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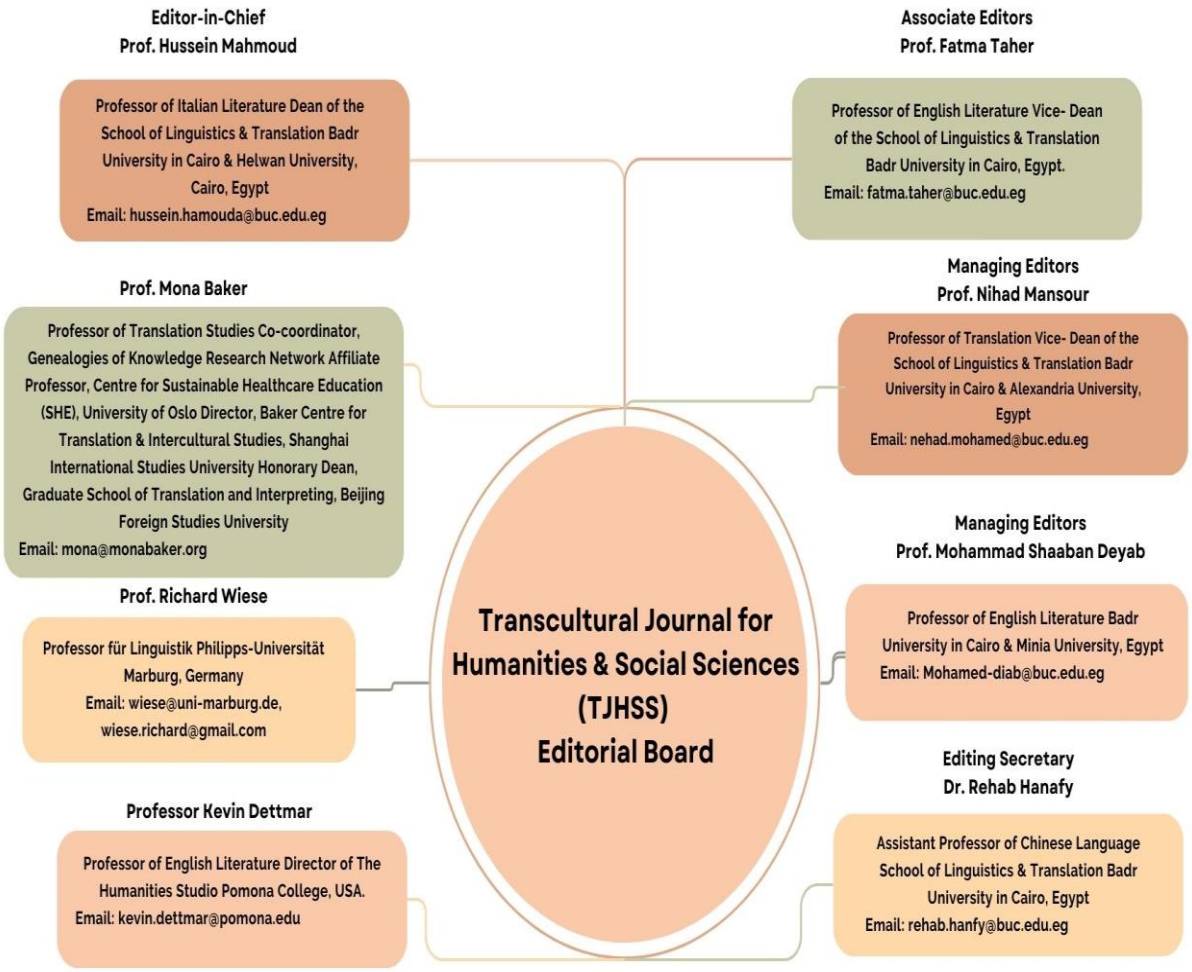

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Editorial Foreword

The first section of this edition of the research papers of the International conference on Transnational Feminism: Explorations, Communications, Challenges & Horizons is clearly conceived as a collection of research papers on the diversified approaches of the intersection between feminism, literature, linguistics, and translation. The diversity of the research papers closely connects to academic experiences and cultural backgrounds of the contributors. While presenting diversity in approaches, this section contributes to achieving a collective discussion of the multifaceted concept of translational feminism.

The section includes studies on the challenges of recent development of translational feminism, gender problematics in the translation of non-literary texts, the English translation of the *The Odyssey* (2018), gender bias in machine translation, the deafening effect of non-feminist translations of literary works, Arab Egyptian Feminist Voices in Translation, and lastly written in Arabic; obsession & rebellion in feminist movements writings.

In an attempt to have a wide reach and significant impact, the second section is allocated for miscellaneous research papers written in English, Spanish and Chinese. A semantic visual study of the image of orientalism in Indian epic tales, literary dissection the literary works of Antonio de Zayas, (Spanish), how poetry reflects and summarizes social life, and a study of Lin Shu's travelogues prose in Chinese are engaged in and/or preoccupied with recent trends and fast growing leaps in linguistic and literary studies.

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Section I

Gender Issues in Machine Translation

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Abstract: In this paper, this study investigates gender bias in MT focusing on three generic, easily accessible, and widely distributed MT systems, i.e. DeepL, Google Translate and e-Translation, in the EL-EN, EN-EL, DE-EL, and DE-EN language pairs. Regarding the pairs EN-EL and EL-EN, ten texts are used from two different genres and various domains (5 journalistic articles and 5 administrative/institutional texts) with varying degrees of inclusive language and with the aim of establishing: a) whether the three systems perform differently as regards gender bias, b) whether the systems perform differently in the two language pairs EL-EN, EN-EL and c) whether the use of inclusive language in the source text influences the MT output and can thus be used as a means to mitigate MT gender bias. Regarding the language pairs DE-EL and DE-EN, the intention is to illuminate the use of neutral-gender language in one segment of a political article, one segment of an official law text of the EU, and one segment of an official text of the German Federal Ministry of Education and Research (BMBF). The text segments range from 200 to 300 words. German, as a grammatically gendered language, has both semantic and formal (grammatical) gender, which is reflected not only in nouns, but in adjectives, adverbs, and articles. The issues studied concern gender inclusivity and gender discrimination. They remain consistent across the texts selected.

Keywords: MT, gender-bias, inclusive-language, EN-EL-DE

Introduction

In the era of AI, machine learning occurs at a high level. Machines process data sets at the level of speech sequences trying to analyze and learn patterns. But these data sets are riddled with the biases of the natural speakers, which are manifested in the production of speech. Thus, machine learning contributes to perpetuating these biases in MT. Gender biases constitute an exemplary manifestation of this process (Ullmann, 2022).

