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Gender, language and labour: gender perception of Estonian and Russian occupational titles

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Introduction: Current research on occupational gender stereotypes in language has indicated that gender bias is influenced by various aspects, including social knowledge about roles associated with either men or women as well as linguistic information. This study focuses on gender perception of language users of Estonian and Russian. The former is a grammatically genderless Finno-Ugric language, while the latter has grammatical gender. Based on previous studies, we investigate whether occupational gender stereotypes in these languages are evoked by social beliefs, stereotypes and other extralinguistic factors and/or by language. Additionally, we examine whether the extent of gender bias varies across these languages.

Methods: Two separate web-based Likert scale surveys were conducted, one in Estonian and the other in Russian. The surveys included sentences featuring 36 occupational titles in Estonian and 34 in Russian. Data were analyzed using R software, employing principal component analysis and binomial logistic regression models.

Results: A total of 581 Estonian-speaking as well as 326 Russian-speaking participants took part in the study. Analyses revealed that biased responses were primarily influenced by social knowledge, followed by the influence of language. In Russian, results indicated that stereotypical information often overrides linguistic cues.

Discussion: The results suggest that gender perceptions are shaped by social knowledge and stereotypes, which work in cooperation with language. Based on these results, we propose that Estonian, while grammatically genderless and thus seemingly gender neutral, evokes as much or even more bias than grammatically gendered Russian.

KEYWORDS

gender stereotypes, generic masculinity, language comprehension, Likert scale, Estonian, Russian

1 Introduction

Many are probably familiar with the famous riddle about a boy and his father who are in a car accident which only the boy survives and, after he is rushed to the hospital, the surgeon there says “I cannot operate, that boy is my son!” A considerable proportion of people initially overlook the possibility that (a) the boy could have two fathers or (b) the surgeon could be a mother (Belle et al., 2021). The fact that this riddle still continues to puzzle people shows the continued power of gender bias and stereotypes.

Gender stereotypes, e.g., beliefs about the characteristics, roles or attributes of representatives of different genders, often serve as tools for making sense of differences between

groups of people, such as men and women (Vaidya, 2019). Stereotypes are deeply embedded in our mental information. For instance, research has indicated that stereotypical thinking develops in an early age (Liben et al., 2002; Vervecken et al., 2013; Canessa-Pollard et al., 2022), affects people's behaviour even during natural hazards such as hurricanes (Jung et al., 2014), and that stereotypes about masculinity in particular are resilient over time and slow to change (Haines et al., 2016; Eagly et al., 2020). The comprehension of gender stereotypes is influenced by several factors, including language (Gygax et al., 2008; Lewis and Lupyan, 2020), the extent of gender equality and feminist movements in a certain society, and individual aspects, such as political views and personality traits (Hammond-Thrasher and Järvikivi, 2023).

Stereotypes are often divided into descriptive and prescriptive stereotypes. That is, not only do they describe how representatives of different genders are believed to be, but they also determine how they should or should not be (Burgess and Borgida, 1999; Heilman, 2001). This also applies to various roles that are expected to be performed primarily by specific genders or to be unsuitable to them, according to societal norms. Social role theory (Eagly, 1987; Eagly et al., 2000; Eagly and Wood, 2012; Koenig and Eagly, 2014) has proposed the following explanation: people's beliefs about women and men derive from their observations and experiences of what roles they have typically encountered women and men in. The historical distribution of roles, in turn, originates from traditional approaches to biological sex differences between men and women (Levanon and Grusky, 2016), especially men's size and strength (described as agentic traits) and women's reproductive abilities and caring (described as communal traits). Thus, people make generalisations while observing individuals in roles traditionally associated with either men or women. This extends to the occupational sphere – since occupations have historically been distributed differently between women and men, they are one of the core components of gender stereotypes (Deaux and Lewis, 1984). Occupational gender stereotypes often derive from individual experiences and observations, as the social role theory suggests. However, they might also emerge from societal norms, learned from several sources such as the media. Such beliefs about gender roles are often prejudiced, not necessarily representing reality accurately or reflecting true ratios of genders in the workplace (Garnham et al., 2015; Gygax et al., 2016). Thus, while stereotyping is inherent to human behaviour, it also often results in oversimplifications and discriminatory judgments.

As mentioned earlier, language has been found to play an important role in producing stereotypes and beliefs about roles assigned to women or men (Lewis and Lupyan, 2020). For instance, role nouns convey gender stereotyping, indicating the likelihood of specific words referring to either women or men (Irmen and Roßberg, 2004). This explains why the word *surgeon*, for example, activates gender bias in the riddle above – there are typically more male than female surgeons in many societies. Hence, a word referring to this occupation tends to activate a mental image of a male person in the minds of a relevant number of people. Several studies indicate that the activation of gender stereotypes, including occupational gender stereotypes, starts immediately from the moment of processing a role name (Carreiras et al., 1996; Kennison and Trofe, 2003; Oakhill et al., 2005). Additionally, it has been shown through studies considering online language processing that stereotypical information is stored differently from other semantic knowledge in a mental lexicon, often overriding grammatical cues (Molinaro et al., 2016). In contrast, grammar has been found to influence the interpretation of role nouns even more than stereotypical information. For instance, Gygax et al. (2008) found that when reading a sentence with

a grammatically masculine role noun, French-speaking participants did not consider female-referring continuations appropriate, even if the role noun indicated stereotypically feminine occupations, such as beauticians, nurses, and hairdressers. Similarly, Misersky et al. (2019) found that German speakers' interpretation, when processing sentences, was based on the grammatical gender of the role name: it was more difficult to process a feminine anaphoric word following a grammatically masculine role noun. Since role nouns in a masculine form are used generically, most of the cited studies draw the conclusion that generically intended masculine is interpreted as primarily referring to a man. This confirms the hypothesis of many feminist theorists, who have claimed that using generic masculinity in language excludes women and individuals of other gender identifications; indicates that words referring to men represent the norm, resulting in men being seen as "typical" people; and is gender discriminatory by nature (see Silveira, 1980; Penelope, 1988; Cooper, 1990; Pauwels, 2003). In contrast, some studies have found that gender-neutral counterparts of masculine generics (i.e., *firefighter* vs. *fireman*) still contain a male bias (see Oakhill et al., 2005; Lassonde and O'Brien, 2013; Gabriel et al., 2017). Thus, gendered conclusions drawn from role nouns often result from the cooperation of two aspects: language users' individual world knowledge, including information derived from stereotypical assumptions, and cues given by language (Gabriel and Gygax, 2008; Gabriel et al., 2017).

This study examines occupational gender stereotypes in two languages: Estonian, a grammatically genderless Finno-Ugric language, and Russian, a gendered Indo-European language, by collecting data from language users. While the majority of studies have examined gender stereotypes in grammatically gendered languages, this subject has not been explored as extensively in genderless languages (for Finnish, see Tainio, 2006; Pyykkönen et al., 2010; Engelberg, 2018; for Finnish and Turkish, see Renström et al., 2014). This paper seeks to fill this research gap. In addition, Russian has not been studied as thoroughly as other Indo-European languages with regard to how the language evokes stereotypes (see Kapatinski, 2006; Garnham and Yakovlev, 2015; Gabriel et al., 2023). Another goal of this study is to compare gender perception and stereotyping in two languages that differ in their methods of gender expression. Additionally, the study contributes to addressing stereotypes not only through processing gender-neutral occupational titles but also through examining nouns that represent generic masculinity, aligning with Lassonde and O'Brien's (2013) research focus. In sum, the study aims to find out:

- Whether Estonian and Russian native speakers perceive certain occupational titles as referring to men or women more dominantly;
- Whether some occupational titles with gender-specific parts used generically are interpreted as neutral or exhibit gender bias;
- Whether occupational gender stereotypes are more often evoked by language or by social knowledge and how the interpretations align with real life gender ratios;
- Whether gender perceptions and stereotypes differ between a grammatically genderless and gendered language.

Based on previous studies we hypothesise that language activates stereotypical thinking and that masculine generics are perceived to indicate a male referent despite their neutral use, also in languages, such as Estonian, which express gender through explicit lexical resources, but have been considered gender neutral.

Two separate surveys (in Estonian and in Russian) were carried out to explore the questions above. These were online surveys incorporating

Likert scale responses, analogously to Gabriel et al. (2008), Misersky et al. (2014), and Gabriel et al. (2023). Since occupational titles are often encountered in job advertisements and it is in the context of recruitment that the exclusionary effect of gendered role nouns has been observed (see Stout and Dasgupta, 2011; Merkel, 2012; Horvath and Sczesny, 2016; Hodel et al., 2017), this context was also simulated in the surveys.

The article begins with an overview of gender expression in Estonian and Russian as well as the societal situation of gender dynamics in both Estonia and Russia. The analysis consists of two main parts: the Estonian and Russian results, followed by a comparison and a general discussion. All analyses in this study were conducted with R software (v 4.3.2, R Core Team, 2023). The article concludes by identifying its limitations and potential approaches for future research.

2 Representation of gender in language and society

2.1 Estonian

Since Estonian does not have grammatical gender or gender-specific pronouns, gender-related information is only conveyed through vocabulary. This can be done through single lexemes (such as *naine* ‘woman’, *mees* ‘man’ etc.); derivatives, which are used to indicate a female referent (such as *lauljanna* ‘female singer’, *eestlanna* ‘female Estonian’, *direktriss* ‘headmistress’); or compound words (Kasik, 2015) in which one or two word stems are attached to another stem carrying a lexical meaning (Metslang et al., 2023: 27, 29), such as *vana + mees* ‘old man’, *naabri + naine* ‘neighbour woman’, *kooli + tüdruk* ‘school girl’, *maa + pois* ‘country boy’. Although most Estonian occupational titles are gender neutral, some do contain a gender marking. Certain compounds referring to occupations include a gendered noun in the second part (or base form) of the word, for instance, *jahimees* ‘hunter’, *kaupmees* ‘salesman’, *esimees* ‘chairman’. The generic use of gendered words in Estonian stems from instances where compound words ending in *-mees* ‘man’ or a component indicating a female¹ are used. Compound words with initial gender-marking part *nais-* ‘female’ and *mees-* ‘male’ are also used, joining any role noun (such as *nais + arst* ‘female doctor’, *mees + modell* ‘male model’), but these are not the focus of this study.

