purrs when he wants to show that he is happy.
The turtle is scared so he hides inside his shell for protection.
The bee flies from flower to flower and he spreads pollen this way.
The iguana managed to run away very fast because he detached his tail.
The gorilla communicates by making different sounds while he moves his arms.
The butterfly was tired because he had flown for a long time.
The fox hunts quietly until he pounces when he finds a rabbit hole.
The shark can have seven rows of teeth so he has many, many teeth.
The coyote is a solitary animal until he needs help to hunt.
The leopard rests on the tree where he calmly eats his prey.
The jaguar swims in the river while he is hunting for fish.
The hyena has found food so he signals it by laughing excitedly.
The gazelle can reach high branches because he can stand on his back legs.
The tarantula has eight eyes therefore he can see the slightest of movements.
The donkey stubbornly refuses to move because he senses he is in danger.
The frog eats the skin which he sheds about once a week.
The snake lies in the sun, so he can warm up fast.
The eagle uses hot rising air, so he can fly without beating his wings.
The owl sees very far away, and he also hears the tiniest of sounds.
The whale sings the same song over and over because he is lonely.
The scorpion rarely attacks with venom because he needs days to produce more.
The crab has ten legs, but he only uses eight of them to walk.
The rhinoceros runs aggressively towards things when he is scared of them.
The panther is easily camouflaged while he is hunting for food.
The piranha has really sharp teeth and he has a really strong bite.
The starfish moves very quickly because he has hundreds of tiny tube feet.
The camel can spit for fun but also if he feels threatened.
The chimpanzee usually walks on all four limbs, but he can also walk upright.
The octopus is great at camouflaging and he can do it in only milliseconds.
The hippopotamus is active at night and he spends his day sleeping in rivers.
The seal can sleep underwater, so he can spend months at sea.
The eel hides in a cave and then he attacks his prey suddenly.
The manta ray jumps out of water, so he can get rid of parasites.
The fly has really fast reaction times and he can also see behind him.
## Appendix B

Nouns used in the online pre-test questionnaire on the gender-neutral nouns

<table>
<thead>
<tr>
<th>Noun</th>
<th>M</th>
<th>SD</th>
<th>Noun</th>
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<th>SD</th>
<th>Noun</th>
<th>M</th>
<th>SD</th>
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</thead>
<tbody>
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<td>0.68</td>
<td>Follower</td>
<td>4.06</td>
<td>0.73</td>
<td>Speaker</td>
<td>4.13</td>
<td>0.57</td>
</tr>
<tr>
<td>Admirer</td>
<td>4.17</td>
<td>1.06</td>
<td>Friend</td>
<td>3.79</td>
<td>0.77</td>
<td>Spectator</td>
<td>4.25</td>
<td>0.79</td>
</tr>
<tr>
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<td>0.80</td>
<td>Grandchild</td>
<td>4.04</td>
<td>0.65</td>
<td>Spouse</td>
<td>4.00</td>
<td>1.22</td>
</tr>
<tr>
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<td>Jogger</td>
<td>4.02</td>
<td>0.70</td>
<td>Student</td>
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<td>0.56</td>
</tr>
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<td>0.91</td>
<td>Lover</td>
<td>4.31</td>
<td>1.15</td>
<td>Supervisor</td>
<td>4.33</td>
<td>0.83</td>
</tr>
<tr>
<td>Athlete</td>
<td>4.48</td>
<td>0.82</td>
<td>Mentor</td>
<td>4.10</td>
<td>0.90</td>
<td>Suspect</td>
<td>4.54</td>
<td>0.80</td>
</tr>
<tr>
<td>Baby</td>
<td>4.02</td>
<td>0.48</td>
<td>Neighbor</td>
<td>4.17</td>
<td>0.81</td>
<td>Teammate</td>
<td>4.21</td>
<td>0.90</td>
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<td>4.17</td>
<td>0.78</td>
<td>Partner</td>
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<td>0.91</td>
<td>Teenager</td>
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<td>Passenger</td>
<td>4.08</td>
<td>0.35</td>
<td>Thief</td>
<td>4.67</td>
<td>0.97</td>
</tr>
<tr>
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<td>Patient</td>
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<td>Traveler</td>
<td>4.23</td>
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<td>Player</td>
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<td>Twin</td>
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<td>0.64</td>
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<td>0.68</td>
<td>Reader</td>
<td>3.73</td>
<td>0.64</td>
<td>Victim</td>
<td>3.52</td>
<td>0.74</td>
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<tr>
<td>Dreamer</td>
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<td>0.70</td>
<td>Relative</td>
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<td>Villager</td>
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<td>0.81</td>
</tr>
<tr>
<td>Employee</td>
<td>4.19</td>
<td>0.70</td>
<td>Resident</td>
<td>4.06</td>
<td>0.73</td>
<td>Worker</td>
<td>4.56</td>
<td>0.99</td>
</tr>
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<td>0.96</td>
<td>Sibling</td>
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<td>Youngster</td>
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<td>0.67</td>
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<tr>
<td>Fan</td>
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<td>0.76</td>
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</tbody>
</table>
Appendix C

