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Breaking the Mold: Analysing the Role of Gender Stereotyping and Gender-Fair Language in Text Comprehensibility and Text Comprehension

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Laura Mathilde Pabst BEd BSc MEd

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1. Introduction

How much of what we understand in a text is shaped not by what is said, but by the way it is said? Language is more than a mere tool for communication: It shapes reality and can be considered as a medium that establishes and reinforces social norms, and cultural values. Based on the structure of a language and the choice of words, our cognitive processing as well as our perceptions and biases are impacted, often in ways we do not consciously recognise (Boroditsky, 2017). The way language is being used has long impacted and shaped gender expectations, often maintaining conventional hierarchies and restricting the representation of marginalised groups by reducing their visibility (Tavits & Pérez, 2019). As awareness of these issues grows, linguistic structures have been facing more scrutiny, especially in relation to gender stereotypes, inclusive and gender-fair language, and text understanding as well as comprehensibility (Braun et al., 2007). Such discussions hold particular relevance as society becomes more inclusive and diverse, as the need for an equitable representation in all forms of communication has become a key priority (Hellinger & Bußmann, 2001, 2002, 2003). In line with this, the sole use of gendered language in the form of masculine generics has received rather harsh criticism. In order to respond to the linguistic asymmetry that is engrained in numerous languages – especially in grammatical gender languages such as German – gender-fair language (= GFL) has been introduced to promote equality (Stahlberg et al., 2007). However, a central debate in the field concerns whether the use of GFL limits comprehensibility (see, for example, Friedrich et al., 2021). Given the mixed results that research has so far yielded, a deeper investigation is still necessary to better understand the potential ramifications of GFL on text comprehensibility. Despite the existing research, critical gaps remain. As such, the question of whether GFL complicates processing and disrupts text understanding has not previously been addressed. Further, the role of texts with gender-stereotypical cues and their potential impact on both comprehension and comprehensibility as well as interaction effects have so far been neglected in the scientific discussion. These research gaps, specifically the unexplored effects of GFL and gender-stereotypical cues emphasise the importance of further studies on how linguistic structures influence readers' preconceptions about gender, ultimately shaping text comprehension and comprehensibility.

Building upon the identified research gaps, the present study pursues the overarching research question of how texts with gender-stereotypical cues and GFL influence text comprehensibil-

ity and text comprehension. The main objective is to examine whether and how these linguistic factors affect readers' text understanding and comprehensibility, while also exploring potential interactions between them. In this regard, it is important to examine secondary-level students enrolled in the teacher training programme because teacher students play a key role in education and language use. In fact, their comprehension of GFL can be considered as highly relevant as they will influence the teaching of language and thereby potentially impact the perceptions of GFL of future student generations. Moreover, their academic training equips them with the skills to critically analyse linguistic structures.

2. Theoretical Background

2.1. Gender Stereotyping in Language and Communication

Language is a dynamic tool that shapes and echoes gender-related norms embedded in society. In the context of this thesis, understanding how texts with gender-stereotypical cues operate within language and communication is pivotal when evaluating their influence on text comprehensibility and comprehension. Focusing on its roots, continued presence and impact across different communication settings, the present chapter explores how gender stereotyping and language intersect.

2.1.1. Understanding Gender Stereotypes

Gender stereotypes are defined as cognitive structures that encompass socially shared knowledge about the characteristic traits of women and men (Eckes, 2004). As such, they form the foundation upon which gendered language and communication practices are built. Gender stereotypes are conveyed through a variety of channels, such as parents, schools, friends, media, political directives, and societal attitudes, and they serve to classify individuals within people‘s cognitive framework as members of a specific social group (Hale et al., 2022). In fact, the process of gender stereotyping not only attributes certain traits to whole groups, such as men and women but also applies a range of characteristics to individuals within one group while simultaneously neglecting potential individual characteristics inclined toward group alignment (Jussim et al., 1995).

Broadly speaking, stereotypes are characterised as fluid and context-dependent (Oakes et al., 1994); however, in the case of gender, they tend to be more rigid and persistent (Ito & Urland, 2003). With gender being a fundamental aspect of person perception, people tend to instinctively and unconsciously categorise unfamiliar individuals by their gender, even in contexts where this distinction holds no relevance or practical value (Ito & Urland, 2003). Gender categories are highly visible, quickly observed, regarded as stable and readily split into opposing sides (Ellemers, 2018). Even though efforts have been made to break the binary categorisation of gender to see gender as being fluid and continuous, gender is still largely perceived as a binary construct (Schudson & Morgenroth, 2022). As a result, men and women are viewed in direct comparison to each other, with differences being framed as contrasts between the two

(Ellemers, 2018). As an example, men tend to be associated with work performance and job execution, while women are dominantly associated with upholding social relationships. In line with this, men are stereotypically characterised as being assertive and performance-oriented, while women are described as being warm and caring (Otterbacher et al., 2017). This pattern of associating men and women with distinct and contrasting traits fosters the development and reinforcement of gender stereotypes, further solidifying perceptions of differences between men and women. Aligning these observations with the theory, the distinction between prescriptive and descriptive stereotypes must be made. Descriptive stereotypes capture the societal image of men and women as they are perceived. In contrast, prescriptive stereotypes define the expectations for how men and women are supposed to act and what they ought to do (Renström, 2024).

Given the persistent presence of gender stereotypes, the question of their origin and development arises. One line of explanation for the emergence of gender stereotypes attributes their origin to inherent biological differences, which have historically been used to justify behavioural distinctions between men and women (see, for example, Coleman & Hong, 2008). However, this explanation fails to align with contemporary scientific evidence. Instead, Ellemers (2018) suggests that gender stereotypes have developed over time due to socialisation and education. Although biological factors may lay the foundation for certain beliefs, it is primary power structures and societal roles – such as women being seen as homemakers and men being seen as providers – that amplify these differences (Ellemers, 2018). Rather than biological sex alone, social roles play a key role in shaping thoughts, emotions, and behaviours by impacting hormonal processes, self-regulation, and social interactions (Ellemers, 2018).

Thus, despite the fact that gender stereotypes are deeply rooted in societal structures and roles, they do not remain confined to these systems. Instead, they manifest in everyday interactions. This is clearly shown in language, which acts as a key medium for both reinforcing and mirroring gender-based assumptions and expectations – an area that has been thoroughly examined in prior studies in relation to gender stereotypes and language processing.

2.1.2. Previous Research on Gender Stereotypes and Language Processing

Gender stereotypes not only affect people's behaviour, they are also expressed through and evident in language (Menegatti & Rubini, 2017). In accordance with this, Swim and colleagues (2004) have corroborated that sexist views are reflected and manifested in people's language choices. These sexist views, as discussed by Swim et al. (2004), hold a close connection to gender stereotypes. As such, they do not only originate from but also perpetuate traditional beliefs about roles related to gender. Such views embody stereotypical expectations regarding gender-appropriate behaviour and are subsequently echoed in the way language is used. As a matter of fact, using sexist language is a prime example of subtle sexism, which – along with covert and blatant sexism – is one of the many facets of sexism. It can be defined as the "unequal and unfair treatment of women that is not recogni[s]ed by many people because it is perceived to be normative, and therefore does not appear unusual" (Swim et al., 2004, p. 117). Research has not only shown that holding sexist attitudes relates to using more gendered language (Jacobson & Insko, 1985), but also that showing forward-thinking attitudes toward gender roles has been accompanied by displaying a conscious effort to avoid gender-biased language (McMinn et al., 1991). In addition, speakers' linguistic behaviours are influenced by habitual patterns that often occur unconsciously, which is crucial for understanding the persistence of sexist language use (Sczesny et al., 2016). Being exposed to gendered norms might lead to automatic language patterns, resulting in individuals employing gender-biased language unintentionally. This underscores how deeply entrenched language habits are and shows how hard it can be to identify and change the subtle sexist cues that persist in everyday speech. As a matter of fact, students exposed to schoolbooks using masculine generics tend to have accepted this usage without questioning it and use it as the standard (see, for example, Lindner et al., 1994; Lee & Collins, 2008).

Further, the implicit associations people hold about gender appear to correspond strongly with the statistical gender markers present in their language (Lewis & Lupyan, 2020). This relationship is especially pronounced in languages that explicitly differentiate occupational titles by gender (Lewis & Lupyan, 2020). These findings align with the idea that linguistic patterns contribute to shaping people's subconscious judgments about gender. In fact, Lewis and Lupyan (2020) revealed that gender stereotypes are evident in the distributional structure of 25 languages.

Over the years, numerous studies using a variety of experimental approaches, ranging from storytelling and reaction time tasks, have provided evidence for the impact of linguistic structures on the mental accessibility of gendered representations (see, for example, Stahlberg et al., 2007; Gygax et al., 2019). Given this fact, the question arises as to how gender stereotyping influences individual behaviour and perception. Interestingly, to the author's knowledge, texts with gender-stereotypical cues have not previously been studied as an independent variable in the context of text comprehensibility and text comprehension in relation to GFL. However, Reali and colleagues (2015) explored how gender stereotypes influence anaphor resolution and text processing in grammatical gender languages. In the anaphor resolution exercises, participants had to determine what an anaphoric expression such as a personal pronoun refers to in a given context. Reali et al. (2015) highlighted that mismatches between stereotypical and grammatical cues disrupt comprehension and increase processing times.

2.1.3. Psychological and Social Consequences of Gender Stereotyping

Expanding on the evidence that language impacts the ease of accessing gendered representations in cognition, it is crucial to examine how these gender stereotypes extend beyond linguistic features to shape people's perceptions, attention, individual behaviour, interests, memory, and broader societal outcomes (Ward & Grower, 2020). When it comes to gender stereotypes, conclusions without sufficient evidence about their positive and/or negative impact are often drawn (Ellemers, 2018). In other words, gender stereotypes – and even stereotypes in general – can be advantageous when there is a demand to manage, process, and structure the flow of incoming information in order to quickly make sense of complex situations and facilitate efficient decision-making; nevertheless, the very qualities that render gender stereotypes useful also make them less effective in their ability to accurately assess a person's true potential and identify their unique traits (Ellemers, 2018). Indeed, while stereotypes can help structure information efficiently, it is sometimes necessary to move beyond their automatic application and examine them more critically (Ellemers, 2018). Unfortunately, discussions about gender stereotypes often suffer from oversimplification, particularly when people rely on group-based assumptions rather than evaluating individuals based on their unique qualities and achievements. As a result, gender stereotypes "reinforce perceived boundaries between women and men and seemingly justify the symbolic and social implications of gender for role differentiation and social inequality" (Ellemers, 2018, p. 278).

Like other societal belief structures, gender norm expectations are acquired and internalised by children and adolescents from their immediate social environment, i.e., their parents, teachers, and peers (Ward & Grower, 2020). In addition to that, mainstream media serve as an especially influential model that reinforces these norms (Ward & Grower, 2020). Further, conforming or nonconforming behaviour influences how adults evaluate children with regard to traits such as likeability, competence, creativity, and self-confidence (e.g., Coyle et al., 2016; Streck & Kessels, 2024). Not conforming to cultural stereotypes tends to elicit negative reactions, such as marginalisation, criticism, unfavourable perceptions from others within society and even lower psychological well-being (e.g., Sullivan et al., 2018; Mac Mullin et al., 2021; Streck & Kessels, 2024).

Even having grown up, gender stereotypes significantly impact people's lives. As such, the presence of gender stereotypes is a major barrier to women's career advancement in leadership roles (Tabassum & Nayak, 2021). This is underscored by the fact that only 33.5 % of senior management jobs are being held by women (Grant Thornton International Ltd, 2024).

Given the pervasive influence of gender stereotypes on the individual, it becomes necessary to explore strategies that can counteract these biases. One effective way to address this issue is through the implementation of GFL, which aims to challenge and mitigate the perpetuation of gender stereotypes in communication.