First, this study will investigate gender bias in MT focusing on three generic, easily accessible, and widely distributed MT systems, i.e. DeepL, Google Translate and e-Translation, in the EL-EN and EN-EL language pairs. This study will adopt an experiment by using the systems to translate ten texts from two different genres and various domains (5 journalistic articles and 5 administrative/institutional texts) with varying degrees of inclusive language with the aim of establishing a) whether the three systems perform differently as regards gender bias, b) whether the systems perform differently in the two language pairs EL-EN, EN-EL and c) whether the use of inclusive language in the source text influences the MT output and can thus be used as a means to mitigate MT gender bias. The issues studied concern gender inclusivity and gender discrimination.

Second, this study will investigate gender bias in the language pairs DE-EL and DE-EN. The intention is to illuminate the use of neutral-gender language in one segment of a political

article, one segment of an official law text of the EU and one segment of an official text of the German Federal Ministry of Education and Research (BMBF). The text segments range from 200 to 300 words. German, as a grammatically gendered language, has both semantic and formal (grammatical) gender, which is reflected not only in nouns, but in adjectives, adverbs, and articles (Hord, 2016, p. 2). If the noun or pronoun refers to a person or a group of persons, then the genus of the noun or pronoun usually corresponds to the gender of the person or group of persons mentioned (Prewitt-Freilino et al., 2011, p. 269). If a pronoun or a noun refers to a mixed gender group, it is common in German to use a noun with a masculine gender (e.g., die Polizei). In the generic masculine, the masculine form of a person's name is used, even if a group consists of persons of different genders.

Recent studies

According to recent studies, different popular Machine Translation (MT) systems are prone to gender biased translations, and this is explained by the functioning of current neural machine translation (NMT) systems (Stanovsky et al. 2019). Such systems involve a single, large neural network that is trained to maximize the probability of providing a more appropriate translation given a source text (Bahdanau et al. 2016). The architecture includes two functions: the first one encodes variable-length translation units and turns them into numeric vectors, which represent concepts (encoder); the second one decodes vectors and provides the target sentence (decoder). NMT system relie on advanced deep learning techniques, as highlighted in works by Sutskever et al. (2014), Bahdanau et al. (2016), and Vaswani et al. (2017). While these approaches significantly enhance performance by learning features directly from data, a notable drawback emerges in the form of biases inherent in the training data, as pointed out by Madaan et al. (2018). This issue, often referred to as machine bias, manifests itself in the perpetuation or even exacerbation of linguistic bias and societal stereotypes, particularly in relation to gender and race (Zhao et al., 2017; Zhao et al., 2018). The models trained using such methods inadvertently reflect and potentially amplify existing asymmetries present in society, as depicted in studies by Prates et al. (2019). This raises concerns about the ethical implications of machine bias in NMT models.

In 2018, Google introduced a measure aimed at mitigating gender bias in its MT application. Specifically, when translating from English into French, Italian, Portuguese, or Spanish, users gained the ability to select between feminine and masculine forms for individual words (Kuczmarski and Johnson, 2018). It's noteworthy, however, that this feature is currently limited to single words and is not extended to entire sentences. The initiative represents a step towards addressing gender-related concerns in translation, but its scope remains confined to lexical choices rather than encompassing full sentence structures.

Neutral language

To fight discrimination, the use of neutral language is proposed. According to the definition given by the EU: "Gender-neutral language is a generic term covering the use of non-sexist language, inclusive language or gender-fair language. The purpose of gender-neutral language is to avoid word choices which may be interpreted as biased, discriminatory, or demeaning by implying that one sex or social gender is the norm. Using gender-fair and inclusive language also helps reduce gender stereotyping, promotes social change and contributes to achieving gender equality." (European Parliament, 2018, p. 3).

Strictly speaking, neutral language refers to the use of language with the purpose of silencing gender identification and, by concealing it, removing any discrimination that would result from the use of such identification. There are many methods of achieving neutral language. Particularly popular in Greek, and especially in the translation attempted in the following texts from English to Greek, is the use of passive syntax (Ευρωπαϊκό Κοινοβούλιο, 2018, p. 10). In this way, one avoids the choice of gender, whether it is a noun or an adjective. While this can be avoided in English, in Greek, as in other languages with similar grammar, this is not so simple. Furthermore, the use of plural, especially in the first or second person of the verb, can be very helpful in achieving the goals of neutral language. The use of imperatives, where possible, has the same effects (Ευρωπαϊκό Κοινοβούλιο, 2018, p. 10). Finally, there is also the possibility of using circumlocution to avoid gender identification, for example using «νοσηλευτικό προσωπικό» (nursing staff) instead of «νοσηλευτές/νοσηλεύτριες» (nurses), thus avoiding the use of the double form (Ευρωπαϊκό Κοινοβούλιο, 2018, p. 11).

Beyond the practices ways to mitigate or even eliminate gender bias in the Greek language, which undoubtedly have a direct impact on the translations of this paper, one must look more broadly to the reasons and the very nature of the use of neutral language. More specifically, one is called upon to answer some basic questions: "Why is the use of neutral language important? Are all uses of the masculine gender patriarchally charged? What happens in the case where the use of multiple dual forms is deemed necessary? Does the person translating have to make a compromise between the aesthetics of the text and the extent of the use of neutral language? Finally, is language that includes double types of the word neutral given the non-acceptance of gender binaries by various social groups?" These questions are part of what the paper at hand addresses. Of course, they are by no means exhaustive nor are they given one-off answers. On the contrary, it is an attempt to open the debate on this particularly important issue.

Language is a cultural vehicle and, therefore, imbued, at least to some extent, with the perceptions of a particular society at a particular point in time. In this respect, patriarchal attitudes have crept into it and are quite difficult to overcome by the vertical imposition of new rules. However, there is a strong tendency to implement such rules. Within this tendency, one finds the use of neutral language, as well as the emergence of gender through the creation of new inclusive types of words, which will be briefly presented below.

Gender Inclusion - Gender Manifestation

Along with the attempt to create a neutral language through the concealment of gender identification, there is a tendency to highlight the latter to remove the dominancy of the male gender. Even in the case of words where the same formula expresses both the masculine and the feminine, it is evident that the masculine dynamic undermines the emergence of the gender marker. Especially in the case of words denoting professions, such as «δικαστής» (judge), for instance, where most people were previously male. However, an attempt is being made to make the female gender visible in this sector by adding new gendered suffixes to the noun, creating the type «δικάστρια» (female judge). Note that the older «δικαστίνα» is not preferred as it carries some negative patriarchal connotations. Even if terms such as «δικάστρια» or «βουλεύτρια» (congresswoman) and so on are still considered unstructured, they present manifestations of the tendency to highlight gender visibility, a reflection of the social change taking place in the

language. In such cases, the use of strictly neutral expressions is not accepted as it reinforces the perpetuation of the status quo.