Estonian language planners and language practitioners have traditionally held the view that such generic gendered words are to be used neutrally (Mäearu, 2008), affirming the genderless nature of the language in contrast to other European languages. Consequently, the issue of implementing gender-neutral language and addressing sexist language practices, which has been initiated in other language communities (see Gerritsen, 2002 for Dutch; see Holmes et al., 2009 for English; see Xiao et al., 2023 for French), has been both underreported and opposed. What lies beneath this opposition to, in fact, any gender equality movement, is the understanding that Graff & Korolczuk (2022: 15) accurately describe: “gender” is a stretchy category that serves as a

screen for collective fears about change, loss of national identity, excessive influence of the West and its cultural hegemony.” In Estonia, as a post-Soviet society, on the one hand, a strong connection with national identity (Erdocia, 2022) and, on the other hand, the example of the Nordic countries are often intertwined in socio-political solutions. Additionally, Estonian has been strongly influenced by a standard language ideology (Lindstöm et al., 2023), which also concerns gender-related considerations, since language users are highly sensitive to any language changes, particularly those with political implications. As a result, references to the discriminatory nature of Estonian generic masculinity have been received negatively. For example, the understanding that Estonian language cannot be sexist due to the lack of grammatical gender has been emphasised in the media. Nevertheless, gender expression in a language is not correlated with gender equality in a corresponding society. Estonia has a significantly lower gender equality index than the EU average (EIGE, 2024) and the labour market is characterised by a high level of gender segregation (Rahvaloendus, 2021).

2.2 Russian

In Russian, gender is a noun grammatical category which can be expressed morphologically (i.e., it does not have specific grammatical markers but there is a strong correlation between gender and noun inflection types) and syntactically (by agreement with predicates and attributives). Gender is inherent in most nouns of the Russian language (Sichinava, 2011; Shvedova, 1980: 464). In addition to the three basic genders (masculine, feminine and neutral) there is also a so-called *common* gender. Common gender includes animate nouns referring to persons (often also animals), which agree either with feminine or masculine gender depending on the natural gender of the referent (morphologically these words are feminine). Semantically, most of these words are associated with negative characteristics (*пьяница* ‘drunkard’, *задира* ‘bully’) or objective disadvantages (*сирота* ‘orphan’). For our survey, we selected one word in common gender that refers to a profession — *судья* ‘judge’ (Sichinava, 2011).

In most cases, if the noun referent is a person, the grammatical gender matches the natural gender (i.e., *отец* ‘father’ is masculine, while *мать* ‘mother’ is feminine). However, if the natural gender is unknown or undefined, the masculine gender is used for gender-neutral referents: *читатель* ‘reader’, *русский человек* ‘Russian person’. To be precise, other genders can also express gender-neutral semantics (i.e., *лицо* ‘person’ — neutral, *жертва* ‘victim’ — feminine), but these cases are occasional and generally masculine is used as a default form (Sichinava, 2011).

However, there are also some lexical models in Russian that allow users to derive a feminine counterpart to a masculine word. Pairs of derivatives for persons of different sexes are sometimes called a *sexual paradigm* (Krongauz, 1996) or *gender pairs* (Voikova, 2008): for example, *продавец/продавица* ‘salesman/saleswoman’, *эстонец/эстонка* ‘Estonian man/Estonian woman’. These pairs can be derived by certain suffixes or simply by meaning (*брат/сестра* ‘brother/sister’). There is no one model to form feminine nouns in Russian – for example, Fufayeva (2020) lists 25 different suffixes. Semantically, a feminine word in the pair is generally used to refer to persons of the female gender, a word in the masculine gender can refer to persons of both genders.

Many words denoting occupations form such gender pairs in Russian (i.e., *учитель/учительница* ‘male teacher/female teacher’),

1 Words such as *medõde* ‘nurse’ and *ämmaemand* ‘midwife’ are the only instances of generic feminine forms in Estonian. These compound words do not contain the most common reference to a woman (*naine*), but forms such as “sister” (*med + õde* ‘nurse’, lit ‘medicine sister’) and “lady” (*ämma + emand* ‘midwife’, lit ‘lady mother-in-law’).

but not all of them are neutral; some specifically mark a female person in the occupation. In addition, various feminine words derived from the masculine ones have a colloquial or even pejorative meaning (*врач/врачиха* ‘male doctor/colloq. female doctor’), since the suffixes that are used for the derivation of feminine words are widely used to denote something small or insignificant (Fufayeva, 2018). Furthermore, feminine words are rarely used as official occupational titles, as opposed to masculine words. Historically, some feminine words in these pairs had the meaning ‘a wife of X’, where X is a male counterpart (*генерал/генеральша* ‘general/wife of general’). In modern Russian, these meanings have become obsolete (Sichinava, 2011).

There are discussions about feminist language reform in Russia as well. Several issues regarding the use of feminine nouns have been highlighted: (1) some professions have gendered word pairs, but this list is incomplete, (2) some pairs have a negative or dismissive connotation, and (3) there are multiple ways to form a feminine noun, making it unclear which one to choose. The diversity of options for derivation raises a great deal of controversy when Russian speakers try to invent new feminine forms for professions where originally there was no female counterpart (Berkutova, 2018, 2019). Feminists believe that it is necessary to use feminine nouns to make women more visible and many have independently adopted this practice (Guzayerava and Kosova, 2017; Petrova, 2019; Zaitseva, 2019). Attempts of neutralising gendered language have also emerged in Russian, particularly among Russian speaking feminist and LGBTQIA+ communities (Kirey-Sitnikova, 2021). However, as Itskova (2024) concludes, these attempts have received both support and criticism, even within feminist communities. Moreover, these discourses unfold in the context of Russia’s anti-gender state policy that idealises traditional values and positions them “at the heart of Russia’s self-identification in opposition to the decadent West as well as at the heart of Russia’s geopolitical strategy to unite like-minded traditionalist forces behind Russia,” presenting Russia as a defender of the so-called true European values (Moss, 2017: 195–196).

3 Estonian survey

In the following sections, we will firstly present the results of the Estonian survey, followed by the results of the Russian survey. We will explore how language and social knowledge interact to guide users’ gender perceptions and examine whether the two languages exhibit different or similar patterns in this regard. In the Estonian survey, sentences typical of a job announcement were created. These sentences contained the name of a specific Estonian institution (e.g., bus company Lux Express, kindergarten Vikerkaar, restaurant Pompei, etc.), a verb referring to recruitment (e.g., *võtab tööle* ‘hires’; *otsib* ‘is searching for...’; *ootab enda ettevõtetesse* ‘is waiting for...to join the company’, etc.) and an occupational title. The names of the companies were selected from Estonian job advertisement sites CV Keskus,² CV.ee,³ with a few exceptions. The used occupational titles were also selected from the same sites, with the exception of words such as *sõjamees* ‘military man’ and *jahipidaja* ‘hunter’. The former is a gendered counterpart of *sõjaväelane* ‘soldier’, and the latter is a gender-neutral formation of *jahimees* ‘hunter’. While these words may not be included in job advertisements,

they are still used quite often in other genres, such as the media. These words were selected to compare their perception to their counterparts.

3.1 Materials

The Estonian questionnaire included 36 sentences with 36 occupational titles. The selected titles represented two groups: (1) morphologically gender neutral occupational titles (e.g., *bussijuht* ‘bus driver’; *liipsja* ‘milkmaid’; *elektrik* ‘electrician’; *lektor* ‘lecturer’ etc.) and (2) occupational titles with a gendered – either masculine or feminine – base form (e.g., *esimees* ‘chairman’; *jahimees* ‘hunter’; *baaridaam* ‘bartender lady’; *medõde* ‘nurse’ etc.). Titles with a masculine base form had a gender neutral counterpart in the other group. Since there are no commonly used gender neutral counterparts of the feminine nouns *medõde* ‘nurse’ and *ämmaemand* ‘midwife’, their gender neutral forms were not included.

Within these two groups, words are also divided based on the gender stereotype associated with the occupation, according to the actual gender ratios in the jobs. Thus, in the stimuli, there are words representing male- and female-dominated occupations (over 60% of one gender), as well as words representing occupations where the proportions of men and women are fairly equal. The data about gender ratios was gathered from Estonian statistics sites <https://www.palgad.ee> and <https://palgad.stat.ee/>. This data includes approximate percentages rather than exact values.

3.2 Procedure

The survey was conducted on a LimeSurvey platform, where it was available from 11 October 2023 to 12 December 2023. The sentences were assigned to participants in a random order and all participants rated all 36 words. Participants were told in the instructions that the occupational titles they would see in the survey are intended for an imaginary context of recruitment (e.g., *Lux Express Estonia AS is hiring a bus driver. What gender is preferred in this position?*). Thus, their task was to imagine that different companies are looking for representatives of these occupations and decide whether men or women are preferred for every position. Participants were also told not to express their opinions about which genders should work in these positions, but respond from the perspective of an employer. The answers were given on a categorical 5-point Likert scale from *only men* to *only women*.

Before filling out the survey, participants also had to answer a couple demographic questions about gender, age, education and place of residence. The link to the survey was shared on Facebook, Instagram and Reddit social media platforms. Before distributing the survey to the general public, 7 people completed it in a pilot test. Based on the received feedback, the survey was adjusted and then shared publicly. Before analysing the results, incomplete responses were excluded from the analysis. Additionally, three responses were removed due to the participant being under 18 years old.

3.3 Participants

In total 581 participants completed the questionnaire (370 females, 196 males and 15 individuals of other gender identifications). The age of the participants in the sample ranged from 18 to over

² <https://www.cvkeskus.ee/>

³ <https://cv.ee/et>

73 years old, with the majority of the participants falling into the 18–28 and 29–39 age group (39 and 38%, respectively). Most of the sample lives in the capital of Estonia, Tallinn (41%), followed by Tartu (31%), elsewhere in Estonia (26%) and outside of Estonia (3%). The majority of the participants in the Estonian sample have higher education (60%), followed by secondary education (33%), doctoral degree (achieved or in progress, 6%) and basic education (1%).

3.4 Results

We will firstly present an overview of the frequency data of the Estonian survey, focusing on two groups of the stimuli: morphologically gender neutral and gendered words. Secondly, we will conduct statistical analyses, more precisely, principal component analysis as well as logistic regression, in order to identify potential factors such as language and stereotypes that may influence the outcome.