2.2. Gender-Fair Language: Concepts and Strategies

2.2.1. Definition and Scope of Gender-Fair Language

In an effort to a) address the above-mentioned structural gender imbalances that are being perpetuated by gender stereotypes and b) combat stereotyping and discrimination in a broader context of political correctness (for more information, see Coleman & Hong, 2008; Maass et al., 2014), GFL has been introduced. The historical starting point of GFL can be seen in the feminist analysis of language that began in the 1970s (Lakoff, 1973), positing that language is skewed to view the male language form as the default. In scholarly discussions, GFL is also known by terms such as gender-neutral language (Sarrasin et al., 2012), gender-inclusive language (Stout & Dasgupta, 2011), and non-sexist language (Douglas & Sutton, 2014). In short,

GFL's overarching goal is to eliminate gender-based disparities in language that become visible when referring to or addressing the whole spectrum of gender identities. In order to effectively combat the dominance of gendered language and to implement compatible strategies, it is essential to analyse the structural differences among various languages as a first step.

2.2.2. Language Structures

Even though gender imbalances are present in nearly all languages, their visibility can vary greatly depending on each language's structure. In line with this, a distinction can be drawn between three language types, namely 1) grammatical gender languages, 2) natural gender languages and 3) genderless languages (Stahlberg et al., 2007).

In grammatical gender languages such as German and French, every noun can be classified as having a fixed grammatical gender; in addition, personal nouns typically reflect the gender of the individual they denote, such as in the German example *Student* for a male student and *Studentin* for a female one (Sczesny et al., 2016). Moreover, personal pronouns convey information about the gender of the individual in question (e.g., French *il/elle*, 'he'/'she') (Sczesny et al., 2016). Lastly, pronouns and other grammatical markers indicate the gender of a personal noun (e.g., French une_{fem} $bonne_{fem}$ $professeure_{fem}$ 'a good (female) teacher', German der_{masc} $freundliche_{masc}$ $Kollege_{masc}$ 'the friendly (male) colleague') (Gygax et al., 2019). When gender is not specified or particularly relevant, the form used to signify male gender is also frequently employed in these languages; known as "the generic use of masculine forms" (Gabriel et al., 2018, p. 845). Languages like English and Swedish, which are classified as natural gender languages, generally avoid gender distinctions for inanimate nouns (e.g., English 'table', 'car') and frequently use personal nouns that do not indicate a specific sex or gender identity (e.g., English 'assistant', 'worker') (Gygax et al., 2019). However, there are still personal pronouns that differentiate between female and male genders (e.g., English 'he/she', Swedish *han*/*hon*) (Sczesny et al., 2016). Genderless languages such as Turkish and Finnish "are languages where most human nouns as well as pronouns are generally unspecified for gender" (Gygax et al., 2019, p. 4). This means that gender can be denoted either by using lexical gender nouns (e.g., 'mother', 'father') or by using attributes (e.g., 'male/female [teacher]') (Sczesny et al., 2016). To put it simply, the grammar of genderless languages does not impose the use of gender-marked forms.

2.2.3. Impact of Gendered and Gender-fair Language

Building on this theoretical distinction, the question has been raised whether the respective language structure, i.e., the extent of visible linguistic gender asymmetries, has an effect on the societal gender inequalities that can be observed. Prewitt-Freilino and colleagues (2012) utilised the *Global Gender Gap Index from the World Economic Forum* to explore whether linguistic factors contribute to differences in equal opportunities, responsibilities, and rights across all genders in an analysis of 111 countries. They were able to provide evidence that in countries where grammatical gendered languages are used, there appears to be a reduced presence of gender equality (Prewitt-Freilino et al., 2012). In addition, they found that "countries where natural gender languages are spoken demonstrate greater gender equality, which may be due to the ease of creating gender symmetric revisions to instances of sexist language" (Prewitt-Freilino et al., 2012, p. 268). Still, even in natural gender languages, i.e., in languages with gendered pronouns like English (using 'he' and 'she'), speakers are more inclined to specify gender explicitly compared to genderless languages (Fukumura et al., 2013). By contrast, this pattern is less common among speakers of genderless languages like Finnish, where a single, gender-neutral pronoun (e.g., Finnish *hän*) is used (Fukumura et al., 2013). At this point, it should be mentioned that the biased treatment of women and men is a pervasive aspect of language and not solely confined to grammatical gender languages. Still, it can be summarised that the greater the presence of linguistic gender imbalances, the more apparent gender inequalities are in society.

Linking these structurally based gender asymmetries to the unequal treatment of different genders, one could ask what role language itself plays in this relationship. To begin with, language serves as a vital tool for self-expression and overall communication. It is shaped by social as well as cultural influences, which mould people's perspectives and their sense of identity (Baker & Cornelson, 2018). Gender impacts both the use and interpretation of language as well as the way in which language shapes people's perceptions (Gygax et al., 2019). As briefly introduced above, the use of masculine generics when no specific gender is intended is a strategy that is regularly applied in grammatical gender languages (Schmitz et al., 2023). This results in a restriction of visibility of all other genders, which in turn has substantial repercussions on one's drive, ambition, self-identification, and sense of connectedness (Stout & Dasgupta, 2011). Moreover, the use of masculine generic terms reinforces gender

stereotypes and marginalises women and other gender identities, effectively excluding them from the conversation (Swim et al., 2004). To put it differently, "masculine formulations may bias outcomes in [favour] of men to the disadvantage of women" (Sczesny et al., 2015, p. 944). This becomes particularly noticeable in various studies examining the connection between GFL and job postings, with solely masculine forms reducing the likelihood of women being perceived as appropriate for the position and even lowering their motivation to apply for the respective positions (see, for example, Budziszewska et al., 2014; Horvath & Sczesny, 2016; Formanowicz et al., 2024). One of the possible reasons that make it challenging for women to be seen as suitable candidates could be that masculine generics are not typically perceived as inclusive of women or other genders but are rather interpreted with a male bias. In fact, studies have shown that fewer mental representations of women have been evoked by gendered language (e.g., Stahlberg et al., 2007; Sato et al., 2016). To reframe this, masculine generics prompt a male-focused interpretation of a text.

2.2.4. Forms of and Strategies in Gender-Fair Language

This imbalance, caused by the dominance of masculine generics and their male-focused interpretation, strengthens the argument for the widespread use and expansive implementation of GFL. Broadly speaking, two main approaches can be distinguished to create more inclusive language, namely feminisation and neutralisation (Gabriel et al., 2008). Instead of solely using one of the two strategies, they can also be combined.

In languages where grammatical rules assign a gender to nouns, verbs, and adjectives, the strategy of feminisation is most commonly applied to make language more gender-fair (Lindqvist et al., 2019). The effectiveness of feminisation has been shown in various studies in the past 25 years. In general, feminisation focuses on improving the prominence of female entities by specifically addressing them, thereby making them more visible (Stormbom, 2019). This can be achieved by using paired forms, i.e., by explicitly stating not only the grammatically masculine form but also the grammatically feminine form. For example, rather than simply using the German term *Schüler* ('students') to refer to both genders, one could instead opt for *Schülerinnen und Schüler* ('$\text{students}_{\text{fem}}$' and '$\text{students}_{\text{masc}}$') to clearly differentiate between female and male students. However, a key drawback of feminisation is that it reproduces the binary categorisation of gender rather than challenging or even breaking it up. Another point of criticism is concerned with structural problems as certain suffixes (e.g., the

Italian -*essa*) tend to carry negative connotations (Marcato & Thüne, 2002) or the formation of feminine forms turns out to be challenging (see, for example, Merkel et al., 2012). This results in the overall strategy not being fully advantageous (Sczesny et al., 2016).

To engage with the above-mentioned criticism of excluding non-binary people by solely creating feminine forms, "the gender asterisk ("Gendersternchen") has become more widespread in grammatical gender languages in order to represent all genders" (Friedrich et al., 2021, p. 1), e.g., *Schüler*innen* ('students of all genders'). To be more precise, by using the gender asterisk, the binary gender paradigm is being challenged, and gender diversity is being embraced. At this point, the strategy of neutralisation needs to be mentioned as it ties in well with deactivating the traditional understanding of gender being solely masculine and female. Instead, neutralisation aims at omitting gendered labels altogether (Elmiger, 2023). Instead of explicitly mentioning gender (Gabriel et al., 2018), indefinite nouns are being used. As an example, 'firefighter' replaces 'fireman' and 'firewoman'. This strategy is generally used in natural gender languages (Sczesny et al., 2016).

In addition to these traditional approaches, a third strategy has been brought forward. In order to move beyond the binary concept of gender, it suggests creating new lexical items (Wayne, 2007). In terms of pronouns, efforts like these are typically seen in languages that have gendered third-person singular pronouns, such as in the English 'she' and 'he', and are often promoted within LGBTQ+ communities (Lindqvist et al., 2019). Examples of such gender-neutral third-person singular pronouns can be seen in the English pronoun 'ze' that specifically refers to people identifying as non-binary (Harris et al., 2017) as well as in the Swedish pronoun *hen*.

In the end, and arguably most significantly, it is essential that authors strive for objectivity concerning their biases and that they examine their perspectives critically (Harris et al., 2017). To avoid and minimise the risk of reinforcing disparities through language, feedback from diverse groups should be considered and a people-first approach should be prioritised or maintained (Harris et al., 2017).

In sum, while each of these strategies can be considered as a meaningful step towards more gender-fair and inclusive language, an aspect frequently brought up by critics of GFL must not be forgotten, namely text comprehensibility.

2.3. Text Comprehensibility

2.3.1. Definition of Text Comprehensibility

The issue of text comprehensibility has been a subject of scientific study and discussion for approximately a century (Kintsch & Vipond, 1979). Broadly speaking, there are two separate clusters of concepts in assessing text comprehensibility (Friedrich & Heise, 2019). The first category views text comprehensibility as a quality that is inherent to the respective text, i.e., dependent on factors like vocabulary, syntax, or structure (Benjamin, 2012). More specifically, words that occur frequently add to a text's comprehensibility, whereas rarely used words negatively impact its ease of understanding (Benjamin, 2012). Further, a simpler structure of each sentence adds to the clarity of a text and to how effectively the text communicates its meaning (McNamara et al., 2012).

However, the notion that text comprehensibility is purely an inherent quality of a text has been called into question rather early on. Therefore, the second concept shifts the focus from the text itself to the interplay between text and reader. As such, Kintsch and Vipond (1979) have argued that meaning is not a passive byproduct of the text but an active construct through the engagement of the reader. In fact, it is shaped by the reader's prior experience and knowledge. In line with this, Friedrich et al. (2021) have emphasised the importance of overall reading proficiency as a key contributing factor to text comprehensibility. This interactionist perspective highlights that comprehensibility is not fixed; instead, it varies depending on the reader's ability to connect new information with what they already know and underlines the dynamic character of text comprehensibility. The example provided illustrates that comprehensibility can change even though the text itself is not being changed: At the beginning of a course, an introductory physics textbook might feel overwhelming, but by the final weeks, it could appear much more straightforward. This might reflect not only a stronger grasp of foundational concepts, but also a potential increased interest in and curiosity about the subject.

Given both the internal and interactionist view of comprehensibility, it can be concluded that factors beyond the text itself, such as language choices, significantly impact how effectively a text is understood by different readers. Having established a general understanding of text comprehensibility, it is crucial to consider how the various notions introduced above can in-

fluence how well a text is understood and whether the use of GFL with the gender asterisk affects the clarity of the text.

If the logic of the internal view of text comprehensibility is applied to GFL, such adjustments tend to be frequently perceived as obstacles to comprehensibility (Gabriel et al., 2018). For example, the gender asterisk increases sentence length and elongates certain words. An additional factor could be that feminine forms are used less often and thus tend to be less intuitive and familiar, further complicating the reader's ability to grasp the text (Friedrich & Heise, 2019).

According to the interactionist view of text comprehensibility, it needs to be considered whether texts written in GFL using the gender asterisk consume more cognitive and mental effort compared to the use of solely masculine forms (Friedrich & Heise, 2019). Said inquiry is particularly pertinent for grammatical gender languages as they employ specific feminine grammatical forms to represent women (Friedrich & Heise, 2019). This prompts a crucial investigation of whether the use of GFL increases the effort that is required to assign meaning to words or to parse sentence syntax, as well as considering whether such language negatively impacts the aesthetic quality of the text and its overall comprehensibility (see, for example, Stahlberg et al., 2007).