It is also worthwhile to analyze the impact of the use of inclusive language to highlight gender on the perceptions of individual identities or how these identities manifest in the use of such language. A study conducted in English on the terms 'hero/heroine' and 'murderer/murderess', has shown that the use of the double formula changed the visibility of the feminine gender in the former case, but not in the latter. More specifically, readers were given two varieties of texts, one with only the masculine type and one with both gender types of the word. Individuals exposed to the second variety identified "more female heroes", to use the traditional expression. This was not the case, however, with the case of the murderer. Of course, more research is needed and this result should not be easily generalized, however, it seems that gender salience becomes more appropriate when the noun or adjective is evaluated positively (Hansen et al., 2016).

Other research on German-speaking people showed that prior use of non-sexist language and one's ideological beliefs regarding gender equality and sexism are key indicators for predicting the use or non-use of inclusive language (Sczesny et al., 2015). The use of inclusive language occurs through complex mechanisms, which have to do with personal attitudes, beliefs, and intentions (Sczesny et al, 2015). A particularly interesting case of inclusive language for highlighting gendered attributes and thus removing the binary schema regarding gender is the use of the neologism Latinx, which refers to people of Latinx origin, conceptually including the entire LGBTQ+ community (Scharrón-del Río et al., 2020).

Concerning the business sector, it was shown that when management and, consequently, the whole organization promotes receptivity to difference, namely by making use of inclusive language, it positively influences employee creativity and performance, creating an organizational culture of openness (Lauring & Klitmøller, 2017). The recognition of the need to use inclusive language and the ethical declaration that the organization aims to use it as much as possible to avoid any exclusions is becoming increasingly common, in scientific journals and newspapers for instance (Dellmann et al., 2017).

Commentary of text sample (EN<->EL)

The selected texts for our case study are taken from various genres. The text samples can be found in the annex of the article. For these translations, various techniques were used. Adopting the American approach, for instance, both word-for-word translation was used when there was a one-to-one correspondence (matching), e.g. "problem" -> «πρόβλημα», and, rather more so, the zigzagging technique where the matching was one-to-many. Still, where it was deemed necessary, items were added or removed, e.g. "Progressive activists" -> «Προοδευτικά άτομα με ακτιβιστική δράση», along with the inversion of specific terms (Malone, 1988). The comparison of the translations with the original in the annex provides several such examples.

The first text is an excerpt from Michael J. Sandel's political philosophy book *Justice: what's the right thing to do?* It has been translated into Greek by Alexandros Kioupkiolis and has been published by Polis in 2013 (Sandel, 2013). However, the translation in the annex is an exercise by the author of this paper to highlight translation issues related to gender-neutral language. To achieve the latter, a variety of translation choices were made. In particular, the gender-neutral term «άτομα» was used to translate the English "people", while the plural

«αποδέκτες» (recipients), despite being in the masculine form, was subsequently retained as this formula corresponds to both genders. Furthermore, the plural nouns «έμποροι» (merchants) and «τραπεζίτες» (bankers) were retained, as it is customary for the same term to be used for both the masculine and the feminine. However, instead of using the term «διαχειριστές» (managers), the expression «τα άτομα που διαχειρίζονται» (people who manage) was used. Another example from the text is the preference for the term «φορολογία» (taxation) instead of «φορολγούμενοι» (taxpayers). These choices, as reflected in the annex, are intended to create neutral language while avoiding double forms and textual overload. This also applies to subsequent texts, although it is not always possible to avoid double forms.

The second text is an excerpt from a scientific popular journal article, of an informative, journalistic nature. In it, the expression «από το χώρο των επιστημών» (roughly: from the scientific world) has been used instead of the noun «επιστήμονες» (scientists), as it conveys neutrality and does not burden the text in this case. Furthermore, the use of a double form in nouns that are usually used with the same form for both genders was avoided, although one could use a double form in the case of the terms «διοικητικοί/ες» (administrators) and «γερουσιαστές/στριες» (senators). The translator chose here to avoid overloading the text. The same has been done below, and the neutral terms «ηγεσία» (leadership) and «επιστημονικό προσωπικό» (scientific staff') have been used instead of the nouns: «ηγέτης» (leader) and «επιστήμονες» (scientists).

The third text is an excerpt from a book review published in a scientific journal. There, the use of passive syntax encompasses all the structures that contain the word «άτομα» (persons) so that the gendered nature of the language is not apparent. Also, neutral expressions were used for the same purpose, as well as double forms. Specific reference to these choices is made in the annex. The same is true for the fourth text, an excerpt from an EU report, where the main method of avoiding gendered language is to use impersonal expressions and circumlocutions.

In summary, all translation options adopted aimed at creating texts with gender-neutral language as far as possible. When it was deemed appropriate to use double forms, this was done according to the directives of the EU manual on inclusive language (European Parliament, 2018). In addition, compromises had to be made between the extent of the use of these types and overloading the text, provided that it is evident from the immediate context that there is no discriminatory use of one gendered attribute at the expense of another.

Finally, the need for gender-neutral language is more urgent than ever. Inclusion and, consequently, non-exclusion of any social group is a key ethical requirement for ensuring gender equality and creating a tolerant and open society. This paper developed some of the strategies used to achieve neutral language and applied them to four different texts. The scheme of strictly neutral language, on one hand, juxtaposed with inclusive language to manifest gender attributes, on the other, was done conventionally. In each case, the issue is to achieve neutral language either through impersonal language that makes no reference to gender or through highlighting gender by creating new grammatical types. The silencing of the above characteristic by granting the use of the masculine for both genders, even in the case of discursive formulae that do not distinguish between the genders, undermines the neutrality of language by establishing the dominancy of the masculine. Therefore, the creation of formulae to make the gender feature visible aims to create a truly neutral language. However, the way in which inclusive language is realized is not without problems. This was shown in the application of translating techniques and

the problems that arose. In some cases, the translator is called upon to make a trade-off between the extent of the use of double forms, for instance, and overloading the text. In Greek, there are a few cases where avoiding the use of double forms in translation is impossible, so the translator will have to find another solution or make some kind of compromise.