3.4.1 Frequency data

Regarding the morphologically gender neutral words, the responses are grouped by the true gender ratios of the occupations. The first group includes male-dominated occupations, the second

group gender-neutral occupations and the third female-dominated occupations (see section 3.1, left panel on Figure 1). As for morphologically gendered words, the responses are classified according to the type of gender marking (masculine vs. feminine) (right panel on Figure 1).

The responses have been grouped into three categories: male-biased (including responses *only men* and *rather men*), neutral (*does not matter*), and female-biased (including responses *only women* and *rather women*).

As for morphologically gender neutral words, the majority of the responses were neutral for all types of occupations, indicating that the participants did not see a gender preference. The results indicate a significant association (Pearson $\chi^2 = 3,763$, $df = 4$, p -value $< 2.2e-16$) between the response and type of occupation. Occurrences of female-biased responses to masculine occupations (std. residual -20.7) and male-biased responses to feminine occupations (std. residual -23.1) were significantly lower than expected, which indicates a deviation from the assumption that the occurrence of biased responses is independent of the type of occupation.

The responses for gender marked words are biased towards the corresponding marker: words with a feminine and masculine gender marking result in predominantly female- and male-biased responses, respectively. A significant association was also found

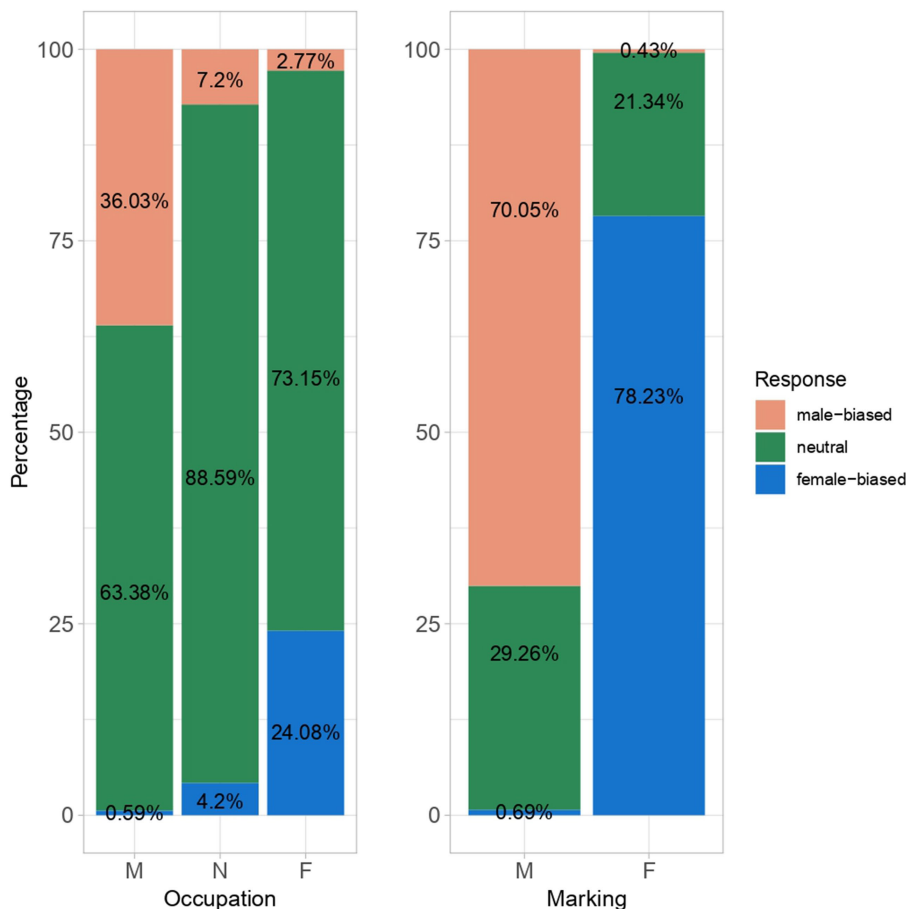


FIGURE 1 Responses to Estonian morphologically gender neutral vs. gendered stimuli.

between the response and type of gender marking (Pearson $\chi^2 = 1722.2$, $df = 2$, p -value $< 2.2e-16$). The frequencies of neutral responses (std. residual -26.3) as well as male-biased responses (std. residual -7.7) were lower than expected for words with a feminine gender marking, while frequencies of female-biased responses (std. residual -12.8) were lower than expected for words with a masculine gender marking.

Figure 2 provides the distribution of responses for words separately. Although the response “does not matter” appears for the majority of gender-neutral words, biases resulting from stereotypical information are still noticeable. Some professions that are strongly female- or male-dominated in the real world are also predominantly perceived as such: professions like nail technicians and kindergarten teachers, with a real gender ratio of 0% men and 100% women, are perceived to be mostly feminine, while the profession of the soldier, with the opposite gender ratio, also exhibits the opposite pattern in the responses. The responses for some occupations (e.g., *electrician*, *bus driver*, *lawyer*, *baker*) were mostly neutral despite unbalanced gender ratios in real life. In sum, 24% of the responses of all female-dominated occupations align with real-life statistics, while the responses for male-dominated occupations showed a closer overlap with actual gender distributions, with 36% reflecting biased perceptions. Overall,

gender-neutral occupations had the highest percentage of responses aligning with real life (89%). Conversely, the responses to gender-marked words are noticeably more inclined towards male or female interpretations. However, there are some exceptions, such as the words *esimees* ‘chairman’ and *medõde* ‘nurse’, which resulted in a considerable percentage of neutral responses as well. The distribution of responses further suggests that words denoting generic masculinity exhibit a greater bias than their neutral counterparts (e.g., *hunter* versus *hunterman*, *security guard* versus *security man*, *chair* versus *chairman* etc.). Feminine-gendered terms such as *owner/housekeeper* (F) and *bartender* (F) manifest greater bias due to their lack of generic usage. The fact that *military man* is not used as generically as other masculine terms is also displayed in the results. However, it could be argued that the word still embodies the same underlying principle of generic masculinity.

3.4.2 Principal component analysis

We examined whether the distribution of responses is influenced by stereotypical information or language. Firstly, a principal component analysis with all the 581 responses to 36 words was conducted, with the “fviz_pca” function in the FactoMineR and FactoExtra packages. Three main components were identified, which

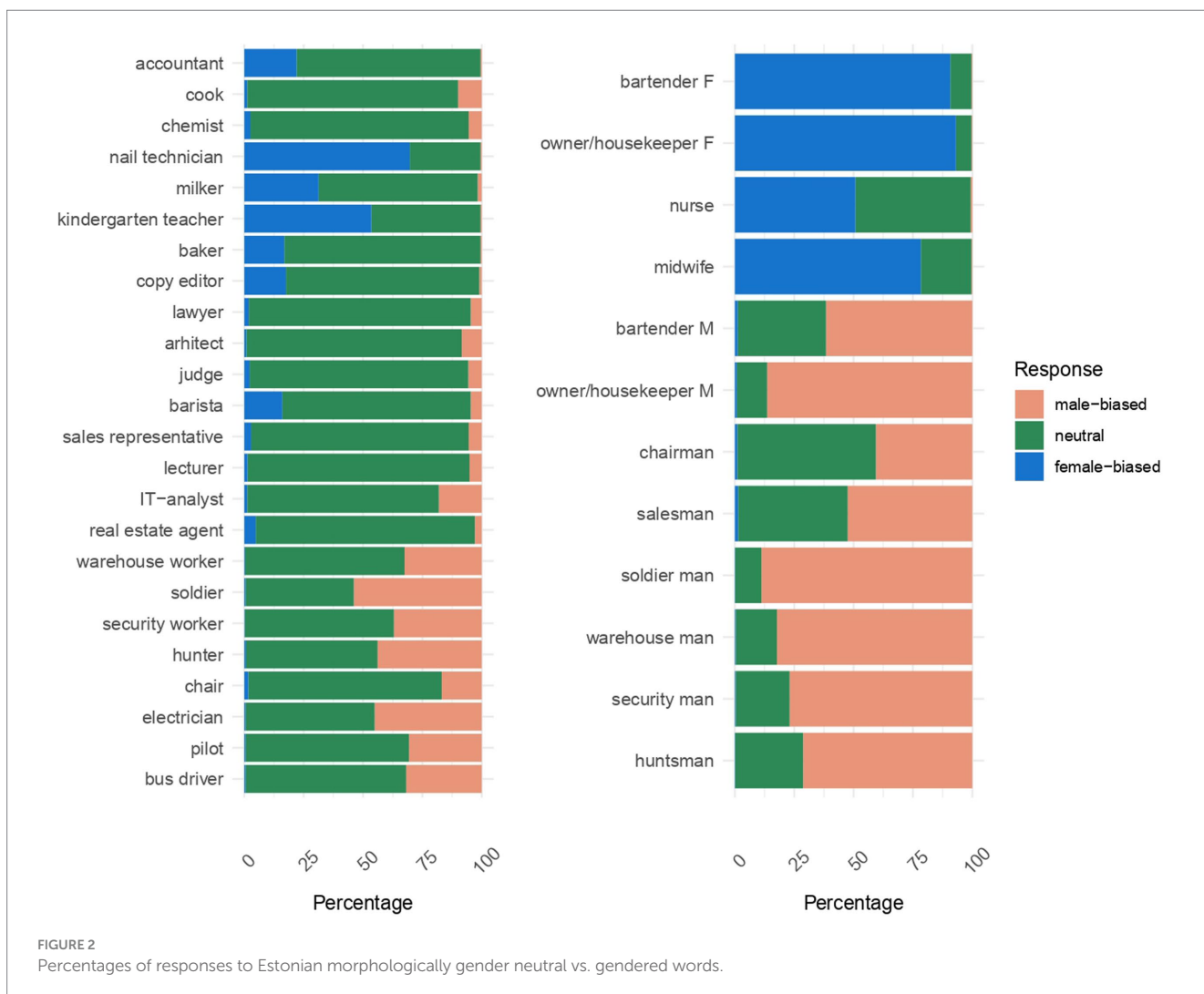


FIGURE 2 Percentages of responses to Estonian morphologically gender neutral vs. gendered words.

collectively accounted for 43% of the total variance: *stereotype*, *language*, and *neutrality*. Figure 3 displays the words that represent each of the components. Hence, since the responses to stereotyped occupations, such as *electrician*, *pilot*, *nail technician* etc., describe the most variance in the data (28%), the results demonstrate that one dimension that strongly influences the patterns in the given responses consists of societal perceptions, expectations and stereotypical information about social roles associated with men or women, respectively. Secondly, another salient dimension is language (10%), which indicates that gender markings play a role in the given responses. This dimension is mostly represented by words with an explicit gender reference, such as *owner/housekeeper M*, *bartender F*, *owner/housekeeper F* etc. The listed words are not used generically,

especially those with feminine endings; based on the results, the occupation perceived as the most neutral among them is bartender (M). Stereotypes and language also interact, as many words associated with stereotypes, and thus representing the first component, also include a gender marking, such as *hunter* or *security man*. Lastly, while stereotypical information affects the interpretation of occupational titles, knowledge about the gender balance in occupations also seems to have an effect, as the third component (6%) is represented by occupations with a balanced gender ratio in the real world, such as *real estate agent* or *judge*.