To draw an interim conclusion, the adaptations and modifications required to create GFL may – in certain situations – add complexity to sentence structure or phrasing, raising concerns about its potential impact on the comprehensibility of complex or formal texts. Still, proponents of GFL argue that, despite these potential difficulties, the advantages outweigh the disadvantages. Reasons for opting for GFL are numerous and include the reduction of gender stereotyping and discrimination (Sczesny et al., 2016), the influence on the perception of gender roles in professions (Vervecken et al., 2015), the positive impact on mental representation and visibility (Prewitt-Freilino et al., 2012) and, naturally, the promotion of gender equality in communication (Hiller, 2023).

2.3.2. Factors Influencing Text Comprehensibility

The preceding subchapter revealed the multifaceted nature of text comprehensibility, highlighting how both the dynamic interplay between reader and text as well as inherent textual features can impact how effectively a text is understood. This observation raises a critical

question, namely, the specific factors that can influence text comprehensibility across different linguistic styles, target audiences and contexts. To clarify this issue, engaging in a more detailed exploration of key determinants of comprehensibility is necessary. Table 1 below illustrates the suggested key factors that Friedrich (2017) proposed in his seminal work which delves into the concepts and measurement tools related to text comprehensibility. The categories have been created to help structure the information by grouping them logically.

Table 1

Key Factors Influencing Text Comprehensibility Categorised by Feature Type

category	**elements**
linguistic features	word difficulty, sentence difficulty, variation in language
content-related features	argument density, proposition density, effort for inference-making
cognitive features	effort for reinstatements, effort for reorganisations
aesthetic-visual features	vividness, emphasis

Starting off with linguistic features, Friedrich (2017) introduces the concept of *word difficulty,* which is a characteristic of the text-reader-interaction and can be defined as the simplicity with which a reader can ascribe meaning to the words in a text. *Word difficulty* is influenced by the specific words that are contained in the text and by the extent to which the reader is acquainted with them: The stronger the reader's grasp of the text's vocabulary, the lower the perceived complexity, and the easier it is to comprehend (Friedrich, 2017). Moving on to the second element of the linguistic category, *sentence difficulty* has been specified as the ease with which the reader can a) decode the text's syntax and b) translate it into a propositional representation, i.e., interpret the sentence's meaning and break it down into fundamental ideas or propositions (Friedrich, 2017). According to McNamara et al. (2012), *sentence difficulty* increases when the syntax is ambiguous, complex and unusual as well as when the reader has to simultaneously hold a large quantity of information in memory while decoding the syntax. Complex syntax is, among others, characterised by nominalisations, negations, passive-constructions, infinitive-constructions and embedded sentence parts (Britton et al., 1978; Just & Carpenter, 1980) *Sentence difficulty* is, however, not only dependent upon textual characteristics, but also upon the reading competency of the reader as well as on the size of their working memory and – probably – depends on the reader's experience with the given syntac-

tical structures (Friedrich, 2017). The third element of the linguistic category is the *variation in language* which indicates how diverse a reader perceives the form of the text to be (Friedrich, 2017).

After outlining the linguistic features, content-related features need to be discussed. As such, *argument density* is a textual characteristic that describes the ratio of different arguments in a text within the total word count of the text (Friedrich, 2017). According to McNamara et al. (2012), a high *argument density* is generally associated with concepts that appear less frequently and are less interconnected, which typically results in a reduced coherence. In addition to that, greater cognitive *effort for reinstatements*, *effort for inference-making*, and *effort for reorganisations* are demanded when there are high demands related to *argument density* (McNamara et al., 2012). To put it briefly, with the *argument density* decreasing, the comprehensibility of a text tends to increase.

Like *argument density*, *proposition density* is a characteristic of texts and, therefore, part of the content-related category; briefly, *proposition density* refers to the number of propositions contained in a text in relation to the number of words in the text (Friedrich, 2017). A proposition can be understood as a basic unit of information or meaning that is contained in a text. While processing a text, readers inherently need to derive each proposition from the text's surface structure: The lower the density of the propositions, the fewer propositions readers need to construct, and the more comprehensible the text becomes (Friedrich, 2017).

The *effort for inference-making* described by Friedrich (2017) represents an advancement of the feature *number of required inferences* introduced by Kintsch and Vipond (1979). It refers to the level of cognitive resources a reader must use to construct a coherent mental representation of the text through inferences. Unlike Kintsch and Vipond (1979), Friedrich's (2017) concept acknowledges that the process of generating inferences can vary greatly in difficulty. The effort required for *inference-making* is a characteristic of the text-reader interaction and primarily depends a) on the coherence of the implicit text base and b) on the reader's prior knowledge (Friedrich, 2017). In this context, it becomes rather clear that the more coherent the implicit text base, the fewer inferences are needed to construct a coherent mental representation of the text content; similarly, if a reader possesses more prior knowledge, coherence gaps can be bridged easier (Friedrich, 2017). In general, it can therefore be concluded: When readers need to expend fewer cognitive resources when drawing inferences to achieve a co-

herent representation of the text, they also require lower effort to generate inferences and, in turn, the text becomes more comprehensible.

The third category that has been devised consists of *effort for reinstatements* and *effort for reorganisations* and can be subsumed as cognitive features. First, the amount of resources a reader must invest to achieve a coherent representation of the text through reinstatements is referred to as the *effort for of reinstatements* (Friedrich, 2017). This effort, in turn, is a feature of the text-reader interaction (Friedrich, 2017). This is because the effort that is necessary for reinstatements depends not only on the order in which information is presented in the text but also on the reader's thematic prior knowledge (Friedrich, 2017). This becomes clear in the following example: When a concept is introduced at the beginning of a text and then revisited only much later, the chances of requiring a reinstatement become greater; however, this likelihood decreases if the reader either has prior knowledge and has already been familiar with the concept or can integrate it rather easily into their existing knowledge.

Second, the *effort for reorganisations* also relates to cognitive processes a reader has to undertake to comprehend a text. Still, it refers to the resources a reader has to invest to correct a misunderstanding of a text's content. Kintsch and Vipond (1979) had already introduced a very similar concept: the *number of necessary reorganisations*. Friedrich's (2017) feature *effort for reorganisations* now depends on both the reader's expectations and prior knowledge as well as on the information and its order. This is why the *effort for reorganisations* is also a characteristic of the text-reader interaction (Friedrich, 2017). In terms of text comprehensibility, it can be observed that understanding is being facilitated with the *effort for reorganisations* decreasing (Friedrich, 2017).

Finally, there are two aesthetic-visual features that Friedrich (2017) suggests, namely *vividness* and *emphasis*. *Vividness* indicates the easiness with which a reader can construct a mental model of the text's content and it again depends on both the text's and the reader's characteristics (Friedrich, 2017). In essence, *vividness* corresponds to what is commonly meant by the process of understanding (see, for example, Schnotz, 1994), since understanding is frequently associated with the creation of a mental model. A text becomes more vivid and comprehensible when it is easier for its readers to construct such a mental model (Friedrich, 2017).

Finally, the feature *emphasis* refers to the ease with which readers can form the macro-propositions of a text and thereby distinguish the important information from the less important details (Friedrich, 2017). In this process, text features such as graphical highlights and headings facilitate the selection of key content in a text (Kintsch & Van Dijk, 1978). In addition, the reader's prior knowledge also plays a crucial role in determining which information is relevant for the topic and for further processing (Friedrich, 2017). The easier it is to construct the macro-propositions of a text, the better the *emphasis* and the higher the text comprehensibility.

After discussing the theoretical underpinnings and factors influencing text comprehensibility, it is apparent that the cognitive and language-related difficulties tied to different text features, including GFL, deserve more in-depth examination. Even though theoretical frameworks have already offered important perspectives on the factors that influence text comprehensibility, further empirical research is needed to evaluate the practical impacts of these linguistic strategies. Therefore, the next subchapter deals with multiple studies that have specifically explored the effect of GFL on text comprehensibility, thereby providing evidence-based insights into how various linguistic choices affect reader understanding and engagement.

2.3.3. Empirical Research on Gender-Fair Language and Text Comprehensibility

Given recurring concerns that GFL may impair text comprehensibility and compromise its aesthetic quality, empirical research in this field has increasingly turned its attention to the question of whether the use of GFL, for example by using the gender asterisk or other inclusive forms such as the colon, indeed affects key aspects of text comprehensibility (Braun et al., 2007). These studies aim to provide a comprehensive basis for discussing GFL and its impact on text comprehensibility. However, the results appear to lack consistency, which diminishes their overall applicability, reduces the results' generalisability, and, in turn, limits their broader relevance.

Given the contrasting findings in this ambiguous research field, a chronological approach is adopted to explore its development and contextualise the findings over time. The first study that asked participants to rate the readability and comprehensibility of a text was carried out by Frank-Cyrus and Dietrich in 1977. The text in question was a legal document presented in

three forms, namely a) in GFL, b) in pair forms and c) in gendered language, i.e., using masculine-only forms. The researchers found that there was indeed a significant impairment of both dependent variables in the conditions using GFL with small to medium effect sizes (Frank-Cyrus & Dietrich, 1997). A significant shortcoming of the study was the within-subjects-design, which could have biased the participants and made it possible for them to infer the study's aim (for more information, see for example, Podsakoff et al., 2003). This limitation was addressed in later studies.

As such, Braun et al. (2007) asked their participants to rate the readability and comprehensibility of only one text that was either written in a) capital-I-forms, b) pair forms or c) gendered language. In addition to the study conducted by Frank-Cyrus and Dietrich (1977), test subjects also had to evaluate the quality of the text's phrasing. Results showed that the variation in text versions did not have a statistically significant main effect on any of the three dependent variables (Braun et al., 2007).

Pöschko and Prieler (2018) used the same three measures and provided a school-book text either in a) slash forms, b) neutral forms or c) gendered language. It is noteworthy that despite the rather similar research design compared to Braun et al. (2007), they found that slash forms impaired readability, while there was no statistically significant effect on the other text forms (Pöschko & Prieler, 2018). Interestingly, these findings align with two experiments by Klimmt et al. (2008) who also reported impairments in readability and aesthetic appeal due to slash-forms in newspaper articles when comparing them to masculine-only forms.

Research has also been focusing on neutral and pair-forms and their respective influence on text comprehensibility. Two experiments showed no statistically significant differences in readability or aesthetic appeal between gender-fair and masculine-only versions of texts (Blake & Klimmt, 2010).

Along with the presented studies that have generated data based on questionnaires, researchers have also approached the field using eye-movement studies (see, for example, Langer et al., 1974; Gygax & Gesto, 2007). In both studies, a primary adjustment period could be observed, meaning that texts using masculine-only forms were initially read faster than gender-fair forms, which first led to slower reading times. However, the participants underwent a rather quick phase of adaptation, resulting in equal comprehension scores. In another study by Steiger-Loerbroks and von Stockhausen (2014), no negative impact on clarity could be de-

tected. This was because the use of GFL did not significantly affect the perceived simplicity or conciseness of the text (Steiger-Loerbroks & von Stockhausen, 2014).

To summarise, the findings from studies examining the potential effects of GFL on how well texts are understood and on their aesthetic quality show mixed results. One major weakness in this area of research refers to the fact that researchers relied on unvalidated tools to measure text comprehensibility, along with the fact that some studies lacked sufficient statistical power.

In a successful attempt to account for these weaknesses, Friedrich (2017) developed a comprehensibility questionnaire based on a reinterpretation of Kintsch and Vipond's (1979) concept of comprehensibility within the framework of Kintsch's (1998) construction-integration model. By integrating concepts of comprehensibility proposed by Langer et al. (1974) and Gagné and Bell (1981), the questionnaire was further enriched. Friedrich (2017) demonstrated that the tool reliably evaluates seven distinct factors of comprehensibility, and the scale has been used in multiple studies since its development. Further relating to the factors of text comprehensibility discussed above, there has been a special focus on overall text comprehensibility, word difficulty, sentence difficulty and the text's aesthetic appeal in the actual application of the questionnaire (e.g., Sczesny et al, 2016; Gabriel et al., 2018; Friedrich & Heise, 2019; Friedrich et al., 2021; Pabst & Kollmayer, 2023). Delving deeper into the studies that have already used Friedrich's (2017) comprehensibility questionnaire, Friedrich and Heise (2019), for example, revealed no notable disruptions in text comprehensibility in their study amongst students of social or educational sciences. As a text source, they employed a real-life power supply contract from a German electricity company that has been either written in gender-fair form or used masculine-only forms (Friedrich & Heise, 2019). However, even within the same study, findings concerning the potential adverse effect of GFL have been conflicting and inconsistent: Having conducted two experiments examining the impact of GFL on text comprehensibility and interest in a board game (Friedrich et al., 2021), the study's first experiment primarily using pair forms to make the language more inclusive did not find a statistically significant negative impact. In contrast, the second experiment, which used a combination of plural and singular forms, uncovered a significant impairment not only in the interest of the game but also in the text's aesthetic evaluation and overall comprehensibility (Friedrich et al., 2021). Friedrich et al. (2021, p. 10) therefore drew the conclusion that "[o]verall, gen-

der-fair language does not seem to affect comprehensibility as long as it is similar to the forms people are used to".