Questionnaire on the languages of the participants

This questionnaire aims at interpreting the results of the test you just took in a better way. Answering all the questions only takes a few minutes! Please answer the questions truthfully and as detailed as possible.

These results will only be used for this research and will not be made public.

Thank you very much for your participation!

Section 1.

1. Which of the following languages are you (to a certain degree) proficient in?
   a. English
   b. Portuguese
   c. Dutch
   d. Frisian

2. What do you consider to be your mother tongue?
   a. English
   b. Portuguese
   c. English and other
   d. Portuguese and other

   2.1 Specify your other native language: ____________________________________________

3. How often and in what context do you use your mother tongue (English/Portuguese)?

<table>
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<tr>
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<th>Almost never</th>
<th>Yearly</th>
<th>Monthly</th>
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<tr>
<td>With relatives</td>
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<tr>
<td>With your partner</td>
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<tr>
<td>When listening to radio/television</td>
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<tr>
<td>When reading books/newspapers</td>
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</tr>
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</table>
4. How proficient are you in your mother tongue (English/Portuguese)?

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<th>Average</th>
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<td>Writing</td>
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<tr>
<td>Speaking</td>
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<tr>
<td>Listening</td>
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</table>

5. Are there any other languages, besides your mother tongue, that you are (to a certain degree) proficient in?
   a. Yes
   b. No

Section 2 (Which was repeated for as many languages as the participants had mentioned before)

1. What is your second language (the one you acquired after your mother tongue)?

__________________________________________________________________________________

2. When did you start learning this second language?
   a. Before the age of 3
   b. Between 3 and 10
   c. Between 10 and 13
   d. After the age of 13

3. How did you learn your second language?
   a. At home
   b. At school
   c. Other: ________________________________

4. How often and in what context do you use your second language?

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Almost never</th>
<th>Yearly</th>
<th>Monthly</th>
<th>Weekly</th>
<th>Daily</th>
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<tr>
<td>At home</td>
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</tr>
<tr>
<td>At school</td>
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<td>With friends</td>
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<td>With relatives</td>
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<td>With your partner</td>
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<td>When listening to</td>
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<td>radio/television</td>
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<td>When reading books/n</td>
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</table>
5. How proficient are you in your second language?

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<th>Bad</th>
<th>Average</th>
<th>Good</th>
<th>Very good</th>
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<tbody>
<tr>
<td><strong>Reading</strong></td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td><strong>Writing</strong></td>
<td>( )</td>
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<td>( )</td>
</tr>
<tr>
<td><strong>Speaking</strong></td>
<td>( )</td>
<td>( )</td>
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<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td><strong>Listening</strong></td>
<td>( )</td>
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<td>( )</td>
<td>( )</td>
</tr>
</tbody>
</table>

6. Are there any other languages that you are (to a certain degree) proficient in?
   a. Yes
   b. No

Section 3

1. How old are you? _________________________________________________________________
2. Gender:  a. Male  b. Female  c. Other
3. Where are you from? ______________________________________________________________
4. Where do you live? ______________________________________________________________
5. How long have you lived here? ____________________________________________________
6. Occupation: ____________________________________________________________________
7. Do you have any trouble reading? ________________________________________________
8. Do you have any language disorder? ______________________________________________
9. Do you have any difficulty with learning a language? _______________________________
10. Are you right-handed or left-handed?
   a. Right-handed