Gender bias in MT

A form of data bias in MT is, of course, gender bias. There is a documented tendency in MT towards the use of male defaults (Prates et al., 2020). Nowadays, gender and language studies focus on how to make language more inclusive by mitigating or even eliminating gender bias. Using gender neutral or gender inclusive language are two ways to achieve this goal. The difference between the two approaches lies in the fact that gender neutral language tries to eliminate gender representation in language usage, e.g., by using the term «νοσηλευτικό προσωπικό» (nursing personnel) instead of «νοσηλευτές/νοσηλεύτριες» (male/female term for nurses), whereas using gender inclusive language attempts to manifest the underrepresented gender term in language usage, e.g., using both the female and the male term for "nurses". In the case of grammatical gender languages, the conflict between these two approaches becomes more apparent.

Gender bias is contingent on the structure of the language. Using a simple categorization, one could distinguish between genderless languages with minimum gender specific expressions, e.g., Turkish, notional gender languages with some gender pronouns and lexical types, e.g., English, and grammatical gender languages with morphosyntactic structures that carry gender qualities, e.g., Greek (Savoldi et al., 2021). In the latter, the predominance of male terms is evident and has mostly to do with a long patriarchal cultural tradition which is manifested in language use.

Mitigating gender should be the primary focus in any of the language categories presented above. But a translator, who moves from one language to the other, should keep in mind that in grammatical gender languages she must be more cautious as the structure of the language may amplify gender bias during the translation process.

Gender issues in Machine Translation

Recent studies have shown that current machine translation (MT) systems are likely to adopt gender bias from humans (Escudé Font 2019; Kuczmarski & Johnson 2018; Prates et al. 2019; Zhao et al. 2018). Gender bias is defined as the prejudice against one gender based on the perception that women and men are not equal. Biases can be unintentionally transferred to mainstream machine translation systems, leading to a reinforcement of gender stereotypes based on predetermined gender views derived from a language, or implicitly impose social stereotypes in the social environment. At the final level, they may lead to gender bias, by purposefully or unintentionally choosing one linguistic structure over another.

Gender is encoded differently in different languages. Some languages feature masculine, feminine or neutral forms (e.g., Greek and German), while others are gender neutral (e.g., English). This diversity in languages represents a challenge for machine translation: when translating from a gender-neutral language into a language which encodes explicit information for this category at the morphological level, translation systems must "guess" or recover missing morphological information, and more than one correct translation may exist for the same source input (Kuczmarski & Johnson 2018; Moryossef et al. 2019). In some cases, the preference of one

linguistic form towards the other is not predefined and, thus, creates issues on applying a more gender-neutral approach to the translated text.

Towards a neutral German language

One of the aspects of our study is the use of the neutral forms in German language, which have emerged as a response to the critique of the traditional generic masculine usage. Traditionally, German, a language characterized by grammatical gender, utilized masculine forms generically to denote individuals of any gender. This practice, however, has been increasingly scrutinized for its perceived gender bias (Belz, et al., 2023). As a remedy, earlier approaches favored the usage of paired forms (e.g., "Studentinen und Studente" - female and male students) to ensure the representation of all genders. More recently, a novel strategy has emerged, integrating gender-neutral terms in written German through the use of specific glyphs like the asterisk (e.g., "Student*innen") or the colon ("Student:innen"). These forms attempt to linguistically encapsulate inclusivity beyond the binary gender framework. However, the oral representation of these gender-neutral terms has been ambiguous. Recent trends indicate a growing preference for incorporating a pause or a glottal stop in spoken language as a means to signify these gender-neutral forms or the use of another form, generic for all genders.

Methodology: case study

In this section, we will describe the methodology followed to our research, which was conducted in August 2023. The selected corpus consists of three language pairs (EN-EL, EL-EN, DE-EL, EL-DE, EN-DE), seven articles each from legal, administrative, and academic backgrounds, along with six journal articles. We extract 200–300-word samples from each article and subject them to translation using Google Translate, DeepL, and E-Translation without conducting any post-editing. Additionally, we investigate the presence of gender biases in the original texts and juxtapose them with the MT outputs.

To conduct a thorough examination of gender biases within the machine-translated texts, the research methodology will be enhanced by incorporating the following steps:

Step 1: Identification of Masculine Form

Search for specific words, nouns, and pronouns in their masculine forms within the source texts. This includes terms such as job titles, professions, and other gendered language elements.

Step 2: Analysis of Generic Masculine

Examine instances where the generic masculine is employed in the source texts. This involves determining whether the use of masculine pronouns or nouns refers specifically to males, encompasses a mix-gender group, or potentially includes females.

Step 3: Role of Source Text in Output

Evaluate the impact of the source text on the translated output, focusing on how gender-specific terms are handled during translation. Determine whether the translated output maintains or alters the gendered nature of the original text.

Step 4: Cross-Language Pair Comparisons

Make detailed comparisons between language pairs (EN-EL, EL-EN, DE-EL, EL-DE, EN-DE) to identify any language-specific patterns in gender bias. We consider the linguistic nuances and cultural context that may influence the translation of gendered language elements.

Step 5: Contextual Understanding

Deepen the analysis by considering the contextual nuances surrounding gender-specific terms. We take into account cultural norms, legal frameworks, and societal expectations that may influence the perception and translation of gendered language.

Step 6: Iterative Process

The methodology will be an iterative process, allowing for refinement based on emerging patterns and insights throughout the analysis. Continuous feedback loops will be incorporated to ensure a comprehensive and nuanced understanding of gender biases in machine translation.

By enriching the methodology with these additional steps, the research aims to provide a comprehensive and nuanced exploration of gender biases in machine-translated texts, considering qualitative aspects across various language pairs and translation tools.

Many scholars, such as Zhao et al. (2018), Rudinger et al. (2018) and Stanovsky et al. (2019), among others, have created challenge sets to detect gender bias, analyse it, and propose debiasing techniques. The MT systems used for the study are three of the most popular MT systems available: there are currently 200 million daily users for Google Translate (available in more than 100 languages), and 312,000 daily users for DeepL (available in more than 8 languages). Since we aim at providing useful insights for gender issues in MT, we have conducted our research through engines that are easily accessible and user-friendly. All sentences were translated in August 2023. A final note of caution: as in all studies using web data and web-provided applications Google Translate, DeepL and E-Translation algorithms are likely to change, the full reproducibility of our results cannot be guaranteed.

Findings

The main general findings regarding the EL<->EN language pair could be summarized in the following: a) gender biases from the original text penetrated the translated one, b) gender biases appeared only in the translated text, and c) in some cases gender biases were mitigated in the translated texts.