Figure 4, which illustrates the relationships between variables and the first two principal components, shows four distinct clusters of variables: words representing feminine occupations (variables 3), words

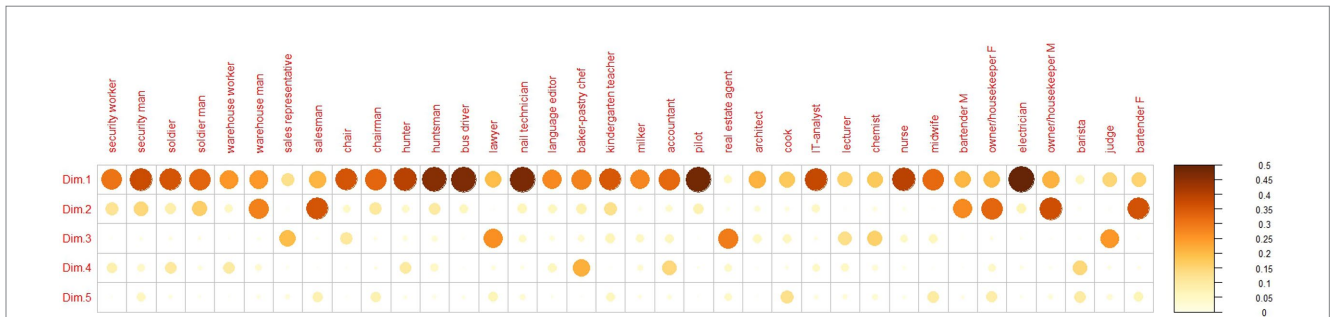


FIGURE 3 Cosine squared (cos²) values of the Estonian variables representing principal components.

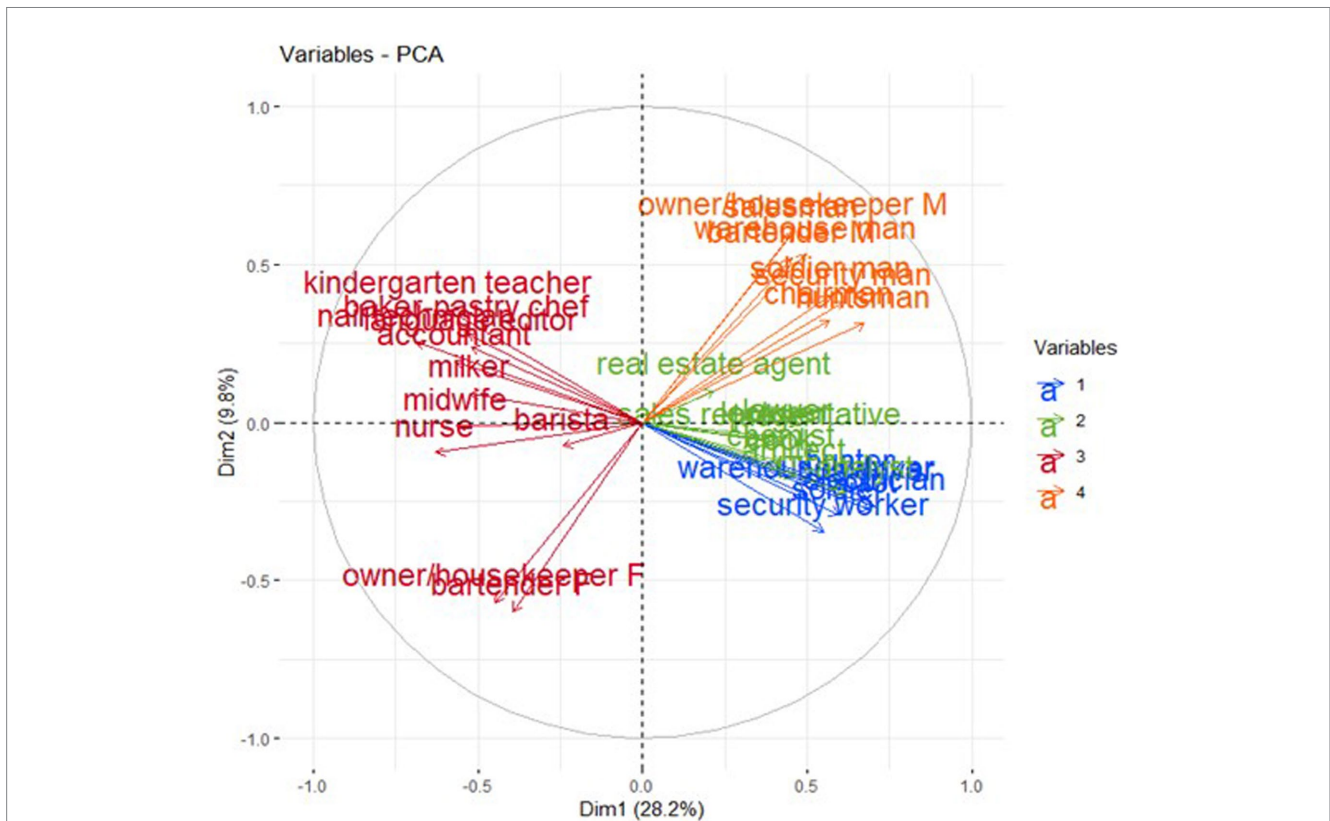


FIGURE 4 Estonian variables in respect to the first and second principal component.

with an explicit feminine marking (variables 3), words representing masculine as well as neutral occupations (variables 1 and 2), and words with a masculine gender marking (variables 4). This shows, for example, that distinct patterns emerge in the data concerning words with masculine markings compared to their neutral counterparts, indicating a small correlation between them. Meanwhile, there is a stronger correlation between feminine generics such as *midwife* and *nurse* and other morphologically neutral words representing feminine occupations.

3.4.3 Logistic regression

The demographic data of the participants, such as gender, age and education, can also influence the perception of occupational gender stereotypes. In order to identify these potential factors, logistic regression models using the “glm” function were generated. Table 1 displays the results of two binomial logistic models, regarding the influence of predictor variables – participants’ gender, age and education as well as morphological gender marking and the type of the occupation – on the outcome variable. The responses here were classified into two categories: neutral (0) vs. male-biased (–1) as well as neutral (0) vs. female-biased (1). The table compares neutral responses, set as the reference category, to male-biased responses on the left side and to female-biased responses on the right side.

Firstly, as for a model with male-biased vs. neutral responses, several predictor variables were found to be significantly associated with the responses.

The predictor that influences the male-biased responses the most is the presence of a masculine occupation, which increases the odds of male-biased responses about 7.91 times when compared to neutral occupations. In addition, the odds ratio for masculine gender marking is 5.24, suggesting that the presence of a masculine gender marking increases the odds of male-biased responses by about 5.24 times compared to when the words do not include a morphological gender marking. In contrast, a feminine occupation and a feminine gender marking increase the odds of female-biased response about 6.67 and 11 times, respectively. Thus, the regression results overlap with those of the principal component analysis, indicating that occupational stereotypes and morphological gender marking have a strong association with biased responses.

As for the participant data, male respondents were less likely to exhibit a bias towards male-biased responses compared to neutral responses (odds ratio = 0.8), but more likely to exhibit a bias towards feminine interpretations (1.17). Regarding age, only the 29–39 age group showed a significant relationship with responses being male-biased (0.79) or female-biased (0.66): respondents in this group were less likely to choose either male- or female-biased responses than those aged 18–28 years. The same pattern appears to hold true for respondents with secondary education, who exhibit a reduced likelihood of male-biased (0.72) and female-biased (0.71) responses than those with higher education.

TABLE 1 Predictors influencing Estonian responses (0 vs. –1) (0 vs. 1).

Predictors	Response (NEUTR vs MASC)				Response (NEUTR vs FEM)			
	Log odds	Std. error	Z-value	Pr(> z)	Log odds	Std. error	Z-value	Pr(> z)
(Intercept)	–2.54	0.08	–30.5	< 2e-16	–2.67	0.09	–29.2	< 2e-16
Gender F	Reference				Reference			
Gender M	–0.21	0.04	–4.6	3.58e-06	0.16	0.06	2.80	0.005
Gender O	–0.67	0.13	–5	4.86e-07	–0.86	0.18	–4.71	2.38e-06
Age 18–28	Reference				Reference			
Age 29–39	–0.23	0.05	–4.8	1.44e-06	–0.42	0.06	–6.91	4.77e-12
Age 40–50	–0.05	0.06	–0.8	0.42	–0.23	0.08	–3.03	0.002
Age 51–61	–0.02	0.09	–0.24	0.81	–0.36	0.12	–3.03	0.002
Age 62–72	–0.38	0.17	–2.28	0.02	–0.40	0.21	–1.92	0.05
Educ. (higher)	Reference				Reference			
Educ. (PhD)	–0.11	0.09	–1.31	0.19	0.01	0.11	0.12	0.90
Educ. (secondary)	–0.32	0.05	–6.60	4.09e-11	–0.33	0.06	–5.43	5.70e-08
Marking N	Reference				Reference			
Marking F	–0.69	0.33	–2.09	0.04	2.39	0.06	38.6	< 2e-16
Marking M	1.66	0.04	38	< 2e-16	–0.42	0.20	–2.11	0.03
Occupation N	Reference				Reference			
Occupation F	–0.36	0.11	–3.17	0	1.90	0.09	21.7	< 2e-16
Occupation M	2.07	0.08	26	< 2e-16	–0.37	0.12	–3.17	0.001
Observations	17,607				15,517			
Null deviance	21,705				160,821			
Log-Likelihood	–7,631				–5,129			
AUC	0.846				0.875			

4 Russian survey

Similarly to the Estonian survey, sentences simulating job announcements were also composed for the Russian task. These sentences utilised typical verb constructions for recruitment, such as *X приглашает на работу Y* ('X invites a Y for work'), *X ищет Y* ('X is looking for a Y'), *требуется Y* ('Y is needed') etc., where X is an employer, i.e., a specific company or institution, and Y is the occupational title. Company names and occupational titles were selected from a popular Russian job search website www.hh.ru.