Apart from Friedrich et al. (2021), who used the gender asterisk to ensure the visibility of people who do not identify as either male or female, only very few other studies have investigated the effect of GFL using the gender asterisk. As such, Pabst and Kollmayer (2023) conducted an experiment on the impact of GFL amongst a target group that had never been questioned before in this research context, namely non-students. Their findings showed that the gender asterisk did not significantly lower comprehensibility ratings in either group, i.e., neither in participants who read a text using masculine generics nor in participants reading a text written in GFL using the gender asterisk (Pabst & Kollmayer, 2023). Additionally, participants' attitudes toward GFL had no impact on their assessments of how comprehensible the text was (Pabst & Kollmayer, 2023). Very recently, Friedrich et al. (2024) published a paper that also specifically tested the possible negative impact of the gender asterisk on GFL in two experiments: Participants were either provided with a masculine-only-text, a text using the gender asterisk in its plural form or a text using the gender asterisk in its singular form and had to rate comprehensibility. Across both experiments, the gender asterisk diminished comprehensibility in the contexts where singular forms were used; plural forms also received lower comprehensibility ratings in the first experiment (Friedrich et al., 2024). Given the fact that the two experiments used texts covering different subjects, it remains unclear whether the observed variations in results stemmed from differences in grammatical number or from other distinct text features.

To summarise the interim findings, the empirical research on GFL and text comprehensibility highlights rather complex and inconsistent findings. Studies spanning several decades have investigated the impact of GFL, such as the use of neutral and pair forms, slash forms, and gender asterisks. While not only early studies but also recent ones suggest impairments in readability and clarity, multiple studies also demonstrate that forms of GFL do not significantly or not at all hinder comprehensibility. Despite these advancements, challenges persist in addressing methodological constraints and inconsistent outcomes. This underscores the need for not only gaining a more profound insight into the cognitive mechanisms driving text comprehensibility, but also to examine how GFL affects actual text comprehension.

2.4. Text Comprehension

2.4.1. Definition of Text Comprehension

This section aims to explore the cognitive underpinnings of text comprehension and to define the concept by examining the construction of meaning from texts. The discussion begins with the definition of overall comprehension, which includes at least three components: the text itself, the reader, and the purpose or activity (Snow, 2002). In addition, a fourth element – the place where and the time when such a process takes place – has been added to this framework. Comprehending a text not only involves the creation but also the gradual adjustment of a mental picture of the situation the text describes (Kintsch, 1998). Through coreferencing and other coherence-building processes, new content is linked to information that is already part of the evolving understanding (van den Broek et al., 1995). However, this integration is not always seamless as readers first might need to revise their understanding of the text (Gueraud et al., 2005). This challenge is particularly relevant in the context of GFL, where readers might have to update their mental models that draw on long-term memory, especially when encountering alternatives to traditionally masculine-only forms.

2.4.2. Factors influencing Text Comprehension

Drawing on the three factors of text, reader, and activity outlined above, *extraction and assembly models* encapsulate the essence of this interaction best (Fox & Alexander, 2009). According to Fox and Alexander (2009, p. 229-230), "text comprehension involved the reader's assembly or other generation of an internal mental representation of the incoming or external text information, which was matched to or reconciled with existing or internal mental contents". Critical elements of a text associated with this initial understanding of comprehension involve the organisational structure, ease of reading, linguistic simplicity and visual presentation, i.e. text design and font style. Although text comprehension has already been considered as critical, most research at the time put their focus on the task of extracting encoded meaning from written text through perception and word recognition (Samuels & Kamil, 2002). In contrast, the actual process by which readers build their understanding from these meaning units was heavily overlooked. Only at the beginning of the 1980s, a shift from this one-directional view of text comprehension to a more bi-directional one could be observed, with the reader

first having a considerable impact on the activity and on the text's interpretation (Samuels, 1983).

In line with this refined understanding, *constructive-integrative models* of comprehension have been brought forward. These models "allow for the possibility of more individuali[s]ed response[s], as each reader builds [their] own mental representation of what the text is saying and of what it means" (Fox & Alexander, 2009, p. 230). Significant textual elements regarded as impactful in this body of literature include the type of content (e.g., genre), the organisational format, the clarity and logical flow (coherence), the level of difficulty (complexity), and the medium of presentation, such as traditional textbooks or digital platforms (Fox & Alexander, 2009).

In the early 2000s, the change from *constructive-integrative models* to elements of text comprehension in *transitional extensions* began to emerge (Fox & Alexander, 2009). This shift was driven by the need to adapt to changing conceptions of text and reading situations that traditional models could not account for as they primarily focused on individual comprehension processes involving single, static texts; however, the expansion of text types, including formats like digital platforms, hypermedia, and interactive content, along with the incorporation of various modalities, required a more flexible and comprehensive framework (Fox & Alexander, 2009). *Transitional extensions* foreground the importance of integrating multiple sources, evaluating credibility, and navigating non-linear, dynamic texts. These models are particularly relevant in educational technology, where learners regularly navigate multimedia texts (Fox & Alexander, 2009).

Expanding on these models, it becomes clear that comprehension is not only shaped by its logical flow, i.e., coherence, and syntactical features, but also by the reader's (limited) working memory capacity (Caccamise & Snyder, 2005). In other words, cognitive factors play a crucial role in shaping how readers construct meaning. As such, "[t]ext understanding is the dynamic process of constructing coherent representations and inferences at multiple levels of text and context, within the bottleneck of a limited-capacity working memory" (Graesser & Britton, 1996, p. 350). Moreover, earlier research has suggested prior knowledge to be related to text comprehension as well. Indeed, Schurer and colleagues (2020) found that participants with higher prior knowledge achieved better comprehension scores compared to those with less prior knowledge. Put differently, one could say that the reader themself is a crucial factor

to whether or not texts are understood, i.e., whether they can "abstract, apply, or generali[se] the information in the text" (Caccamise & Snyder, 2005, p. 11). Finally, linguistic variations such as GFL are addressed that might influence said cognitive processes by shaping memory, attention, and comprehension. They may affect readers' perception and interpretation of information and potentially reduce their bias as well as promote inclusivity in text processing. Even though these factors have not always been highlighted in earlier models, they are essential for understanding the differences in how individuals process, interpret and understand texts.

2.4.3. Links between Text Comprehensibility and Text Comprehension

Even though text comprehensibility and text comprehension are often used interchangeably in the literature, they represent distinct concepts. Still, they are somewhat interconnected as they generally denote how readers interact with written material. Turning to the key differences in definition, text comprehensibility denotes a text's fundamental attributes that determine whether it is easy or difficult to grasp. In contrast, text comprehension describes the ability of a reader to make sense of the text's content. With text comprehensibility being influenced majorly by linguistic, content-related, cognitive and aesthetic-visual features, text comprehension depends more on the reader themself, i.e., on their prior knowledge and on their working memory capacity. Despite this distinction, cognitive abilities and text characteristics such as coherence and syntactical features also contribute to comprehension processes.

The conceptual overlap and the theoretical interconnections between the two concepts suggest a potential link. However, empirical studies examining this connection remain sparse. For example, no studies have yet examined the relationship between Friedrich's (2017) understanding of text comprehensibility and participants' text comprehension scores. A notable exception is a recent study by Hackemann et al. (2022) which analysed the impact of overall linguistic demands on secondary students' understanding by varying the linguistic complexity of German texts. The study revealed that those students who read linguistically complex text displayed lower perceived comprehensibility scores, even though there was no significant negative impact on actual comprehension scores (Hackemann et al., 2022). Thus, this study suggests that the impact of linguistic features on text comprehension might be lower than currently expected (Hackemann et al., 2022). Thereby, it challenges prevailing assumptions about the role of linguistic features in comprehension and comprehensibility and highlights

that a solid theoretical foundation is lacking to make informed decisions (Hackemann et al., 2022). It is important to note, however, that Hackemann et al.'s (2022) study focused exclusively on secondary students who read a text from physics, limiting the generalisability of their results to other populations, such as university students or adult learners.

As a result, the limited generalisability of these findings underscores the need for further research that examines diverse populations and contexts. Exploring these issues is crucial to elucidate how the features of a text and the qualities of its readers interact in shaping the process of making sense of written material. The distinction between text comprehensibility and text comprehension is particularly vital in educational and learning contexts. By clearly differentiating text comprehensibility, i.e., the features of the text, and text comprehension, i.e., the ongoing processes within the reader, materials can be chosen that fully align with the learning goals and teaching strategies. This, in turn, might optimise learning outcomes. While comprehensibility relates to what the text offers, comprehension shifts the focus to the student's engagement with the text. This distinction is essential because focusing on one while neglecting the other can reduce the overall impact of educational initiatives.

2.5. Interconnections Between Gender Stereotyping, Gender-Fair Language, Text Comprehensibility, and Text Comprehension

After exploring the individual concepts of gender stereotyping, GFL, text comprehensibility, and text comprehension in detail in the preceding sections, this chapter synthesises these ideas to provide a comprehensive analysis of their interrelated roles in influencing reader perception and text understanding. By integrating the intricate relationships between the given concepts, this chapter additionally seeks to highlight the imperative of a systematic empirical investigation.

Starting with the conceptual integration, the first section focuses on how the individual factors work together to shape how readers comprehend a text. Combining these factors creates a flexible framework that influences readers' perception and understanding. A major idea is that gender stereotypes impact linguistic practices, i.e. the way language is used. In turn, textual processing is being impacted. Using GFL challenges traditional stereotypes, shapes mental models and possibly changes how readers process texts. Simultaneously, by interacting with

factors like sentence complexity and the reader's familiarity with the content of the text, GFL can affect how comprehensible a text is. Exploring these links highlights that language decisions go beyond stylistic preference; they are closely connected to the cognitive and social dynamics that affect text comprehension and text comprehensibility.

Moving onto the cognitive underpinnings of how gender stereotyping and GFL influence text comprehension, the role of mental models needs to be discussed. Readers rely on these models to interpret and integrate information. Furthermore, it is important to examine what impact novel linguistic features – e.g., gender asterisks, gender-neutral pronouns – have on these mental models. It comes as no surprise that the cognitive load is initially being heightened when having to process unfamiliar language forms; however, attitudes towards GFL and prior knowledge have been shown to mediate these effects. By analysing these mechanisms, the discussion so far has highlighted the dynamic interaction between comprehension processes, cognition, and language, delivering a refined understanding of the mental processes involved in engaging with gender-fair communication.

In conclusion, most studies to date have focused on specific forms of GFL and on their impact on text comprehensibility, but there is a lack of comprehensive research examining the interplay between gender stereotyping, language forms, text comprehension and text comprehensibility across diverse populations. Understanding this interplay requires an interdisciplinary approach, integrating insights from psychology, linguistics and cognitive science to fully grasp the far-reaching implications – a goal that the present study seeks to achieve.