EL->EN

In the texts taken from news journals, it was found that gender bias was mitigated due to the morphology of the target language and, namely, because of the inclusive plural form in English, e.g., “the scientists” (Η Εφημερίδα των Συντακτών, 2022). Moreover, in English there was no gender bias in the genitive case, e.g. “of the smokers” (Protagon team, 2022). Additionally, the source text may fail to use inclusive language in Greek making it necessary to include a specific description, whereas in English there is no need to do so. Even though in Greek the male pronoun is dominant, in the English translation inclusive language is used, e.g., «του διευθυντή» a male term in Greek, whereas in the English translation the term used is the inclusive “the principal”, as indicated by the administrative texts used (ΔΗΜΟΥ, 2019). In the case of the original Greek text the abstract term “locals” is expressed with the dominant male term «οι ντόπιοι» (Πούλιος et al., 2016). When neutral language was used as in the case of a Greek

scientific, medical text, e.g., «του ατόμου», it penetrated the translated text (Polikandrioti & Stephanidou, 2013). The same happened when inclusive language was used in the Greek text to denote the nursing profession «το νοσηλευτικό προσωπικό», which was retained in the English translation "nursing personnel" (Πανταζής, & Ίντας, 2016). As shown in scientific texts and texts taken from news journals, in Greek pronouns the male term is dominant, e.g. «πολλοί», «κανείς», «κάποιον», whereas in English the term used is inclusive ("many", "no one", "someone") (NEWSIT, 2022; Newsroom, 2022; Βεργολιά, 2022). Interestingly, in the case of the Greek official administrative text that implemented inclusive language by using the double form (feminine/masculine) of some terms (e.g. ενδιαφερόμενοι/ενδιαφερόμενες) DeepL and Google Translate performed better than e-translation as they translated the aforementioned Greek term with the term "interested" without the slash, whereas e-translation did not take into account the inclusive use of the slash and translated as follows: "interested/interested" (Baka, 2022).

EN->EL

MT translation in Greek is biased towards using male pronouns and male suffixes, a common motif through all the texts selected, i.e., philosophical, scientific, journalistic, and administrative (Sandel, 2009; Rosenberg, 2021; Dillon, 2021; European Commission, 2022). Gender bias also appeared towards certain adjectives or professions (e.g., "nurses" often translated in Greek using the feminine type of the word). Regarding the term "nurses" it is quite interesting that in the news journal text used to test the MT tools, DeepL used the masculine term and correctly identified the gender of the person's name (Jyme Kinnard) afterwards, whereas Google Translate and e-translation used the feminine type and incorrectly identified the person's gender (Bombardieri & Zhavoronkova, 2022). Furthermore, in another journalistic text DeepL could also recognize the gender of the person's name and keep it when translating into Greek the following nouns, whereas Google Translate and e-translation, even though correctly recognizing the gender of the person's name, reverted to the dominant masculine form for the following nouns (i.e., "Professor Kristie Ebi, an expert"="professor" was translated using the Greek feminine form, but "expert" was translated with the masculine form) (Debusmann, 2022). Another journalistic text gave similar results, where DeepL was the only MT that could effectively identify the gender of the person's name and translate accordingly its predicates even if they preceded it (Andrews, 2022). Across the texts used, there were not many significant differences between the 3 MT tools regarding gender bias. However, e-translation appeared to make some efforts to mitigate gender bias in scientific texts, probably because of the distribution of data sets used to train (Riazi et al., 2022; de Groot et al., 2022; Pang, 2022). This assertion should be tested with a larger data set and evaluate how effective the EU directive to use inclusive language is in the case of its MT tool.

EN-DE-EL

The administrative texts of the European Union (European Parliament and Council, 2011) represent equal linguistic realizations, as no language is a translation of another. As far as the neutral language is concerned, this was not fully followed, since we encountered cases where the neutral language was observed only in English (e.g. *stateless* ***person***), but not in Greek and German, where the masculine singular (e.g. ***ανιθαγενής*** = stateless (without denoting person)) and plural form (e.g. ***Staatenlosen*** = stateless (people)) was employed respectively.

The same observation can be made in the case of pronouns. In English, reference to a particular person was made using masculine and feminine pronouns respectively (e.g. *he* or *she*),

whereas in Greek and German no account was taken of reference to a particular group of people (e.g. *της εισόδου* ***του*** = after ***his*** entrance (GR), and ***die*** *nach der Einreise in das Hoheitsgebiet eines Mitgliedstaats* = after ***their*** entrance (DE)). In the former case, only the masculine form was employed, while in the latter, the plural form was applied.

DE-EL

A second case we examined concerns official texts of the Federal Ministry of Education and Research of Germany (Internetredaktion, 2023), from one language that reflects gender (German) to another language that equally reflects gender (Greek). In this case, our results are more confusing. Our findings were analyzed using DeepL, Google Translate and E-Translation, providing us with some interesting observations. In the case of nouns with a generalized statement, the German original text retained the neutral reference (*bei* ***älteren Menschen***), while the Greek translations, in all three translation engines, used the feminine generalized form (*σε* ***προχωρημένη ηλικία*** (Google Translate, DeepL), *στα* ***γηρατειά*** (E-Translation)).

Regarding nouns denoting professions, in the German original text we encounter double forms, referring to both men and women practicing the professions in question (*Die* ***Wissenschaftlerinnen*** *und* ***Wissenschaftler***), while in the Greek, in all three translation engines, the generalised plural form of masculine was preferred (*Οι* ***επιστήμονες*** = The scientists).

Another observation that concerns us is the declaration of gender in participles acting as adjectives. In this case, another grammatical gender (adjectives ending in -e) was preferred in the German text, which involves a neutral declaration of the adjective, without referring to the masculine or feminine respectively (*Das gilt für* ***jüngere*** *wie* ***ältere Erkrankte***). In contrast, the Greek preferred the generalized masculine form, in the plural (για **νεότερους** και **μεγαλύτερους** ασθενείς = *for younger and older patients*) (DeepL, Google Translate), για τους **νεότερους** και τους **ηλικιωμένους** ασθενείς = *for younger and elderly patients*) (E-Translation).

EL-DE

Several additional findings from our research are noteworthy, particularly concerning the translation of excerpts from journalistic texts from a smaller to a larger language, reflecting the genre, specifically from Greek to German (Psara, 2021). In this case, we translated certain samples of Greek journalistic discourse from Greek to German using three translation engines, examining the use of generic nouns, participles, and adjectives. Regarding the first category, the use of generic masculine forms was preferred in the original Greek text (***των Ελλήνων*** = *of the Greek people,* ***των πολιτών της ΕΕ*** = *of the EU citizens*), a phenomenon also observed in the German translations (***der Griechen, aller EU- Bürger***). The same observation applies to the statement of participles (***των ερωτηθέντων,*** ***der Befragten*** = *[percentage] of the respondents*).