4.1 Materials

The Russian survey included 34 sentences with 34 different occupational titles. Since one of the aims of the survey was to compare the two languages, a large number of occupational titles (22) were identical with the gender-neutral words from the Estonian survey. The remaining occupational titles are not suitable for comparison, as they have specific Russian features (more details below).

Most of the occupational titles (24 out of 34) were grammatically masculine (e.g., *лектор* 'lecturer'; *охранник* 'security guard'; *редактор-корректор* 'copy editor'). Such words in Russian denote not only a male person but also carry a gender-neutral meaning. 8 occupational titles were feminine (*горничная* 'chambermaid'; *домработница* 'house-keeper'; *сиделка* 'family nurse'; *сестра-хозяйка* 'nurse administrator'; *няня* 'babysitter'; *модель* 'model'; *гадалка* 'fortune-teller'; *дойрка* 'milker'). Two more complex words of grammatical gender were included in the survey. The occupational title *судья* 'judge' has a *соттон* gender and can be grammatically feminine or masculine, depending on the person it refers to. Additionally, *швея-портной* 'sewer-tailor' is an occupational title composed of feminine (*швея*) and masculine (*портной*) words. These words were included in the survey to examine how the participants would respond when the grammar permits a dual-gender interpretation of the word. In addition, it is important to note that for the profession "milker," two words (and thus 2 sentences) were used: a masculine *дойр* and a feminine counterpart *дойрка*. The choice of this occupation was intentional. Typically, Russian occupational titles in masculine represent gender-neutral usage, while words in feminine emphasise gender, rendering women the distinct and marked category (Cooper, 1990: 17; Pauwels, 2003; McConnell-Ginet, 2020: 50–51). However, in the case of "milker," the feminine word *дойрка* is used more frequently than the masculine, resulting in the feminine word being generic and the masculine word becoming marked. This pair of words was therefore included in the sample to examine the respondents' preferences in a situation where the masculine occupational title is not the default form.

The list of occupations is not homogeneous in terms of gender distribution. Excluding 8 feminine occupational titles representing female-dominated occupations, the remaining occupations can be categorised into three groups, similar to the Estonian stimuli – male-dominated (10), neutral (6) and female-dominated occupations (10). Unfortunately, the Federal State Statistics Service of Russia (RosStat) does not provide information about the gender distribution of certain occupations (only in general economic fields) (RosStat, 2020, 2021). For information about the distribution of men and women in these professions, the www.superjob.ru portal was used.

This website includes research based on the CVs submitted. Data from the surveys on this website was used^{4,5,6} (link1, link2, link3) and percentages of men and women were manually calculated based on the submitted CVs for selected professions in Moscow, St. Petersburg, the North-West region and the Central region of Russia, the most densely populated areas of the Russian Federation. The type of the occupation based on real gender ratios was determined like in the Estonian survey – male or female-dominated occupations include over 60% of individuals of one gender, while neutral occupations indicate equal proportions of men and women (40/60%). It should be noted that all these groups contain *masculine* words (excluding common-gendered *судья* 'judge'), including the last group of female-dominated occupations. The full gender distribution of the jobs in Russia is presented in the [Table 2](#).

4.2 Procedure

The survey was conducted on a LimeSurvey platform, where it was available from 11 October 2023 to 12 December 2023. The sentences were assigned to participants in a random order and all the participants rated all 34 words. The instructions of the Russian survey were identical to those for the Estonian one, meaning that the participants rated whom employers would prefer to hire (e.g., men or women) for the listed positions. The answers were given on a categorical 5-point Likert scale. Before filling out the survey, participants also had to share some demographic data: gender, age, education, place of residence. They also had to name the country where they have lived most of their life (among the sample, a large number of people left Russia after 2022 and currently live abroad. This question was asked in order to separate new departures from expatriate Russians). The link to the survey was shared on Facebook, Vkontakte and Telegram social media platforms. Before distributing the survey to the general public, 20 people completed a pilot test. Based on the received feedback, the survey was corrected and then shared publicly.

4.3 Participants

326 participants (189 females, 135 males and two individuals of other gender identification) completed the Russian questionnaire in total. Incomplete responses were removed from the analysis. The age of the participants in the Russian sample ranged from 18 to 72 years, with the majority of the participants representing the 29–39 age group (48%), followed by participants in the 40–50 age group (26%). The majority of the sample possess higher education (77%), followed by an academic, i.e., postgraduate degree (12%), secondary (10%) and basic education (1%). Most of the Russian participants reside in Russia (61%), followed by Estonia (21%) and other places (18%), such as Germany ($n = 10$), Israel ($n = 7$), Serbia ($n = 4$), Spain, Latvia ($n = 3$ participants each) and so on. The country in which the sample have

4 <https://www.superjob.ru/community/life/49849/>

5 <https://www.superjob.ru/research/articles/111137/zhschiny-osvaivayut-muzhskie-professii-chasche/>

6 <https://www.superjob.ru/research/articles/113907/bolshe-doveryaem-voditelyam-i-inzheneram/>

TABLE 2 The gender distribution of listed professions in Russia according to the www.superjob.ru website.

Male-dominated occupations (less than 40% of women)	Neutral occupations (women and men 40–60%)	Female-dominated occupations (more than 60% of women)
Пилот (М) Pilot	Бариста Barista (М)	Мастер маникюра (М) Nail technician
Водитель автобуса (М) Bus driver	Судья Judge (М/Ф)	Редактор-корректор (М) Copy editor
Электрик (М) Electrician	Агент по недвижимости (М) Real estate agent	Бухгалтер (М) Accountant
Повар (М) Cook	Дояр/доярка (М and F) Milker	Повар-кондитер (М) Baker-pastry chef
Системный аналитик (М) System analyst	Архитектор (М) Architect	Воспитатель (М) Kindergarten teacher
Бармен (М) Bartender	Модель (F) Model (fem)	Химик-технолог (М) Industrial chemist
Генеральный директор (М) CEO		Судья Юрист (М) Lawyer
Охранник (М) Security guard		Лектор (М) Lecturer
Торговый представитель (М) Sales representative		Косметолог (М) Cosmetologist
Военнослужащий по контракту (М) Contract soldier		Продавец-консультант (М) Sales assistant
		Няня (F) Baby sitter (fem)
		Горничная (F) Chambermaid
		Сестра-хозяйка (F) Nurse administrator
		Домработница (F) Housekeeper
		Сиделка (F) Family nurse

lived for the majority of their lives is predominantly Russia (89%). Additionally, participants mentioned other places, including Estonia (5%), Ukraine ($n = 7$), Latvia ($n = 4$), Belarus, and Kazakhstan ($n = 3$ each), Uzbekistan ($n = 2$ participants), and one participant from Transnistria (Pridnestrovie).

4.4 Results

In this section, the frequency data of the Russian questionnaire will be presented. Here, frequencies of responses are presented in two groups: grammatically feminine and grammatically masculine words, with the latter including both generic masculine words and words of common gender. Additionally, predictors potentially influencing the outcome are examined.

4.4.1 Frequency data

Similarly to the Estonian survey, all the responses were categorised into three groups: male-biased (including *only men* and *rather men*),

neutral (*does not matter*) and female-biased (including *only women* and *rather women*). Figure 5 displays the frequency distribution of responses for feminine words (left) as well as masculine and common gendered words (right).

The association between the response and the grammatical gender marking was found to be significant (Pearson $\chi^2 = 5340.3$, $df = 2$, p -value $< 2.2e-16$). Neutral (std. residual -28.6) as well as male-biased responses (std. residuals -22.2) occurred less frequently than expected for feminine words, while female-biased responses (std. residual -29.2) were less common than expected for masculine words.

It is evident from the frequency distributions that feminine words have predominantly female-biased answers, with only 9.8% of answers being neutral, and a few male-biased responses. In contrast, for masculine words, neutral responses (60%) prevail, rather than male-biased, as might be expected. This confirms that feminine nouns in Russian denote the gender of a referent, while masculine nouns, in contrast, are neutral. In other words, a speaker is more likely to use the feminine gender when they want to specify that a person in a

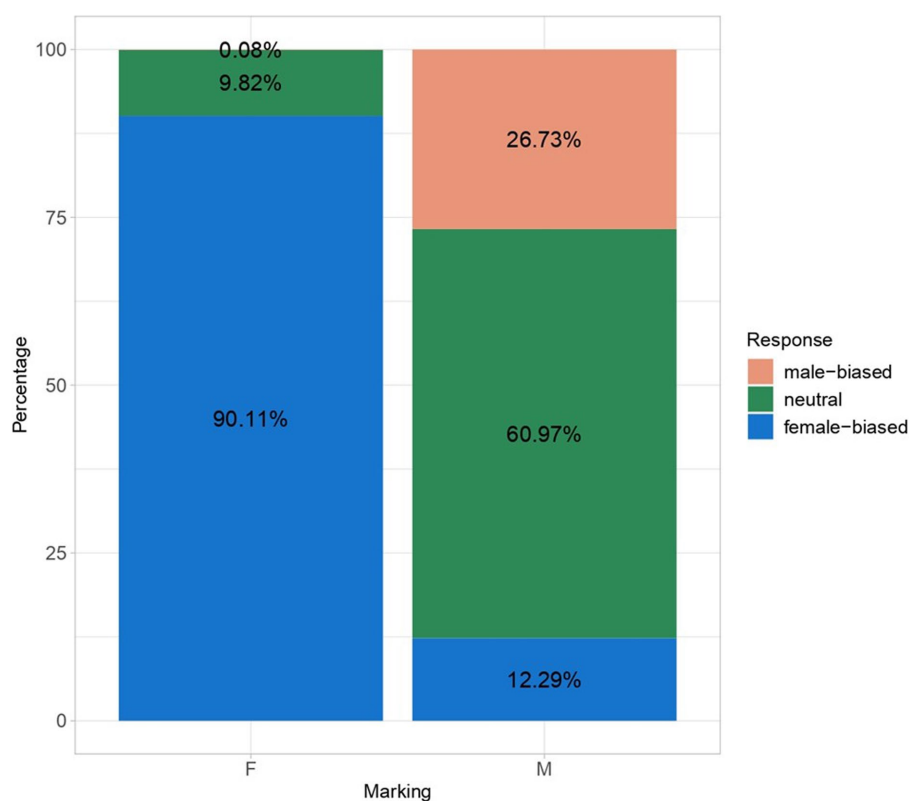


FIGURE 5
Frequencies of responses to Russian grammatically feminine (F) and masculine (M) stimuli.

profession is female and the masculine form when the gender is considered irrelevant.