3. Present Study

Building upon the theoretical foundation established in the previous sections, this chapter outlines the research questions and hypotheses guiding the present study. Its overarching aim is to examine how texts with gender-stereotypical cues and GFL influence readers' comprehension and perceived comprehensibility of texts. As touched upon above, it is quite striking that texts with gender-stereotypical cues have – with the exception of Reali et al. (2015) – not previously been investigated as an independent variable in the given research context. Even though Reali et al.'s (2015) work underlined the cognitive impact of stereotypical cues, it did not shed light on the independent role of stereotypical versus counter-stereotypical content on text comprehension and text comprehensibility, particularly in gender-fair contexts. Still, their findings suggest that the presence of stereotypical gender cues and clear cognitive associations potentially leads to enhanced text comprehension and reduced difficulty in cognitive processing. This is in line with the idea that gender-stereotypical texts are easier to understand because they conform to established social norms and align with deeply ingrained mental frameworks. In other words, these texts do not challenge readers' expectations and therefore facilitate easier and quicker processing. Conversely, processing counter-stereotypical texts may demand extra cognitive effort, which could diminish their clarity and overall comprehension. Building on Reali et al.'s (2015) findings and addressing the identified research gap, this study therefore hypothesises with a specific directional focus:

Hypothesis 1: Texts with gender-stereotypical cues will lead to higher comprehension scores compared to texts with counter-stereotypical cues.

Hypothesis 2: Texts with gender-stereotypical cues will lead to higher comprehensibility scores compared to texts with counter-stereotypical cues.

The design of the research questions and hypotheses on the theme of GFL has primarily been informed by the studies conducted by 1) Friedrich and Heise (2019) who explored whether the use of GFL in the form of pair-forms influences the comprehensibility of texts and 2) Friedrich et al. (2021) who investigated the influence of the gender asterisk on comprehensibility and interest. Regarding the relationship between text comprehension and GFL, there are currently no published findings available. Due to the relatedness of the concepts, it is reasonable to assume that the direction of the relationship between GFL and text comprehension

mirrors that of text comprehensibility. Based on Friedrich and Heise (2019) and Friedrich et al. (2021), the added complexity of GFL may require more cognitive effort, suggesting a similar effect on comprehension as observed for text comprehensibility.

Following the structure of the studies that have so far been carried out in the field of GFL and text comprehensibility, the overall subjective text comprehensibility, the readers' ability to derive meaning from the words, their ease in analysing sentence syntax, and the aesthetic appeal of the text were examined. As with the approach taken by Friedrich and Heise (2019) and Friedrich et al. (2021), no additional elements of text comprehensibility were assessed. Although the findings in the field are somewhat inconsistent, the following research questions have been formulated in alignment with the directions outlined in the seminal papers already published and are as follows:

Hypothesis 3: Texts using gender-fair language will result in lower comprehension scores compared to gendered texts.

Hypothesis 4: Texts using gender-fair language will result in lower comprehensibility scores compared to gendered texts.

In addition to the hypotheses that have just been introduced, including interaction hypotheses is crucial because gender stereotypes and GFL might influence text comprehension and text comprehensibility in interconnected ways. As such, the impact of gender stereotypes on ingrained mental structures allows stereotypical information to be processed more effortlessly. Concurrently, employing GFL adds novelty layers, and the new linguistic forms might require greater cognitive exertion. The interplay of these elements could either mitigate or amplify the individual impacts, contingent upon whether the text conforms to readers' preconceived notions. As a result, studying interaction effects allows for a deeper understanding of how these variables jointly influence comprehension and comprehensibility. Due to the lack of existing research on this theoretical interplay, the hypotheses have been formulated without a specific directional focus. The approach is therefore based on the following assumptions:

Hypothesis 5: There will be an interaction effect between gender stereotyping and gender-fair language on text comprehension.

Hypothesis 6: There will be an interaction effect between gender stereotyping and gender-fair language on text comprehensibility.

The last research question in this thesis concerns the potential influence of the readers' gender identity on these outcomes. Again, this aspect has so far been left out of the theoretical discussion and empirical investigations. Still, research shows that the visibility and inclusion of women and non-binary individuals are being enhanced through the use of GFL, leading to a stronger sense of engagement for these groups (Stout & Dasgupta, 2011). By resonating with their daily experiences and thought patterns, the content could become easier for them to comprehend. Conversely, male participants who might be more familiar with and accustomed to the sole use of traditional masculine terms might perceive gender-fair texts as more mentally taxing. These dynamics suggest the following moderation hypothesis:

Hypothesis 7: Female and non-binary participants will have higher comprehension and comprehensibility of gender-fair texts than male participants.

The hypotheses outlined above reflect the intricate interplay between gender stereotypes, GFL, and text comprehension as well as text comprehensibility. To be able to thoroughly explore these connections, a target group must be chosen that is strongly influenced by these linguistic patterns. Accordingly, students within the educational sector stand out as a highly suitable group for this study. Not only do they consume and produce academic texts, but they also frequently encounter diverse linguistic structures, including those incorporating GFL. Moreover, in the course of their professional career, they are expected to work with schoolbooks that are often still characterised by a strong male bias. It can be said that it is not only necessary to train university students in their use of GFL and how to reflect on their beliefs, but also that students in the educational sector learn how to train their future pupils at school how to use inclusive language. As such, they can be considered as a highly suitable target group for the given study.

4. Methodology

4.1. Study Design

This study used a 2x2x2 mixed factorial design to examine the effects of gender-stereotypical cues, GFL, and reader gender identity on text comprehension and text comprehensibility. Participants were randomly assigned to one of four conditions based on the presence of gender-stereotypical cues and the type of language used. Therefore, the following four conditions emerged:

condition 1: texts with gender-stereotypical cues + gendered language

condition 2: texts with gender-stereotypical cues + GFL (gender asterisk)

condition 3: texts with counter-stereotypical cues + gendered language

condition 4: texts with counter-stereotypical cues + GFL using the gender asterisk

Block randomisation was employed to assign participants to one of the four conditions. Block randomisation was chosen to ensure that each condition would be equally represented throughout the study. Each participant only read one text, namely the one in their assigned condition, making this a between-subjects design regarding text type and language type. Gender identity was treated as a categorical variable for the analysis, allowing for comparisons across different identities.

4.2. Sample Description

In total, 174 participants (48 male = 27.6 %, 110 female = 63.2 %, 3 non-binary/genderqueer = 1.72 %, 1 no gender = 0.57 %, 4 do not wish to tell = 3.00 %, 8 no information = 5.00 %) filled out the questionnaire, which was administered in German. Their mean age was M = 25.36 years (SD = 5.37, range = 19 – 58 years). To ensure that the participants met the eligibility criteria of 1) being older than 18 and 2) being enrolled in the teacher training program at an Austrian university, three data sets had to be excluded because the participants did not study to become teachers at the time they were completing the questionnaire. In addition to that, eight participants had to be excluded because they did not fully complete the questionnaire after having read the text, resulting in missing information that was crucial for data analysis. The reasons for withdrawing from the study at this stage could have varied, includ-

ing factors like fatigue or cognitive overload, difficulties with the text, or even a straightforward loss of interest. These diverse reasons for disengaging inevitably impacted the participant pool. Therefore, the final sample consists of 163 people (46 male = 28.2 %, 109 female = 66.9 %, 3 non-binary/genderqueer = 1.8 %, 1 no gender = 0.6 %, 4 do not wish to tell = 2.45 %) with a mean age of $M = 25.05$ years ($SD = 4.65$, range = 19 – 44 years). Based on a power analysis that has been carried out with the software G*Power (Faul et al., 2009), a sample size of at least 126 people was necessary to achieve adequate statistical power ($1 - \beta = 0.90$) at a significance level of $\alpha = 0.05$, with a small to moderate effect size of 0.0625 (F-test). Even though the sampling plan suggested in the preregistration aimed to detect a smaller effect size of 0.02, the final sample size only allowed for the detection of a small-to-moderate effect size of 0.0625. Despite requiring modification due to fewer participants than initially expected, this adjustment continues to support a thorough and reliable analysis of the collected data.

Following the approach of Friedrich et al. (2021) that has also been used by Pabst and Kollmayer (2023), individuals were asked to join a study exploring the cognitive and emotional responses they experience while reading a text on a new, interdisciplinary school project. All participants remained anonymous, with all data securely maintained in strict confidentiality. Additionally, participation was strictly voluntary, and the participants were and will remain unidentifiable in any subsequent write-ups or publications. The participants were also made aware that there were no definitive answers and that they could choose to withdraw from the study at any point.

4.3. Materials and Measures

As stimulus material for the study, a German text that introduced an innovative and interdisciplinary school project was chosen. The theme of the topic was carefully selected as it aligned with the possible future life realities of students who were enrolled in the teacher training programme at the time of study participation. The raw version of the text was initially generated by ChatGPT using the following prompt:

> Can you help me devise four texts written in German including at least 15 instances of either 1) gender-fair language using the gender asterisk in the plural and singular form (e.g., Lehrer*in, Ingenieur*innen) or 2) gendered language (e.g., Lehrer, Ingenieure). The topic should be rather easily understandable and include either 1) gender-

stereotypical or 2) counter-stereotypical information. Please make sure that the text content is the same for the four groups and that only the information necessary for the condition needs to be adapted.

At this point, it needs to be mentioned that the text underwent several rounds of revisions, proofreading, and adjustments to make it tailored to the needs of the current study. The final text designed for condition one, i.e., written in gendered language and displaying stereotypical content, consisted of 425 words, which is very similar to the chosen text length of Friedrich et al. (2021). An example sentence from the text is: *Die Lehrer loben die Zusammenarbeit der Berufsgruppen und berichten, dass die Klassenkameraden jetzt selbstbewusster und sicherer mit schwierigen Situationen umgehen können* ('The teachers praise the collaboration between the professional groups and report that the classmates can now handle difficult situations with more confidence and security'). In sum, 28 instances of gendered language can be found in the text. To develop a gender-fair version, all of these terms have been consistently substituted with gender-fair forms using the gender asterisk, e.g., *Schüler* ('students') was replaced with *Schüler*innen* ('students'). In addition, the German word *man* ('one') was systematically replaced with the gender-fair term *mensch* ('human'), as part of a broader gender-fair language approach that aims to reduce gender bias and promote inclusive communication. Moving on to the issue of gender-stereotypical cues, the text drew on traditional gender roles, such as police officers being typically male and nurses/healthcare professionals being typically female (Gustafsson Sendén et al., 2019). These traditional roles have been switched for the counter-stereotypical conditions, i.e., the main protagonists are a female police officer and a male nurse. For the sake of completeness, the four texts of the respective groups can be found in the appendix.

The independent variables are (1) text type (stereotypical vs. counter-stereotypical cues), (2) language type (gendered vs. GFL), and (3) reader gender identity (male, female, non-binary/genderqueer, no gender, do not wish to tell). Turning to the dependent variables, it is evident that they are quantitative, latent and discrete. Broadly, there are two primary variables: text comprehension and text comprehensibility. Text comprehension was assessed by three multiple-choice questions, three true/false questions and three open-ended questions. A sample item for the multiple-choice category including the answer choices is as follows: *Was lernen die Schüler(*innen) in der Einheit mit den Krankenpflegerinnen? a) Selbstverteidigungstechniken b) Prävention und Erste Hilfe c) Umgang mit Notrufen d) Kommu-*

nikationsstrategien (‘What do the students learn in the session with the nurses? a) self-defense techniques b) prevention and first aid c) handling emergency calls d) communication strategies’). An example item of the true/false category is: *Das Projekt dient ausschließlich der Förderung sportlicher Aktivitäten der Schüler(*innen). Richtig/Falsch* (‘The project is solely aimed at promoting the students' physical activities. true/false’). Finally, one of the open-ended questions is: *Am Ende des Projekts haben die Schüler(*innen) die Möglichkeit, das Gelernte in einem _____ anzuwenden.* (‘At the end of the project, the students have the opportunity to apply what they have learned in a _____.’). Out of the nine items, a single text comprehension score was computed, with a maximum possible score of 9. To assess the internal consistency of the dichotomous text comprehension scale, Kuder and Richardson 20 was calculated separately for each of the four conditions. The results showed varying levels of reliability: $\rho_{KR20\ \text{condition}\ 1} = .581$, $\rho_{KR20\text{stand condition}\ 2} = .632$, $\rho_{KR20\text{stand condition}\ 3} = .758$, $\rho_{KR20\text{stand condition}\ 4} = .720$. It is evident that the scales in condition 3 and 4 exhibited acceptable reliability. In contrast, condition 1 demonstrated questionable reliability and the Kuder and Richardson 20 for condition 2 was notably low, thereby suggesting a possible lack of internal consistency for this group. The reason for these results may lie in the presence of a potential ceiling effect and in the moderate to severe negative skewness of the scales ($g_{1\text{condition1}} = -.71$ with a $SD = .38$, $g_{1\text{condition2}} = -1.19$ with a $SD = .36$, $g_{1\text{condition3}} = -2.10$ with a $SD = .37$, $g_{1\text{condition4}} = -2.72$ with a $SD = .37$).