As for the case of adjectives, we noted a paradox. While a neutral usage of adjectives was favored in the original Greek text (***Ικανοποιημένο*** = *satisfied [the percentage]* (GR)), a different trend was observed in the German translation (***sie*** *wahrscheinlich nicht oder überhaupt nicht* ***zufrieden*** *sind* (DE)).

The case study presented above is restricted by a series of limitations and should be viewed as an initial attempt to approach the subject of gender bias in MT. First, the sample used was very limited, albeit including various types of articles. The qualitative analysis was simple,

using only a few examples of gender bias to reveal the biases in the original text, along with those that penetrated the translation. Moreover, as the length of the sample was too small the MT tools were not tested as much as we would like at this point. However, the current attempt can form the basis for an upcoming quantitative analysis of gender bias. In this study, we will create a corpus of texts in Greek, English, and German to test these MT tools regarding gender bias. In this corpus it will be possible to categorize the texts and understand how gender bias is manifested in various genres. As far as the Greek language is concerned, creating a linguistic corpus to evaluate gender bias in MT is an open field of research and something that is urgently needed.

Discussion

In discussing the mitigation of gender bias in machine translation (MT), it is crucial to recognize the multifaceted challenges inherent in this endeavor. The key lies in addressing the biases often embedded in language data and the algorithms processing it. This exploration involves not only technical solutions but also an ethical and methodological reorientation towards data handling and algorithm design. First, the issue of unequal representation of neutral language in triple language pairs, such as English, Greek, and German, is noteworthy. The prevalence of neutral language varies across these languages, impacting the quality of MT output. For instance, the translation of gender-neutral terms like "Seniorinnen und Senioren" in German to "στους ηλικιωμένους" in Greek illustrates how language-specific nuances can affect translation fidelity. Similarly, variances in the usage of plural forms and genitives among these languages pose additional challenges. Addressing these disparities requires an in-depth understanding of linguistic structures and cultural contexts, which are often overlooked in current MT systems. The reliance on general plural forms and avoidance of gender-specific language, while seemingly a neutral approach, can sometimes obscure the intended meaning or societal context. For example, the use of "person" as a mitigation strategy may result in translations that are technically accurate but lack the nuance of gendered expressions present in the source language. This highlights the need for more sophisticated approaches that can capture and respect linguistic diversity.

Moreover, the notion that machine learning applications can impartially improve decision-making is a misconception. Bias in AI and data processing is not just a by-product but can be a systemic issue. Biases are often deeply ingrained in the datasets used for training MT systems, reflecting historical and societal inequalities. This hardcoding of bias necessitates a rigorous examination of the "black box" of data and AI, advocating for a shift towards transparency and ethical data handling. The integration of ethical frameworks into MT development is paramount. Approaches like annotating text and creating tags, as suggested by Danielle Saunders and Bill Byrne (2020), are steps towards creating more balanced datasets. These datasets, in turn, can lead to more nuanced and unbiased translations. The use of neutral and inclusive language is another strategy that, while challenging, can significantly reduce gender bias in MT outputs.

Finally, while eliminating gender bias in machine translation is a complex and ongoing challenge, efforts to mitigate it are essential. This requires a multifaceted approach encompassing technical solutions, ethical considerations, and a deeper understanding of linguistic diversity and gender representation. As the field progresses, it is vital to continually re-evaluate and adapt these strategies to ensure that MT systems are not only accurate but also equitable and inclusive.

The case study presented in this paper shows that gender biases in the original texts are usually perpetuated by MT. However, there are some ways to mitigate gender bias in MT. This could be achieved through annotating text and creating tags. Another proposal would be to create a balanced dataset to train the machine (Saunders & Byrne, 2020). Also, one should try to use neutral or gender inclusive language whenever possible. No matter how difficult the task of addressing gender bias may be, one should try to mitigate it in the data used to train the machine.

Primary resources

Sandel, M. J. (2013). *Δικαιοσύνη: Τι είναι το σωστό;* (μτφρ.) Κιουπκιόλης Α. Αθήνα: Πόλις.
Sandel, J., M. (2009). *Justice: what' s the right thing to do?* New York: Penguin books.
Rosenberg, A. (2022). Eric Lander's Departure Is a Step toward Safer Workplaces in Science. *Scientific American*. Eric Lander's Departure Is a Step toward Safer Workplaces in Science - Scientific American
Dillon, S. (2021). book review: Going Stealth: Transgender Politics and U.S. Surveillance Practices by Toby Beauchamp. *Feminist Review*, *129*(1), 148–150. https://doi.org/10.1177/01417789211031432
European Commission, Directorate-General for Communication. (2022). *European citizenship: report*. 2022, https://data.europa.eu/doi/10.2775/43202 (pp. 39-41)

Articles taken from Journals/Books EN-EL

Rosenberg, A., Andrew. (2021). Eric Lander's Departure Is a Step toward Safer Workplaces in Science. *Scientific American*. https://www.scientificamerican.com/article/eric-landers-departure-is-a-step-toward-safer-workplaces-in-science/
Sandel, J., M. (2009). *Justice: what' s the right thing to do?* New York: Penguin books. (pp. 24-26)
Bombardieri, M. & Zhavoronkova, M. (2022). Opinion: There's a dire shortage of nurses across the US. There's also an overlooked solution. *CNN*. https://edition.cnn.com/2022/07/20/opinions/nursing-shortage-covid-hospitals-bombardieri-zhavoronkova/index.html
Debusmann, Jr., B. (2022). Climate change: Will naming heatwaves save lives? *BBC*. https://www.bbc.com/news/world-us-canada-62297346
Andrews, R. J. (2022). How Florence Nightingale Changed Data Visualization Forever. *Scientific American*. https://www.scientificamerican.com/article/how-florence-nightingale-changed-data-visualization-forever/