In Figure 6, the distribution of individual responses to Russian grammatically feminine and grammatically masculine words is presented, with the feminine words shown on the left panel and the masculine words on the right.

The figure further shows that, for feminine words, the responses were predominantly female-biased, with the exception of the word *модель* 'model'. The response distribution for this word was 48% neutral and 52% female-biased, with no male-biased responses. This result can be explained by two factors. Firstly, it correlates with the real-life gender distribution. According to our data, women and men in this profession are currently represented in equal proportions, and respondents in this case answered in accordance with their social knowledge. The second factor is linguistic: unlike other feminine words in this list, *модель* does not have typical markers of feminine gender, which are used to form feminine nouns in Russian, such as the suffix *-k-* or the ending *-a* (e.g., *доярка-а* 'milker (F)'; *гадалка-а* 'fortune teller (F)'), since *модель* is a loanword. Thus, in the group of grammatically feminine words, the factor of grammatical gender seems to influence the responses in cooperation with stereotypical assumptions, as their perception is predominantly female-biased. The word *модель* 'model' stands out as an exception precisely because its linguistic characteristics do not reflect the feminine gender as strongly.

In regards to the other group, the most frequently occurring response was "does not matter": 17 out of 25 (68%) occupations received gender-neutral responses, despite the words being

predominantly masculine. Thus, the language factor has less influence on the perception of masculine and common words than feminine words. However, as the respondents tended to favour the gender-neutral option both in occupations where women and men are equally represented (e.g., *architect*, *real estate agent*) as well as in occupations where a gender bias exists in real life (e.g., *IT-analyst*, *accountant*), the real-life statistics and social knowledge alone do not appear to influence the responses. In the Russian survey, 52% of the responses for male-dominated occupations were male-biased, while 45% of the responses for female-dominated occupations were female-biased. The responses of neutral occupations were predominantly neutral (62%), with the remaining responses nearly equally distributed between male-biased (20%) and female-biased (18%). This further indicates that language influences the perceptions, as the bias toward men or women is shaped by the corresponding grammatical marker.

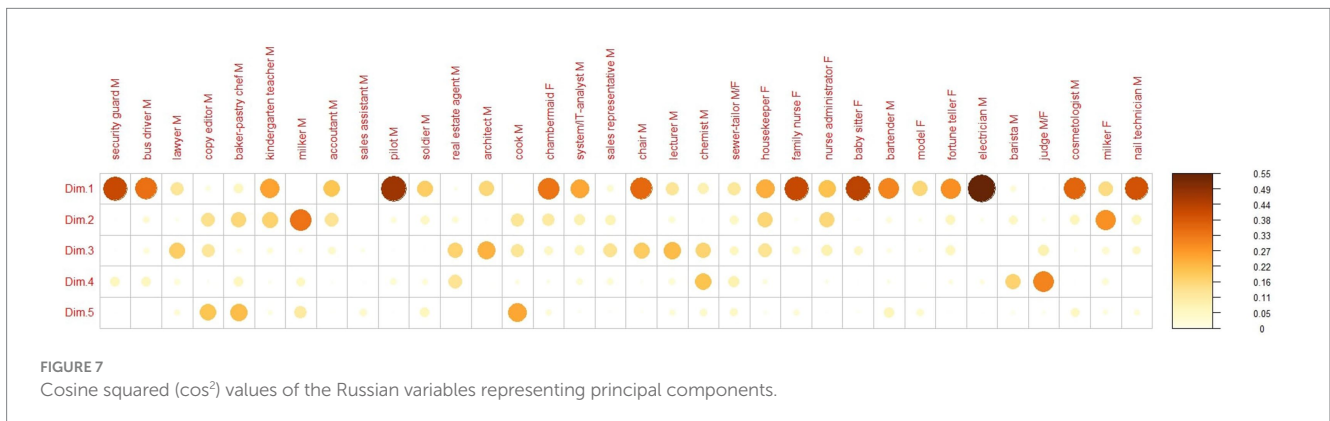
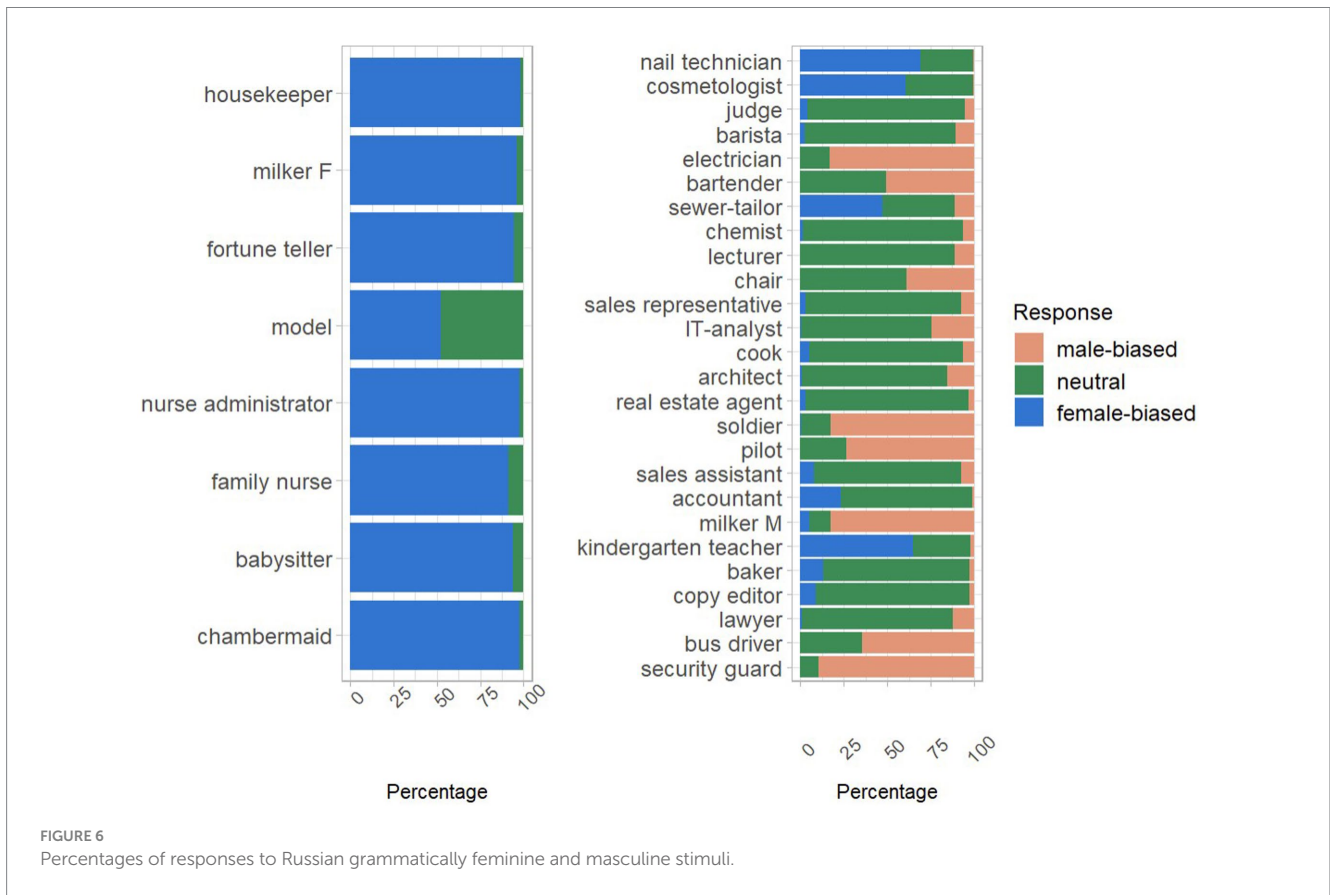
It is noticeable that for some occupations, respondents tended to favour one gender over the other more strongly. For example, bus driver (65%), pilot (73%), electrician (83%), security guard (90%) and soldier (83%) resulted in predominantly male-biased responses, while, in contrast, kindergarten teacher (65%), cosmetologist (60%) and nail technician (70%) resulted in female-biased responses. The last three are particularly interesting, since the responses directly contradict the linguistic reality: despite the words having a grammatically masculine form, language users interpret these as mainly referring to women, suggesting a correlation between the real gender distribution and the responses. Respondents tend to select a specific gender only in cases where the gender bias in a particular occupation is at its highest – that

is, when occupations are almost exclusively held by men or women (90–100%). In other instances, respondents prefer to choose the gender-neutral option. This indicates that the masculine gender in the occupational titles has become more neutral over time. Thus, while language does seem drive the perceptions, in some cases it is more strongly influenced by gender stereotypes that correlate with the real world.

4.4.2 Principal component analysis

A principal component analysis was performed with all the 326 responses to 34 Russian words, using the “fviz_pca” function in the FactoMineR and FactoExtra packages. Three main components

identical to the Estonian survey were identified, accounting for 35% of variance in the data: *stereotype*, *language*, and *perceived neutrality* (see Figure 7). Here, the first component is mostly represented by male or female stereotyped occupations, such as *electrician*, *pilot*, *babysitter*, *family nurse*. In addition to stereotypes, linguistic gender markers are also important, since many words influencing this component align in terms of gender stereotype and grammatical gender. Nevertheless, since words such as *nail technician* and *cosmetologist* are exceptions, being grammatically masculine while expressing female-stereotyped occupations, it can be assumed that the first component is more strongly characterised by stereotypical associations about occupational roles. Secondly, the language component is mostly represented by



milker M and *milker F*. While this profession in the real world has an equal proportion of men and women, the results show that linguistic cues also affect the interpretation of job titles. Last, words such as *architect*, *lecturer*, *chair*, *lawyer* represent the last component. In other words, these are mostly professions that language users have perceived to be more gender neutral, but for some of which (for instance, lawyer or chair) a bias exists.

It is also evident from the inter-variable relationship displayed on Figure 8 that, concerning the first and second principal component, distinct clusters of variables form based on stereotype and language.