Moving on to the second dependent variable, four subscales were taken from Friedrich’s (2017) questionnaire on comprehensibility to compute an overall score of text comprehensibility. The details of the individual subscales are outlined below: subjective comprehensibility (Cronbach’s $\alpha = .76$), word difficulty (Cronbach’s $\alpha = .76$), sentence difficulty (Cronbach’s $\alpha = .80$), and aesthetic appeal (Cronbach’s $\alpha = .88$). The scales achieved internal consistency levels classified as acceptable to excellent, as indicated by Cronbach’s α values between .76 and .88. All of the subscales have been quantified by means of five distinct items on a 5-point Likert scale. Responses span from 1 (‘I disagree’) to 5 (‘I agree’). An example item for the subscale overall subjective comprehensibility is *Der Text vermittelt seinen Inhalt meines Erachtens sehr gut* (‘In my opinion, the text conveys its content very well’). Word difficulty measures how easily meaning can be ascribed to words, with one sample item being *Ich wusste bei allen Wörtern gleich, was sie bedeuten* (‘I immediately knew the meaning of all the words’). The scale for sentence difficulty assesses how straightforward it is to interpret the

syntactical structure of the text's sentences, for example by the item *Manche Sätze muss man mehrmals lesen, um sie zu verstehen* ('Some sentences need to be read multiple times to be understood'). Lastly, the extent to which a text aesthetically appeals to its readers is presented in form of the scale variety of language, for which a sample item is *Die Sprache des Texts war sehr schön* ('The language of the text was very beautiful').

4.4. Procedure

Participants were recruited through two main strategies, the first of them being social media (Whats App group chats, Instagram stories, Facebook groups) thereby applying the strategy of snowball sampling. Second, convenience sampling was employed: Students enrolled in the lecture *'Principles of Individual and Developmental Psychology of Education and Learning'* were invited by their professor to participate in the study, with the incentive of earning one extra credit point toward their final exam.

As previously stated, the study was conducted in the online format using SoSciSurvey (https://www.soscisurvey.at/) (Leiner, 2024) and was available from November 14th, 2024 to January 12th, 2025. In total, the questionnaire was structured into five comprehensive sections: Following the review of the instructions and the provision of informed consent (1), the participants were randomly assigned to one condition and had to read the text (2). Subsequently, nine items to check text comprehension followed (3), and four comprehensibility scales constituted the second to last part of the questionnaire (4). Finally, information regarding the participants' demographic characteristics – including gender, age and a safety item asking them whether they were currently enrolled in the teacher training program – was collected (5). Completing the questionnaire only required approximately ten minutes to ensure that participants remained engaged.

4.5. Statistical Analysis

To test the hypotheses, a two-way ANOVA was employed to assess the main effects and interactions related to text type and language type. This was followed by a three-way ANOVA that additionally examined the influence of reader gender identity. The statistical analyses

have been conducted using IBM SPSS Statistics 28 (IBM Corporate, 2023). All statistical analyses were conducted at a a significance level (α-error) of 5 %, and *p*-values ranging from .05 to .15 were considered indicative of a trend, following the guidelines outlined by Cohen (1988). For significant results, the effect size η_p^2 (partial eta squared) was also reported and categorised as follows: a η_p^2 value of 0.01 was interpreted as small, a η_p^2 value of 0.06 as medium, and a η_p^2 value 0.14 as large. For correlations, *r* values between 0.1 and 0.3 were classified as small to moderate, those between 0.3 and 0.5 as moderate to large, and *r* values of 0.5 or higher as large.

5. Results

As previously indicated, to answer the first six research questions, a two-way ANOVA was calculated. Table 2 shows the descriptive statistics of the four conditions (condition 1: text with gender-stereotypical cues + gendered language; condition 2: text with gender-stereotypical cues + GFL using the gender asterisk; condition 3: text with counter-stereotypical cues + gendered language; condition 4: text with counter-stereotypical cues + GFL using the gender asterisk) for the dependent variables text comprehension and text comprehensibility including the four subscales subjective comprehensibility, word difficulty, sentence difficulty and aesthetic appeal by condition, i.e., text and language type.

Table 2

Descriptive Statistics of Text Comprehension and Text Comprehensibility including the Four Subscales Subjective Comprehensibility, Word Difficulty, Sentence Difficulty and Aesthetic Appeal by Condition

dependent variable	**subscale**	**text type**	**language type**	***M***	***SD***	***n***
text comprehension[1]		gender-stereotypical	GEN	7.53	1.31	38
			GFL	7.34	1.31	44
		counter-stereotypical	GEN	7.30	1.52	40
			GFL	7.95	1.32	40
text comprehensibility		gender-stereotypical	GEN	4.33	0.49	38
			GFL	4.09	0.63	44
		counter-stereotypical	GEN	4.32	0.52	40
			GFL	4.12	0.60	40
text comprehensibility	subjective comprehensibility[2]	gender-stereotypical	GEN	4.61	0.54	38
			GFL	4.32	0.81	44
		counter-stereotypical	GEN	4.50	0.54	40
			GFL	4.34	0.76	40
	word difficulty[2]	gender-	GEN	4.76	0.58	38

		stereotypical	GFL	4.64	0.57	44
		counter-stereotypical	GEN	4.88	0.41	40
			GFL	4.63	0.59	40
	sentence difficulty[2]	gender-stereotypical	GEN	4.44	0.53	38
			GFL	4.12	0.87	44
		counter-stereotypical	GEN	4.26	0.79	40
			GFL	4.03	0.83	40
	aesthetic appeal[2]	gender-stereotypical	GEN	3.52	1.00	38
			GFL	3.29	1.01	44
		counter-stereotypical	GEN	3.66	0.89	40
			GFL	3.49	0.88	40

M, mean; SD, standard deviation; GEN = gendered language; GFL, gender-fair language. [1]possible range: 0-9, high scores indicate high text comprehension. [2]*1 = stimmt nicht, 'I disagree'; 5 = stimmt genau, 'I agree'*

Before conducting the two-way ANOVA, test prerequisites have been checked. As such, the Levene's Test for both dependent variables revealed non-significant results, meaning that equal variances across the groups can be assumed. In contrast, the Shapiro-Wilk Test of normality exposed that the data significantly deviates from normality in all testing conditions. Detailed information concerning these assumption-checking tests can be found in the appendix. However, due to the large sample size, the ANOVA could still be used for the analysis as it is rather robust to deviations from normality due to the central limit theorem. Still, if ANOVA results indicate significant differences, post hoc tests can be used to identify which groups differ.

Adding to this, a Pearson correlation was run between the two dependent variables, text comprehension and text comprehensibility, to ensure that multicollinearity was not a confounding factor. The results showed a weak positive correlation (r = .25, p = .001), well below the threshold of concern for multicollinearity.

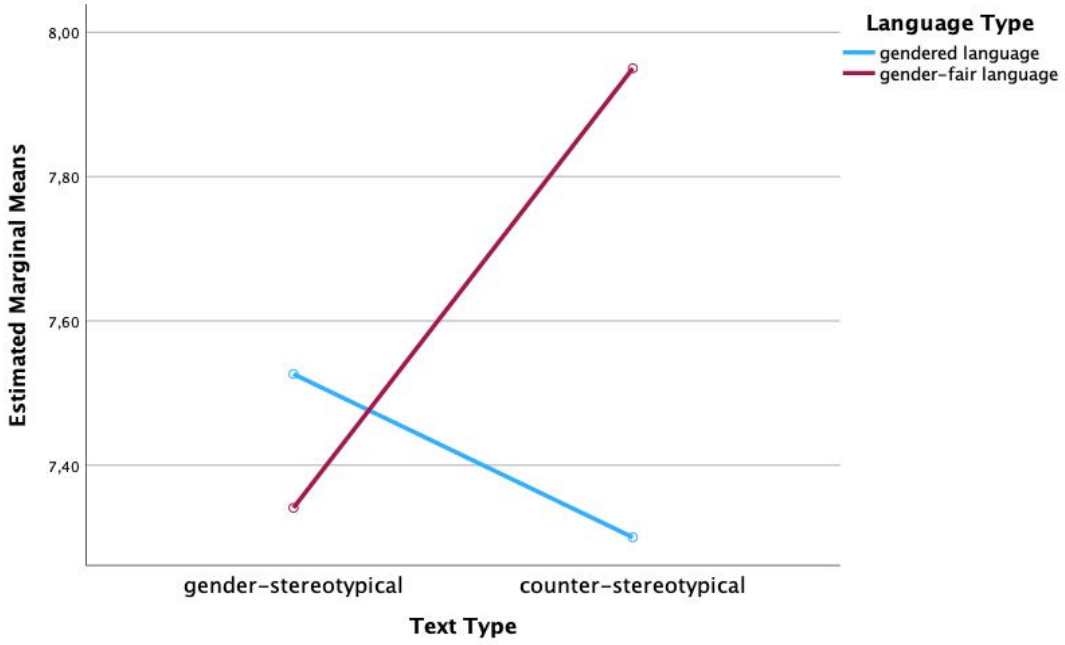
The first two-way ANOVA investigated the effects of text type (gender-stereotypical vs. counter-stereotypical) and language type (gendered language vs. GFL) on text comprehension, thereby answering research questions 1, 3, and 5. The dependent variable was the total

comprehension score per participant. Starting off with the analysis of potential main effects, the main effect of language type was not significant, $F(1, 158) = 1.17$, $p = .282$, $\eta^2 = .01$, indicating that there was no statistically significant difference in the comprehension scores between texts that were either written in gendered language or in GFL. Furthermore, there was no significant main effect of text type, $F(1, 158) = 0.79$, $p = .375$, $\eta^2 = .01$. This suggests no significant difference in comprehension between gender-stereotypical and counter-stereotypical texts.

Proceeding to the results of the checked interaction effect between language type and text type, statistical significance was approached, $F(1, 158) = 3.77$, $p = .054$, $\eta^2 = .02$, indicating a potential trend for the interaction. A visual inspection of the estimated marginal means in Figure 1 suggests that 1) texts written in GFL were better comprehended when they were counter-stereotypical ($M = 7.95$, $SD = 1.32$, $n = 40$), whereas 2) texts written in gendered language were slightly better comprehended when they were gender-stereotypical ($M = 7.53$, $SD = 1.31$, $n = 38$).

Figure 1

Estimated Marginal Means of Comprehension Scores as a Function of Language Type (Gendered vs. Gender-Fair) and Text Type (Gender-Stereotypical vs. Counter-Stereotypical)



The overall model accounted for 3.5 % of the variation in text comprehension ($R^2 = .035$, adjusted $R^2 = .017$), suggesting a small effect size.

Moving on to the second two-way ANOVA which shed light on research questions 2, 4 and 6, an analysis of the independent variables text type and language type on the dependent variable text comprehensibility was conducted. Concerning text type, there were only minimal differences between the gender-stereotypical (M = 4.20, SD = 0.58, n = 82) and counter-stereotypical texts (M = 4.22, SD = 0.57, n = 80). The ANOVA revealed a significant main effect of language type, $F(1, 158) = 6.18$, $p = .014$, $\eta^2 = .04$, which translates into gendered-language-texts being rated as significantly more comprehensible compared to gender-fair-language-texts. In contrast, the main effect of text type was not significant, $F(1, 158) = 0.01$, $p = .927$, $\eta^2 < .01$. Thus, there was no difference in comprehensibility between gender-stereotypical and counter-stereotypical texts.

The interaction effect between language type and text type was not significant, $F(1, 158) = 0.05$, $p = .824$, $\eta^2 < .01$. This means that the influence of the language type on comprehensibility was not dependent upon the text either being written in a gender-stereotypical or counter-stereotypical context.