EL-EN

Protagon team. (2022). PMI: Ένα δισεκατομμύριο καπνιστές σημαίνει 80 εκατομμύρια περιστατικά καρκίνου του πνεύμονα. *Protagon.gr*. https://www.protagon.gr/themata/pmi-ena-disekatommyrio-kapnistes-simainei-80-ekatommyria-peristatika-karkinou-tou-pnevmona-44342531414
NEWSIT. (2022). Η παραγωγός του Τζέιμς Μποντ λέει ότι η επόμενη ταινία θα «επανεφεύρει» τον 007. *Newsit.gr*. https://www.newsit.gr/lifestyle/i-paragogos-tou-tzeims-mpont-leei-oti-i-epomeni-tainia-tha-epanefeyrei-ton-007/3556663/
Newsroom. (2022). Η Αμερικανική Ακαδημία καλεί 397 νέα μέλη. *Η Καθημερινή*. https://www.kathimerini.gr/culture/cinema/561933334/i-amerikaniki-akadimia-kalei-397-nea-meli/
Η Εφημερίδα των Συντακτών. (2022). Τεράστιο επιστημονικό άλμα η αποκάλυψη της δομής 200 εκατ. Πρωτεϊνών. *Efsyn.gr*. https://www.efsyn.gr/epistimi/iatrika-

themata/353720_terastio-epistimoniko-alma-i-apokalypsi-tis-domis-200-ekat
Βεργολιά, Μ. (2022). Αφγανιστάν: Μια επίγεια κόλαση για τους ΛΟΑΤΚΙ+. *In.gr*. https://www.in.gr/2022/07/28/life/lgbtqi/afganistan-mia-epigeia-kolasi-gia-tous-loatki/?fbclid=IwAR0XTfbvewOKf4-YuqSSyQUWqZ5qDx4J09PvU7LfnDcGtYwmn6CIRO_pHlo

Administrative/Academic Articles

EN-EL

European Commission, Directorate-General for Communication. (2022). *European citizenship: report*. 2022, https://data.europa.eu/doi/10.2775/43202 (pp. 39-41)
Dillon, St. (2021). book review: Going Stealth: Transgender Politics and U.S. Surveillance Practices by Toby Beauchamp. *Feminist Review*. 2021;129(1):148-150. doi:10.1177/01417789211031432
European Commission. (2022). Directorate-General for Communication, European citizenship: report, 2022, https://data.europa.eu/doi/10.2775/43202 (pp. 39-41)
Riazi, K., Azhari, H., Charette, H., J., Underwood, E., F., King, A., J., Afshar, E., El., Swain, G., M., Congly, E., St., Kaplan, G., Gilaad & Shaheen, Ab.-Az. (2022). The prevalence and incidence of NAFLD worldwide: A systematic review and meta-analysis. *The Lancet Gastroenterology & Hepatology*, *0*(0). https://doi.org/10.1016/S2468-1253(22)00165-0
Pang, G. (2022). "The AI Chip Race," in IEEE Intelligent Systems, vol. 37, no. 2, pp. 111-112, 1 March-April 2022, doi: 10.1109/MIS.2022.3165668
de Groot, B., Leendertse, W., & Arts, J. (2022). Co-Evolution of Organizations in Infrastructure Planning: The Role of Communities of Practice as Windows for Collective Learning Across Project-Oriented Organizations. Administration & Society. https://doi.org/10.1177/00953997221100379

EL-EN

Πούλιος, Ι., Αλιβιζάτου, Μ., Αραμπατζής, Γ., Γιαννακίδης, Α., Καραχάλης, Ν. Γ., Μάσχα, Ε., ... & Τουλούπα, Σ. (2016). Τουρισμός, πολιτισμική διαχείριση, τοπική κοινωνία και βιώσιμη ανάπτυξη.
Polikandrioti, M., & Stephanidou, S. (2013). Κατάθλιψη σε μη ψυχιατρικούς ασθενείς. Βήμα του Ασκληπιού, 12(4).
ΔΗΜΟΥ, Π. (2019). Ο ρόλος του διευθυντή στην ανίχνευση και εκπαιδευτική διαχείριση χαρισματικών μαθητών, απόψεις διευθυντών δημοτικών σχολείων. Πανελλήνιο Συνέδριο Επιστημών Εκπαίδευσης, 1, 185-194.
Baka, Ch. (2022). ΕΚΔΟΣΗ ΒΕΒΑΙΩΣΗΣ ΣΧΟΛΙΚΗΣ ΝΙΚΗΣ. Υπουργείο Παιδείας και Θρησκευμάτων. https://www.minedu.gov.gr/publications/docs2020/96_%CE%A5%CE%A0%CE%9F%CE%92%CE%9F%CE%9B%CE%97_%CE%94%CE%99%CE%9A%CE%91%CE%99%CE%9F%CE%9B%CE%9F%CE%93-_%CE%92%CE%95%CE%92%CE%91%CE%99%CE%A9%CE%A3%CE%97_%CE%9D%CE%99%CE%9A%CE%97%CE%A3.pdf?fbclid=IwAR1lSj4GIPyb-pDudAPB_5DosFAORCAN_akHjoUt2Cre_Xwl8PduL_pn_-0.
Πανταζής, Α., & Ίντας, Γ. (2016). Επαγγελματικός Ψυχολογικός Εκφοβισμός στο Νοσηλευτικό

Προσωπικό. Nosileftiki, 55(4).

EN-DE-EL

European Parliament and Council, Directive 2011/95/EU. (2011). *Directive 2011/95/EU of the European Parliament and of the Council of 13 December 2011 on standards for the qualification of third-country nationals or stateless persons as beneficiaries of international protection, for a uniform status for refugees or for persons eligible for subsidiary protection, and for the content of the protection granted* (pp. 16-17), https://eur-lex.europa.eu/legal_content/EN/TXT/?uri=CELEX%3A32011L0095.

DE-EL

Internetredaktion, R. B. L. (2023). Lebensqualität erhalten - DLR Gesundheitsforschung. *Deutsche Zentrum für Luft und Raumfahrt e.V. - DLR Gesundheitsforschung*. https://www.gesundheitsforschung-bmbf.de/de/lebensqualitat-erhalten-6787.php.

EL-DE

Psara, M. (2021). "Ελληνική δυσφορία και δυσπιστία". *Efsyn*. https://www.efsyn.gr/kosmos/eyropi/309695_elliniki-dysforia-kai-dyspistia.

References

Bahdanau, D., K. Cho, Y. Bengio (2016). Neural Machine Translation by Jointly Learning to Align and Translate, paper presented at *the 3rd International Conference on Learning Representations ICLR 2015* (San Diego, CA, 7-9 May 2015).

Belz, M., Müller, M., Mooshammer, C. (2023): Pronunciation of gender-neutral German with respect to speaker attitude, in Radek Skarnitzl und Jan Volín (Hg.): *Proceedings of the 20th International Congress of Phonetic Sciences*. Prague: Guarant International, 3532–3536.