For instance, grammatically feminine words expressing feminine occupations (e.g., *babysitter*, *chambermaid*, *nurse administrator*) versus grammatically masculine words expressing feminine occupations (e.g., *kindergarten teacher*, *cosmetologist*, *nail technician*) are divided into separate clusters. This partitioning indicates variations in response patterns of the named variables, accompanied by a modest correlation. Moreover, as grammatically masculine female-dominated occupations are placed in different clusters from grammatically feminine female-dominated occupations, the clustering seems to be primarily influenced by stereotypes, suggesting that these stereotypes are a key factor in the interpretation of Russian occupational titles. On the other hand, as is illustrated by *milker* (M and F), the interpretation is also determined by the explicit gender marker.

4.4.3 Logistic regression

Table 3 displays the results of two binomial logistic models, regarding the influence of predictor variables – participants’ gender,

age and education as well as grammatical gender and the type of the occupation – in the Russian survey. The procedure was similar to the Estonian survey: models were generated with the “glm” function, the responses were classified into two categories: neutral (0) vs. male-biased (−1) as well as neutral (0) vs. female-biased (1). The table compares neutral responses, set as the reference category, to male-biased (on the left) and to female-biased responses (on the right).

In the Russian results, a predictor strongly influencing male-biased responses, as opposed to neutral ones, is masculine gender marking. Compared to the feminine gender marking, masculine gender marking increases the odds of male-biased responses by 35 times. In addition, words referring to masculine occupations are more likely to result in male-biased responses than words referring to neutral occupations, with an odds ratio of 2.5, while feminine occupations decrease the odds, as expected. Another significant predictor is the age group 29–39 years. Participants in this group are less likely than those aged 18–28 years to give male-biased responses, with an odds ratio of 0.68. As for female-biased responses, a predictor strongly influencing the results here is feminine gender marking, increasing the odds of female-biased responses 39 times compared to masculine gender marking. Here, the opposite effect is observed for occupations: a feminine occupation, as opposed to a neutral occupation, doubles the odds of female-biased responses, while a masculine occupation decreases them. No strongly influencing predictors emerged from the participants’ data. Participants with an academic degree were less likely to exhibit male-biased (odds

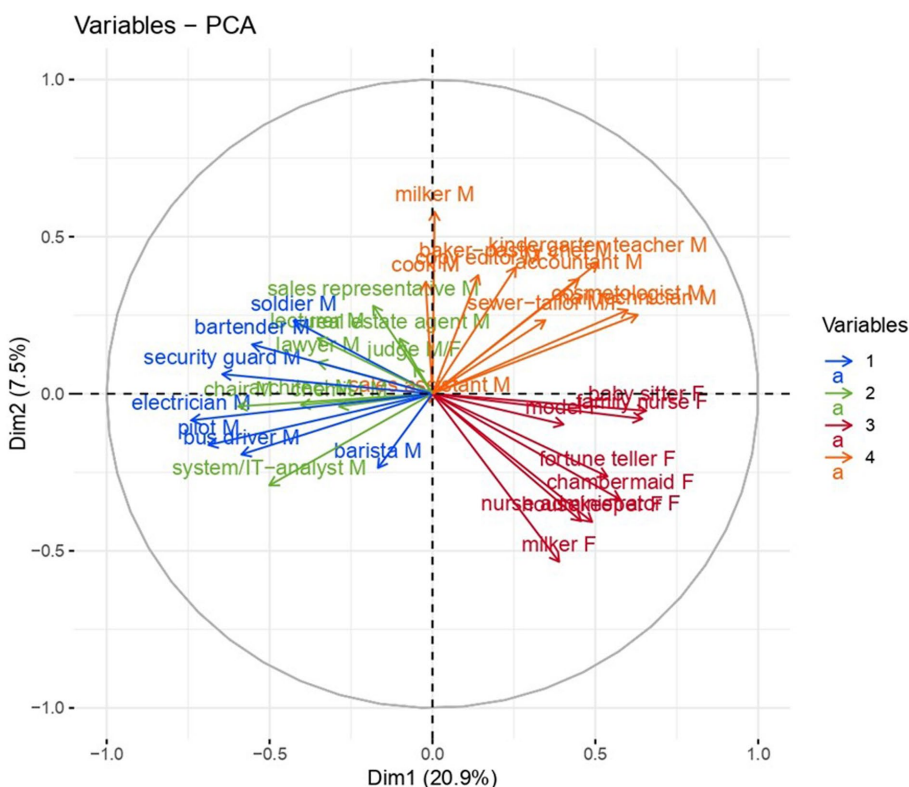


FIGURE 8 Russian variables in respect to the first and second principal component.

TABLE 3 Predictors influencing Russian responses (0 vs. -1) (0 vs. 1).

Predictors	Response (NEUTR vs MASC)				Response (NEUTR vs FEM)			
	Log odds	Std. error	Z-value	Pr(> z)	Log odds	Std. error	Z-value	Pr(> z)
(Intercept)	-4.37	0.71	-6.20	9.38e-10	-1.90	0.12	-16.2	< 2e-16
Gender F	Reference				Reference			
Gender M	-0.08	0.05	-1.44	0.15	0.05	0.06	0.81	0.42
Age 18-28	Reference				Reference			
Age 29-39	-0.39	0.09	-4.41	9.38e-10	-0.18	0.10	-1.73	0.08
Age 40-50	-0.03	0.09	-0.34	0.73	0.22	0.11	1.95	0.05
Age 51-61	-0.26	0.11	-2.27	0.02	-0.02	0.14	-0.17	0.87
Age 62-72	0.30	0.15	1.91	0.05	0.54	0.17	3.07	0.002
Educ. (higher)	Reference				Reference			
Educ. (academic degree)	-0.27	0.09	-3.15	0.001	-0.33	0.10	-3.31	0.0009
Educ. (secondary)	0.22	0.09	2.42	0.01	0.11	0.11	1.02	0.31
Marking F	Reference				3.66	0.08	44.4	< 2e-16
Marking M	3.56	0.71	4.99	5.97e-07	Reference			
Occupation N	Reference				Reference			
Occupation F	-1.56	0.10	-14.9	< 2e-16	0.96	0.08	12.5	< 2e-16
Occupation M	0.92	0.07	13.2	< 2e-16	-1.04	0.12	8.47	< 2e-16
Observations	7,692				8,816			
Null deviance	9,329				11,749			
Log-Likelihood	-3,954				-3,328			
AUC	0.749				0.887			

ratio = 0.76) and female-biased responses (0.72) than those with higher education. The age group 62–72 is also an important predictor, as participants in this group are 1.71 times more likely to exhibit female-biased responses.

5 Comparison

While Estonian and Russian are systematically different in terms of gender expression, language users' interpretation of occupational titles nevertheless revealed some similar tendencies. Firstly, the results suggest that many occupational titles are perceived as gender neutral for both languages, despite the grammatical gender in the case of Russian. Notably, many of such occupations have an equal gender distribution in real life as well, underscoring the consistency of perceptions and societal realities. This is further evident in strongly male- or female-biased occupations, which are perceived accordingly. However, responses to grammatically masculine generic words in Russian show greater variability toward male bias compared to Estonian, where words without morphological gender marking retain a more consistent neutral interpretation. This results in a higher proportion of responses in Estonian that conflict with real gender distribution. For instance, occupations such as *pilot* and *security guard* are interpreted with significantly stronger biases in Russian. This pattern suggests that while the grammatical masculine gender in Russian is intended to function generically, linguistic cues,

alongside social beliefs and information about gender roles, play a significant role in guiding interpretations. Consequently, Russian speakers, who rely on both linguistic and social information, exhibit more pronounced response patterns than Estonian speakers. Nonetheless, Estonian words representing generic masculinity elicited more biased responses than their neutral counterparts, highlighting the possibility that lexical gender references in genderless languages, though potentially less frequent in everyday usage, can be similarly influential when they are being employed.

Our findings suggest that Russian language speakers tend to integrate stereotypical information more prominently in cooperation with language, with stereotypes often seeming to take the lead. This is also suggested by Kapatinski (2006), as well as Doleschal (1993, cited through Doleschal and Schmid, 2001: 266), and Garnham and Yakovlev (2015), who demonstrated that gender associations stem from accurate gender distinctions, overriding incongruent linguistic cues. Our study similarly observed this trend, as several female-stereotyped occupational nouns primarily elicited female-biased responses in the Russian survey, despite their grammatically masculine form. Similarly, Estonian language speakers also appear to rely on both stereotypes and language simultaneously, though in a different manner. Estonian masculine generics represent traditionally masculine occupations and their use in turn evokes male-biased perceptions, as shown by our findings. However, the lack of grammatical gender means that the associations rely more heavily on social knowledge.

Russian femininives are used to explicitly mark female referents and become pejorative when used for naming a male person. Moreover, Russian incorporates generic masculinity more frequently, with masculine grammatical gender increasing the odds of male-biased responses by over 30 times compared to neutral responses. These aspects indicate that the Russian language, through its reliance on grammatical gender, not only reflects existing gender stereotypes but also perpetuates them by embedding gender distinctions and biases into linguistic practices. However, grammatically masculine words expressing generic masculinity used in the Russian survey elicited more neutral responses than Estonian *mees*-ending occupational titles. This suggests that in certain respects, the Estonian language may be equally or even more biased. This observation is particularly relevant given the widespread perception of Estonian as a gender-neutral language. Nevertheless, the structural differences between Russian and Estonian mean that direct comparisons are not entirely straightforward. Gender dynamics in the perceptions of language users, as we noted, also result from many extralinguistic factors, including cultural and environmental settings in which the languages are spoken.

6 Discussion

Language users' perception of Estonian and Russian occupational titles firstly revealed that the majority of professions are perceived to be gender neutral. This finding should be interpreted with an understanding of the specific characteristics of the study design. Likert scale surveys often convey a central tendency bias, as participants tend to place their responses closer to the midpoint to avoid giving extreme responses at the endpoints of a scale (Malone et al., 2014; Kusmaryono et al., 2022). Several factors could explain this result. First, this tendency could indicate that many respondents lacked a strong opinion (Krosnick et al., 2002; Nadler et al., 2015) or aimed to give socially acceptable answers (Garland, 1991), despite instructions to respond otherwise. Second, it is possible that most participants genuinely did not perceive these occupations as predominantly male- or female-dominated. For example, some Estonian participants subsequently indicated in the comments section that, in their view, gender boundaries within occupations are beginning to blur. Third, since we explicitly instructed participants to adopt the perspective of employers, it is possible that this led participants to assume that employers do not have gender preferences. The judgments might also reflect the belief that employers ought to behave impartially in a recruiting role, based on social expectations. Additionally, responding to Likert scale surveys also depends greatly on cultural differences and environmental aspects (Lee et al., 2002). Thus the manner in which respondents approached the questionnaire and subsequently answered also varies within these surveys. It has been argued, however, that the central tendency bias is an inherent result of how participants interpret such scales (Douven, 2018). Despite these considerations, the large sample size in both surveys supports the generalisability of the findings (Andrade, 2020).