The overall F-test of the model yields $F(3, 158) = 2.09$, $p = .103$, $\eta_p^2 = .04$ and the corrected model explained 3.8 % of the variance in text comprehensibility ($R^2 = .038$, adjusted $R^2 = .020$), indicating a small effect size.

Finally, the testing of the last hypothesis required a three-way ANOVA. It is necessary to note that the analysis had to be reduced to a comparison between only female and male participants because there were too few participants who identified as either non-binary/genderqueer, as having no gender or who did not want to answer the question. Unlike the preceding two-way ANOVA, the Levene's Test showed insignificant results only for text comprehensibility but did so for text comprehension. Boxplots checking variance homogeneity can be found in the appendix.

The first three-way ANOVA was conducted to investigate the effects of language type (gendered language vs. GFL), text type (gender-stereotypical vs. counter-stereotypical), and gender identity of the reader (male vs. female) on text comprehension. There was a significant main effect of the reader's gender identity, $F(1, 146) = 4.10$, $p = .045$, $\eta^2 = .03$, with male participants scoring slightly higher than female participants. However, no significant main effects were found for language type, $F(1, 146) = 2.34$, $p = .128$, $\eta^2 = .02$, and text type, $F(1, 146) = 3.04$, $p = .083$, $\eta^2 = .02$. The analysis further revealed that the three-way interaction

among language type, text type, and the reader's gender identity did not significantly influence text comprehension, $F(1, 146) = 0.37$, $p = .543$, $\eta^2 < .01$. This suggests that these three factors, when considered together, had no meaningful combined effect.

Lastly, the second three-way ANOVA was performed to examine the effects of language type, text type, gender identity and their interaction on text comprehensibility scores. It revealed a significant main effect of language type, $F(1, 146) = 4.11$, $p = .044$, $\eta^2 = .03$, indicating that gendered language was perceived as more comprehensible than gender-fair language. However, no main effect was shown for gender identity, $F(1, 146) = 2.20$, $p = .140$, $\eta^2 = .02$, indicating that female readers did not necessarily achieve higher comprehensibility scores than male readers. Again, no significant main effect was found for text type, $F(1, 146) = 0.15$, $p = .704$, $\eta^2 < .01$. The three-way interaction was not significant, $F(1, 146) = 0.21$, $p = .647$, $\eta^2 < .01$, indicating that the combination of language type, text type, and the gender identity of the reader did not jointly affect text comprehensibility.

6. Discussion

The aim of the present study was to provide insights into how gender- and counter-stereotypical text cues, as well as gendered and gender-fair language, influence text comprehensibility and text comprehension. To the best of the author's knowledge, this appears to be the first study to investigate the construct of gender stereotypes as an independent variable in the given theoretical context. The following section will interpret and contextualise the key findings and integrate them into existing literature.

6.1. Integration and Discussion of Hypotheses with Text Comprehension as a Dependent Variable

Contrary to the originally assumed first hypothesis, the analysis revealed that the text type did not significantly impact text comprehension. To be clear, the results indicate that gender-stereotypical content did not facilitate how well a text was understood in the given sample. Instead, both texts with gender-stereotypical and counter-stereotypical cues were similarly well understood, suggesting that other factors might play a greater role in text comprehension. A possible explanation for this result could be that the investigated target group, i.e., university students who are becoming teachers, are less strongly influenced by stereotypical patterns of thinking than assumed in earlier studies. This stands in contrast to findings such as those of Reali et al. (2015), who reported that stereotypical content can enhance cognitive processing. The inability to replicate this effect in the present study suggests that the role of stereotypes in comprehension may depend on contextual or demographic factors.

Further, the language type, i.e., whether the text had been written in gendered or gender-fair language using the gender asterisk, did not significantly influence text comprehension, thereby rejecting hypothesis three. Instead, the results suggest that readers understand GFL just as well as texts written in gendered language. A potential reason for this result may lie in the rather high level of familiarity the participants of the target group could already have had with reading texts in GFL. An alternative explanation could be that even though GFL may introduce unfamiliar syntactic structures or new word forms, the process of mental modelling suggested by Kintsch (1998) could help integrate these new elements into their existing under-

standing. Also, according to van den Broek et al. (1995), text comprehension does not occur in isolation but rather through the active construction of a mental network. This could potentially explain why GFL did not have a negative impact on participants' comprehension scores.

Proceeding to research question five, the accompanying hypothesis must be rejected as well. This is because there was no significant interaction effect between gender stereotypical cues and the use of GFL on text comprehension; however, the results showed a potential trend toward significance. This suggests that there may be an emerging tendency for the relationship between text comprehension and gender stereotypes to vary depending on whether gender-fair or gendered language is used. While the interaction fails to achieve statistical significance ($p > .05$), the marginal result ($p = .054$) suggests it may be worth discussing further. The estimated marginal means reveal that counter-stereotypical texts are more effectively comprehended in GFL, whereas gender-stereotypical texts are slightly better understood in gendered language. The observed comprehension patterns might be attributed to readers' preconceived notions about gender roles. When reading a counter-stereotypical text, GFL might have facilitated understanding by reducing gender bias and increasing gender inclusivity rather than reinforcing traditional gender roles. Conversely, when readers encountered stereotypical texts in gendered language, the match between content and linguistic style aligned with their expectations and worldview. In summary, the results suggest that there is no uniform effect of text type and language type on text comprehension but rather a context-dependent one. Text conforming to traditional stereotypes might be more easily understood when they are written in gendered language using masculine generics. In contrast, in counter-stereotypical contexts, important cognitive scaffolding might be provided by GFL.

6.2. Integration and Discussion of Hypotheses with Text Comprehensibility as a Dependent Variable

After discussing the three hypotheses dealing with potential effects on text comprehension, those with text comprehensibility as their dependent variable will follow. As such, hypothesis two, stating that gender-stereotypical texts would be perceived as more comprehensible than counter-stereotypical texts, needs to be rejected, as there were only minimal non-significant differences in comprehensibility ratings between the two text types. A potential reason for

that may again lie in the sample's composition, with student teachers potentially being less prone to stereotypical thinking patterns than the previously examined groups. Originally, the theoretical foundation of the hypothesis can be traced back to Oakes et al. (1994), who underlined the context-dependent implications of stereotypes. Even though stereotypes tend to be automatically activated as they rely on internalised concepts, the present results illustrate that this automatic activation does not directly lead to higher comprehensibility scores. An alternative explanation might be that the used texts were written in a generally understandable, everyday context, therefore making deep prior knowledge redundant. This, in turn, could be the reason why potential facilitation effects of gender stereotypes did not come into play.

However, a significant main effect of language type on text comprehensibility was found, indicating that texts written in gendered language were rated as significantly more comprehensible than those written in GFL. These findings lead to the acceptance of hypothesis four. Contextualising these results, previous studies on GFL and text comprehensibility have yielded mixed findings, with some suggesting that GFL hinders comprehension (Friedrich et al., 2021) and others finding no significant differences (Friedrich & Heise, 2019; Pabst & Kollmayer, 2023). Delving deeper into this discussion, this could suggest that the investigated relationship between GFL and text comprehensibility may be moderated by the concrete language forms used. More precisely, the used form of GFL might impact the extent to which text comprehensibility is impacted. While pair forms, neutral forms, capital I-forms and gender asterisks in the plural form have not revealed any negative effects (see, for example, Rothmund & Christmann, 2002; Braun et al., 2007; Klimmt et al., 2008; Steiger-Loerbroks & van Stockhausen, 2014; Pöschko & Prieler, 2018; Friedrich & Heise, 2019), slash forms and gender asterisks in the singular form have been connected to reducing text comprehensibility scores (Friedrich et al., 2021). As previously stated, the present study used a combination of gender asterisk forms in the plural and singular; however, it is not possible to clearly distinguish which exact language forms might have had a negative/neutral/positive impact on text comprehensibility, making this a promising area for future research. Interestingly, though, the use of the gender-fair term *mensch* (‘human’) was frequently commented on in the annotation section of the questionnaire. Participants noted that they had been rather unfamiliar with using this word in the given context but did not report any difficulties in understanding. Another important consideration must be included. With linguistic routines playing a prominent role in comprehensibility and familiar language forms being processed easily, an increased cognitive

load might be attributed to the use of GFL. In line with this, Friedrich's (2017) theory of comprehensibility highlighted that word and sentence length, as well as syntactical structure, directly correspond with text comprehensibility. The use of asterisks and new word forms often leads to more complex sentence structures. This may explain the potential negative effect observed in the study. Taking the results of hypotheses two and four together, while gender stereotypes in content may not strongly impact perceived comprehensibility, linguistic structures play a more prominent role.

Hypothesis six postulated an interaction effect between gender stereotypical cues and GFL on text comprehensibility. However, this effect was not observed, as comprehensibility scores were generally higher regardless of the text type provided. As a result, the assumption based on Reali et al. (2015) that gender-stereotypical content could make up for potential comprehensibility deficits caused by GFL as they relate to existing mental schemata was not confirmed. Had that been the case, GFL would have caused fewer comprehensibility problems in gender-stereotypical texts, which refutes the idea of stereotype-induced cognitive facilitation in text processing. Actually, it solely suggests that formal linguistic aspects such as asterisks and sentence structures are more important for comprehensibility ratings than the text content being gender-stereotypical or counter-stereotypical. This can be related to earlier findings stating that cognitive reading loads arise primarily from sentence and word structure (McNamara et al., 2012; Friedrich & Heise, 2019).

Drawing an overall conclusion, it is crucial to note that comprehensibility should not automatically be equated with text comprehension: A lower comprehensibility rating does not necessarily mean that readers understand the content less well (Hackemann et al., 2022). Transferring this to the context of GFL, lower ratings on this construct might be explained by unfamiliar forms that are subjectively perceived as less comprehensible but do not necessarily reduce text comprehension. By implication, this means that with increasing familiarity with GFL, said disadvantage of comprehensibility may decrease without impairing text comprehension. This is why a lower comprehensibility score should not be considered as proof that GFL causes cognitive disadvantages in text understanding.

6.3. Integration and Discussion of Hypotheses including Participant's Gender Identity

The last hypothesis stated that female and non-binary participants would have higher comprehension and comprehensibility of gender-fair texts than male participants, with greater differences observed for counter-stereotypical texts. Due to a lack of participants who identified as being outside the binary gender spectrum, the analysis had to be carried out solely based on the answers of participants identifying as male or female. Still, as no significant main effect of text type was found on text comprehension, the hypothesis needs to be rejected. With gender-stereotypical and counter-stereotypical content having no significant influence on this dependent variable taking the gender identity into account, it can be assumed that the text type itself does not suffice to uncover differences in processing. The additional missing main effect of the language type on text comprehension hints at the fact that the target group had already been familiar with GFL, therefore not leading to any differences in comprehension. There was, however, a small, but significant main effect of gender identity on text comprehension as men scored slightly higher than women, which needs to be studied in more detail in further research. Various arguments can try to explain these differences: In line with Ellemers (2018), one potential line of reasoning to account for this effect lies in differences in socialisation rather than in the existence of inherent biological differences. From early childhood onward, exposure to gender-based norms shapes individual's reading habits, interpretive strategies and their levels of engagement with texts. This argument has manifested itself in the development of traditional gender roles that may encourage boys to develop greater confidence in task-oriented domains (Eccles, 2011). These differences in socialisation may have impacted participants' reading approaches, potentially contributing to the marginally better comprehension outcomes found for men. Moving on to the interaction effect between text type, language type and gender identity, no combined significant effect of these factors could be shown. This confirms the argument above that the text content lacked sufficient variation to produce measurable effects or that the target group had already been familiar with GFL.

Progressing to the second dependent variable, text comprehensibility, that was investigated in the three-way ANOVA, a similar picture emerged regarding the missing main effect of text type. Contrary to the results above, however, a significant main effect of language type was observed, underlining the conceptual difference between text comprehension and text com-

prehensibility. While text comprehension relates to the question whether a reader can comprehend and recall the information of a text, text comprehensibility describes how pleasant a text is to read, which is more related to linguistic factors. Put simply, this implies that a text can be perceived as more difficult to read without necessarily impairing the ability to absorb information correctly. Further, no significant main effect was yielded for gender identity, suggesting that the clarity of the text was perceived similarly by men and women. Women have been found to often demonstrate stronger linguistic processing skills (Roivainen, 2011), which could theoretically lead to higher comprehensibility ratings. However, this finding contrasts with previous research. Comprehensibility is a subjective measure that relies on participants' self-assessment rather than on a standardised performance assessment; it reflects the perceived ease of reading rather than the true cognitive effort. Understanding this differentiation sheds light on a potential reason why no significant gender effect emerged, suggesting that individuals' perceptions of text comprehensibility are influenced by factors that extend beyond actual linguistic processing skills.