Dellmann, S., Kember, J., & Shail, A. (2017). Towards a non-discriminatory, inclusive use of language and images in our journal. *Early Popular Visual Culture*, *15*(4), 393–404. https://doi.org/10.1080/17460654.2017.1413826

Diesner-Mayer, T. & Seidel, N. (2022). Supporting Gender-Neutral Writing in German. In *Mensch und Computer 2022 (MuC '22), September 4–7, 2022, Darmstadt, Germany*. ACM, New York, NY, USA 4 Pages. Available at: https://doi.org/10.1145/3543758.3547566

Escudé Font, J. (2019). *Determining Bias in Machine Translation with Deep Learning Techniques*, UPC, Master Thesis, https://upcommons.upc.edu/handle/2117/128025.

European Parliament. (2018). *Gender-Neutral language in the European Parliament.*

Hansen, K., Littwitz, C., & Sczesny, S. (2016). The Social Perception of Heroes and Murderers: Effects of Gender-Inclusive Language in Media Reports. *Frontiers in Psychology*, *7*. https://www.frontiersin.org/article/10.3389/fpsyg.2016.00369

Hord, Levi C. R. (2016). "Bucking the Linguistic Binary: Gender Neutral Language in English,

Swedish, French, and German," *Western Papers in Linguistics / Cahiers linguistiques de Western*: Vol. 3, Article 4. Available at: https://ir.lib.uwo.ca/wpl_clw/vol3/iss1/4

Kuczmarski, J., M. Johnson (2018). Gender-Aware Natural Language Translation, *Technical Disclosure Commons* (8 October 2018), https://www.tdcommons.org/cgi/viewcontent.cgi?article=2642&context=dpubs_series.

Lauring, J., & Klitmøller, A. (2017). Inclusive Language Use in Multicultural Business Organizations: The Effect on Creativity and Performance. *International Journal of Business Communication*, *54*(3), 306–324. https://doi.org/10.1177/2329488415572779

Madaan, N., S. Mehta, S. Mittal, A. Suvarna (2018). Judging a Book by its Description: Analyzing Gender Stereotypes in the Man Bookers Prize Winning Fiction, *CoRR*, abs/1807.10615.

Malone, J. L. (1988). *The Science of Linguistics in the Art of Translation: Some Tools from Linguistics for the Analysis and Practice of Translation*. SUNY Press.

Moryossef, A., R. Aharoni, Y. Goldberg (2019). Filling Gender & Number Gaps in Neural Machine Translation with Black-Box Context Injection, in M.R. Costa-jussà, C. Hardmeier, W. Radford and K. Webster (eds.) *Proceedings of the First Workshop on Gender Bias in Natural Language Processing*, Florence: Association for Computational Linguistics, 49-54, https://arxiv.org/pdf/1903.03467.pdf.

Prates, M.O.R., P.H. Avelar, L.C. Lamb (2019). Assessing Gender Bias in Machine Translation - A Case Study with Google Translate, *Neural Computing and Application*, Springer: London, 1-19.

Prates, O.R., Marcelo, Avelar, H., Pedro & Lamb, C., Luís. (2020). Assessing gender bias in machine translation: a case study with Google Translate. Neural Comput & Applic 32, 6363–6381 (2020). https://doi.org/10.1007/s00521-019-04144-6

Saunders, D. & Byrne, B. (2020). Reducing Gender Bias in Neural Machine Translation as a Domain Adaptation Problem (arXiv:2004.04498). arXiv. https://doi.org/10.48550/arXiv.2004.04498

Savoldi, B., Gaido, M., Bentivogli, L., Negri, M., Turchi, M. (2021). Gender Bias in Machine Translation. Transactions of the Association for Computational Linguistics 2021; 9 845–874. doi: https://doi.org/10.1162/tacl_a_00401

Scharrón-del Río, M. R., & Aja, A. A. (2020). Latinx: Inclusive language as liberation praxis. *Journal of Latinx Psychology*, *8*(1), 7–20. https://doi.org/10.1037/lat0000140

Sczesny, S., Moser, F., & Wood, W. (2015). Beyond Sexist Beliefs: How Do People Decide to Use Gender-Inclusive Language? *Personality and Social Psychology Bulletin*, *41*(7), 943–954. https://doi.org/10.1177/0146167215585727

Stanovsky, G., N.A. Smith, L. Zettlemoyer (2019). Evaluating Gender Bias in Machine Translation, in *Proceedings of the 57th Annual Meeting of the B49 Association for Computational Linguistics*, Florence: Association for Computational Linguistics, 1679-1684, https://arxiv.org/abs/1906.00591.

Sutskever, I., O. Vinyals and Q. Le (2014). Sequence to Sequence Learning with Neural Networks, in Z. Ghahramani, M. Welling, C. Cortes, N.D. Lawrence and K.Q. Weinberger (eds.) *Advances in Neural Information Processing Systems 27*, Cambridge, MA: MIT Press, 3104-3112, http://papers.nips.cc/paper/5346- sequence-to-sequence-learning-with-neural-networks.pdf.

Ullmann, St. (2022). Gender Bias in Machine Translation Systems. In A. Hanemaayer (Ed.), *Artificial Intelligence and Its Discontents: Critiques from the Social Sciences and*

Humanities. Springer International Publishing (pp. 123–144). https://doi.org/10.1007/978-3-030-88615-8_7

Vaswani, A., N. Shazeer, N. Parmar, J. Uszkoreit, L. Jones, A.N. Gomez, L. Kaiser, I. Polosukhin (2017). Attention Is All You Need, in I. Guyon, U.V. Luxburg, S. Bengio, H. Wallach, R. Fergus, S. Vishwanathan and R. Garnett (eds.) *Advances in Neural Information Processing Systems 30, Reed Hook*, New York: Curran Associates Inc, 5998-6008, https://papers.nips.cc/paper/7181- attention-is-all-you-need.pdf.

Zhao, J., T. Wang, M. Yatskar, V. Ordonez, K.W. Chang (2017). Men Also Like Shopping: Reducing Gender Bias Amplification Using Corpus-Level Constraints, in *Proceedings of the 2017 Conference on Empirical Methods in Natural Language Processing*, Copenhagen: Association for Computational Linguistics, 2979-2989.

------ (2018) "Gender Bias in Coreference Resolution: Evaluation and Debiasing Methods", in M. Walker, H. Ji and A. Stent (eds.) Proceedings of the 2018 Conference of the North American Chapter of the ACL, Volume 2, New Orleans, Louisiana: Association for Computational Linguistics, 15-20, https://arxiv.org/pdf/1804.06876.pdf

Ευρωπαϊκό Κοινοβούλιο. (2018). *Ουδέτερη ως προς το φύλο γλώσσα στο Ευρωπαϊκό Κοινοβούλιο*.