Another factor that could explain these findings is the level of exposure to certain professions. The more personal contact there has been with the representative of a certain occupation, the more

stereotypical information has accumulated. Conversely, occupations that individuals have encountered less frequently (e.g., IT analyst, chemist, copy editor) may carry less gender-stereotypical information, resulting in these occupations being perceived as more neutral. This aligns with the principles of social role theory (Eagly, 1987; Eagly and Wood, 2012; Koenig and Eagly, 2014). Interestingly, several occupations were perceived neutrally despite existing gender biases in the real world. For Estonian, this applied to both male and female-dominated occupations expressed by morphologically gender neutral stimuli. For example, although approximately 10% of bus and tram drivers are women in Estonia, survey participants perceived bus drivers as 68% neutral. Similarly, despite at least 65% of chemists being women, this profession was perceived as 92% neutral. The increasing participation of women in traditionally male-dominated fields may contribute to the growing perception of these occupations as gender-neutral. This trend appears to be reflected in the results of Estonian, where perceptions are not additionally guided by linguistic information. In contrast, the reverse trend – men entering traditionally female-dominated occupations – has not been as pronounced (Haines et al., 2016).

The findings revealed that the dimension most significantly influencing the variation of responses for both languages is related to social knowledge. This is particularly prevalent in the Russian survey: in line with the previous studies (Doleschal, 1993; Kapatinski, 2006), we found that Russian occupational titles were perceived according to the stereotype, regardless of their grammatical gender. Additionally, while most Russian feminine nouns exclusively mark female agents, the word *модель* 'model' resulted in more neutral responses, since the proportion of women and men in this profession is equal. This result implies that cultural and societal perceptions associated with specific occupations often have a stronger influence on how individuals perceive gender in occupational titles. It also supports the discussion initiated by Garnham and Yakovlev (2015) about the distinctive nature of the Russian language compared to other grammatically gendered languages, such as French or German. Speakers of these languages have been found to rely on grammatical cues even in stereotype-incongruent situations (Gygax et al., 2008), a tendency that has not been observed that commonly among Russian speakers.

Indeed, the findings suggest that social knowledge affects the interpretation of occupational titles. However, language also plays a role in shaping these judgments, as also evidenced by previous studies (Gabriel and Gygax, 2008; Gabriel et al., 2017). For instance, as the outputs of regression models indicate, linguistic gender cues increased the odds of biased responses for both languages. Furthermore, while many occupations were perceived as neutral in Estonian, grammatical gender in Russian led to biased perceptions of the same occupations. In contrast, Estonian occupational titles without a morphological gender marking were perceived as more neutral than their gender-marked counterparts. While both Estonian gender-marked and neutral variants primarily referred to stereotypically male occupations, this could be the evidence of stereotypical thinking already existing due to social knowledge, with language further consolidating, reinforcing, and even amplifying it. Since we simulated a recruitment scenario, the results additionally suggest that the use of (generic) gender-marked words in job advertisements can cause exclusion, as found in previous studies as well (Stout and Dasgupta, 2011; Merkel, 2012; Horvath and Sczesny, 2016). Individuals whose gender identity

is not encompassed by the word used may feel they are not being addressed by this ad. This may sometimes be intentional, as employers occasionally indicate preferences for hiring either men or women, but in most cases, it stems from a lack of awareness. Although gender-neutral terms can also carry bias, their use might still increase the likelihood that they are perceived as inclusive of women and other genders, thereby introducing a degree of neutrality.

In addition to social knowledge and language, it became evident that gender of the participants also partially influences the perceptions. Specifically, the responses of male participants in the Estonian survey were associated with a reduction in the odds of male bias. It could be argued that Estonian male participants may not recognise male bias, as men are less likely to experience bias or discrimination in the workplace. Additionally, previous studies have shown that men tend to interpret generic masculine terms more inclusively, often perceiving them as referring to themselves (Hamilton, 1991; Redl et al., 2021). Conversely, men seem to be more aware of a female bias. Participants aged 29–39 years seemed to be the most aware of gender biases in both languages. Interestingly, Estonian participants with a secondary education were more likely to exhibit biased perceptions. On the one hand, this indicates that respondents with a secondary education perceive employers' gender preferences perhaps more strongly. Alternatively, this might suggest a lack of awareness, as those with a secondary education may be less involved in social environments where gender issues are addressed. This contrasts with the Russian participants, where those with an academic degree were less likely to give biased responses. Several factors, such as different educational systems, cultural and societal norms, could explain this. Gender issues might not be frequently discussed in the Russian academic sphere, which could also affect the level of awareness. However, respondents with an academic degree in Russia could also potentially be more critical of occupational gender biases, leading them to give more neutral responses as a form of resistance.

Finally, our study provides valuable insights into the comparison of gender perceptions in grammatically genderless and gendered language. It is often assumed that the absence of linguistic gender makes a language more gender neutral. However, our results suggest that a language that expresses gender only in vocabulary can exhibit as much or perhaps even more bias than a language with grammatical gender. When gender is not as frequently marked and does not form such an ingrained part of the language structure as it does in languages with grammatical gender, any artificially introduced lexical gender marking becomes more explicit.⁷ In Estonian, for instance, gender-marked words are relatively recent formations that have come to be used through language contacts. Consequently, such words have not become fully entrenched and gender connotations have persisted despite generic usage. Moreover, since generic masculinity is less prevalent and less naturalised in Estonian than in Russian, occupational titles expressing generic masculinity in Estonian are perceived less neutrally than comparable Russian grammatically masculine words. Therefore, gender-specific forms that are introduced can amplify social gender bias, by reinforcing inequality instead of reducing it (Hasselblatt, 2015: 130, 133–134). Nevertheless, most

Estonian occupational titles are gender neutral by form, which makes this language more flexible for expressing diverse gender identities, while the Russian language lacks gender neutral expressions. In addition, if the grammatically masculine gender is the default form, respondents in the Russian survey generally agreed on most feminine nouns referring exclusively to women, which confirms their non-standard and secondary position. It could also be possible, as Szuba et al. (2022: 833) indicate based on Polish language, that language users are generally less exposed to feminine nouns, which explains why they are perceived as more gender-emphasising. It is nevertheless interesting that, despite Russia's traditionalist society, widespread patriarchal attitudes and gender discrimination (see Pishlakova-Parker, 2022), there was a significant number of neutral perceptions in the survey, hinting that, for language users, gender differences in the labour market are not as important or prominent.

In addition to providing insights into gender perception of two systematically different languages, our study also makes an important contribution by bringing attention to understudied languages such as Estonian, thereby enriching the landscape of linguistic research. Our research focuses on examining these languages through the lens of gender, a particularly unexplored topic, since, as far as we know, the phenomenon of generic masculinity has been studied more extensively in languages with grammatical or natural gender. Thus, our results provide important information about gender dynamics in such languages. By investigating the mechanisms of gender expression in languages with different means for gender expression, we gain new perspectives into linguistics and a more comprehensive understanding of how gender operates across different societies.

The study has several limitations that should be addressed. Firstly, as mentioned earlier, Likert scale surveys often lead to a central tendency bias, which accounts for the majority of responses falling into the neutral category. Secondly, the survey design, which relies on opinion ratings from language users, captures only explicit gender bias and is unlikely to reveal deeper stereotypical thinking patterns. Moreover, this study adopts a quasi-experimental approach, where perceptions of linguistic units were evaluated without randomly assigning participants into different groups (Mackey and Gass, 2021: 269). This may have influenced the results, for instance, by making participants assess neutral and marked forms in relation to one another. Given the lack of similar studies in Estonian, it became evident that a simpler survey format was necessary to provide an initial overview of the validity of the established hypotheses. This study could benefit from a follow-up experimental research, using tools like sentence evaluation tasks (Carreiras et al., 1996; Gyga et al., 2008; Misersky et al., 2019; Redl et al., 2021, etc.) or self-paced readings (Szuba et al., 2022), to explore these questions more comprehensively and further validate the findings presented here.

7 Conclusion

Several findings of this study illustrate language users' perception of gender in two languages with different means for gender expression – grammatically gendered Russian and genderless Estonian. Firstly, we found that stereotypical assumptions about gender roles influence perception most actively, often overriding linguistic cues, particularly in the context of a grammatical gender language. For instance, consistently with previous research, we found

⁷ The neutralisation of Estonian *mees* 'man' probably derives Indo-European and/or Finnish influences (Karlsson, 1974, cited through Puna, 2006: 12).

that when the grammatical gender of an occupational title and stereotype of the named occupation are inconsistent, Russian participants rely on stereotypical information. This highlights the difference of Russian from several other languages with grammatical gender, the users of which have been found to be relying on language more often. Secondly, according to our results, stereotypical information seems to be amplified by language, intertwining linguistic and social knowledge in gender perception. For example, in the case of the Estonian survey, occupational titles ending in masculine suffixes elicited more biased responses than their neutral counterparts. Since these words mostly denote traditionally male occupations and generic masculinity, this suggests that, firstly, language perpetuates stereotypes, and secondly, generic masculinity is not perceived as generically as it seems in languages without grammatical gender. We hypothesise that, despite certain languages lacking grammatical gender, they still contain as much or sometimes even more bias than gendered languages. This could be attributed to the fact that gender is not as commonplace in the system of these languages, making it less naturalised and more explicit.

Data availability statement

The original contributions presented in the study are included in the article/[Supplementary material](#), further inquiries can be directed to the corresponding author.

Ethics statement

Ethical approval was not required for the studies involving humans because it was deemed unnecessary after consulting with an ethics advisor from the University of Tartu. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

EK: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Visualization, Writing – original draft,

Writing – review & editing. PO: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing. LL: Conceptualization, Methodology, Supervision, Writing – review & editing. RM: Conceptualization, Supervision, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fcomm.2024.1454022/full#supplementary-material>

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