As was the case previously, there was no significant interaction effect between text type, language type, gender identity and text comprehensibility. A potential explanation for the absence of such an interaction could be a compensatory effect. With gender identity reducing the perceived comprehensibility, stereotypical content might facilitate processing by activating mental schemas. As a result, the contrasting effects of these factors might have offset one another, leading to a non-significant interaction effect.

6.4. Limitations and Implications

As with any study, this research has its limitations. A major constraint is the uneven distribution of participants, as women constitute a disproportionately large portion of the sample. This imbalance aligns with previous findings as women tend to engage more frequently in survey participation than men (Porter & Whitcomb, 2005; Becker, 2022). Furthermore, individuals outside of the male-female binary are notably underrepresented, which also led to the exclusion of the respective data to answer research question seven. Future investigations would highly benefit from striving for a more diverse and balanced participant pool, thereby also enhancing generalisability.

Second, there is a likelihood that participants in the gender asterisk conditions might have inferred that the study aimed to assess its clarity. Subsequently, they could have – whether intentionally or subconsciously – provided ratings that were more positive and therefore somewhat biased, either due to their ideological stance or a desire to give socially favourable responses. Nonetheless, the fact that multiple unprompted remarks at the end of the study expressed criticism of the gender asterisk – both criticising and advocating for its use – implies that many of these participants were likely unaware of the experiment's true objective. Moreover, given that the sample consisted solely of education students, it can be assumed that the target group might be more accustomed to using GFL than individuals from other fields.

Third, it is possible that the differences between the text types, meaning between the stereotypical and counter-stereotypical content, have not been large enough to have a measurable effect on text comprehension and comprehensibility. It could be that the cognitive mechanisms typically responsible for facilitating the processing of stereotypes were overridden by other factors in this context. To address this limitation, future research could increase the contrast between the conditions even more, expand the sample by conducting the study with a more diverse participant group and manipulate the processing load, such as by introducing conditions that increase the cognitive load to find out whether stereotype-facilitated processing emerges in a more pronounced way when cognitive resources are limited.

Fourth, due to the limited effect size, it was only possible to detect small-to-moderate rather than small effects. While this can still be considered to have a meaningful impact, it also suggests that the effect is more pronounced than one might anticipate in some real-world scenarios. This, in turn, raises the question of the generalisability of the effects and highlights the need for future research exploring similar effects with smaller effect sizes and across more diverse populations.

Another constraint pertains to the low reliability of the calculated text comprehension score. This issue is likely due to a ceiling effect that went undetected during pretesting. In the future, it is strongly recommended to develop more challenging items in order to improve the resulting reliability. From a methodological standpoint, it needs to be noted that the assumption of normal distribution was violated; however, despite this breach, conducting the analysis with ANOVA was still feasible. This is because the central limit theorem states that, even when the

data are not normally distributed, they can approximate a normal distribution if the sample size is sufficiently large.

Despite all of these limitations, the results remain robust and provide a solid initial indication of the underlying effects, serving as a valuable starting point for further research. Overall, the study has expanded our understanding of how linguistic structures and text contents influence text comprehension and text comprehensibility and therefore offers important insights for the discussion on GFL. The results indicate that more research is necessary to identify the conditions under which gender-stereotypical content might lead to a facilitated processing. Future studies could therefore investigate whether individual differences such as prior experience with GFL or personal attitudes towards stereotypes have an influence on these interactions.

On a practical level, the results can encourage teachers and educational institutions to use GFL on a widespread level in order to ensure gender equality and heighten visibility as well as facilitate comprehension and comprehensibility. The findings can also act as a springboard to opt for a gender-fair design of textbooks and teaching materials.

7. Conclusion

The primary objective of the study was to analyse the role of gender stereotyping and GFL in text comprehensibility and text comprehension. Overall, results showed that neither language type nor text type had a significant main effect on text comprehension. Further, the missing interaction effect between the variables suggests that both factors operate independently.

Moving on, whether the text had been written in gendered or gender-fair language had significant ramifications on text comprehensibility. This is consistent with previous studies suggesting that GFL may increase difficulties in processing or hinder comprehensibility. However, future research is still necessary to explore whether the challenges posed by GFL vary across different linguistic and cultural contexts. By contrast, whether the text displayed gender-stereotypical or counter-stereotypical content showed no influence on comprehensibility ratings, which may suggest that gender stereotypical cues do not play a decisive role in text comprehensibility. The non-significant interaction suggests that the influence of language type is consistent regardless of text type.

Further analyses revealed that gender identity only had a significant impact on text comprehension – but not on text comprehensibility. These results not only highlight the conceptual distinction between the two constructs, but also point to potential influences of socialisation, varying reading strategies or levels of motivation. The absence of notable interaction effects among the factors language type, text type and gender identity indicate the presence of a possible compensatory mechanism, underscoring the complexity of how the factors shape the comprehension and comprehensibility of texts.

As research is still in its infancy regarding the potential impact of GFL and it has even been studied in combination with gender identity and gender stereotypes for the first time, further investigations are needed to explore its long-term effects, cognitive implications, and potential influence on societal attitudes.

Finally, to draw a conclusion, the initial question asking how much of what we understand is shaped by how it is said can now be revisited. While the question seems simple, the answer is more complex and warrants further exploration. Still, it appears that form shapes our understanding more than we tend to acknowledge.

8. References

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9. List of Figures

10. List of Tables

11. List of Abbreviations

GFL……..gender-fair language

12. Appendix

12.1. Assumption Checking Tests

As stated above, the following tables provide detailed information on the results of the assumption checking tests that have been conducted prior to the hypothesis tests. More precisely, Table A1 first displays the results regarding the two-way ANOVA, Table A2 then shows the respective results for the three-way ANOVA. In addition, two boxplots (Figure A1 and Figure A2) are attached to visualise variance homogeneity.

Table A1

Results of Levene's Test and Shapiro-Wilk Test for Assumption-Checking Prior to the Two-Way ANOVA

test	**dependent variable**	**text type**	**language type**	**statistic**	**sig.**	***df***
Levene's Test	text comprehension			0.91	.439	
	text comprehensibility			1.32	.270	
Shapiro Wilk	text comprehension		GFL	.80	<.001	84
			GEN	.84	<.001	78
	text comprehensibility		GFL	.90	<.001	84
			GEN	.85	<.001	78
	text comprehension	gender-stereotypical		.87	<.001	82
		counter-stereotypical		.76	<.001	80
	text comprehensibility	gender-stereotypical		.89	<.001	82
		counter-stereotypical		.87	<.001	80

sig, significance; df, degrees of freedom; GEN, gendered language; GFL, gender-fair language

Table A2

Results of Levene's Test for Assumption-Checking Prior to the Three-Way ANOVA

test	dependent variable	statistic	sig
Levene's Test	text comprehension	2.66	.013
	text comprehensibility	0.73	.643

sig, significance

Figure A1

Distribution of Text Comprehension Scores by Gender

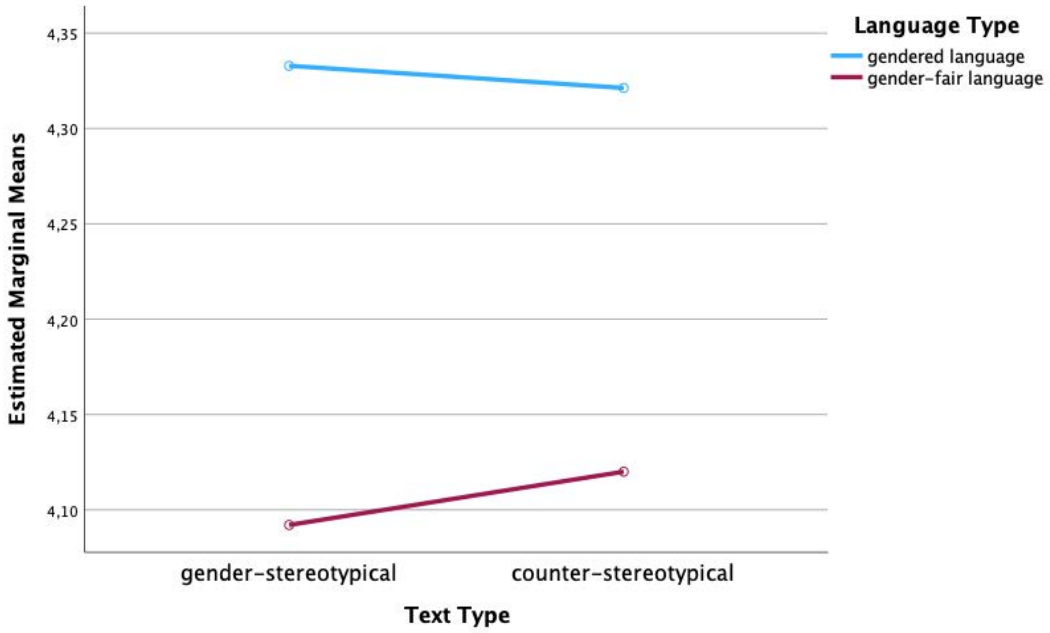
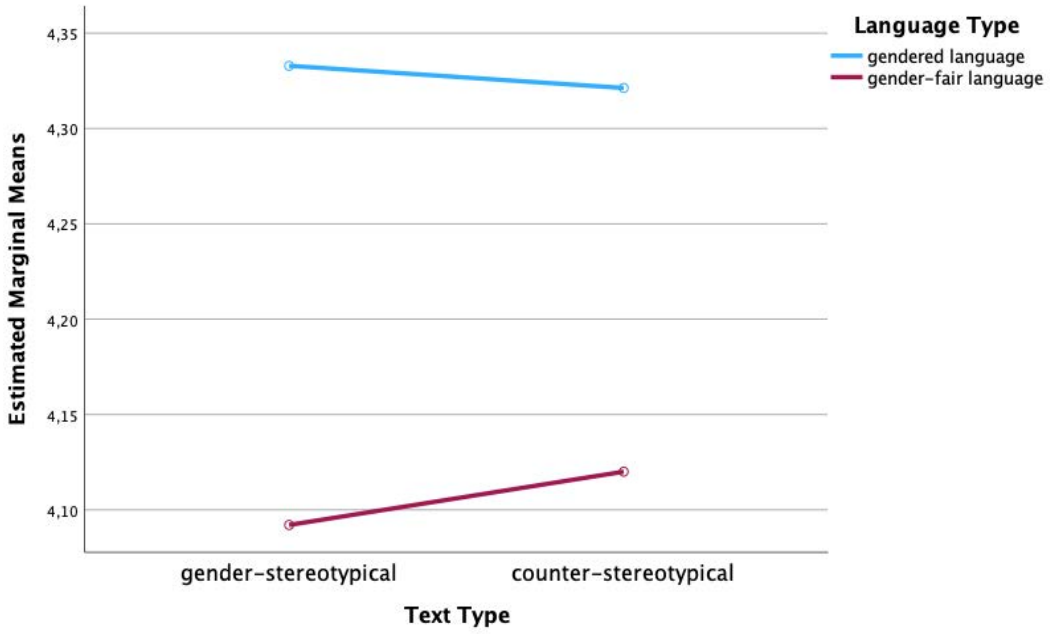


Figure A1 illustrates that the male group shows more variability with extreme outliers and some skewness, while the female group has a tighter distribution. Variance homogeneity might be troublesome; however, with the group size being large enough, the assumptions for an ANOVA can be considered fulfilled.

Figure A2

Distribution of Text Comprehensibility Scores by Gender



As shown in Figure A2, both male and female groups exhibit similar median scores and variances, with only minor outliers. Thus, the assumptions for an ANOVA regarding variance homogeneity seem reasonably met.

12.2. Questionnaire

Herzlich Willkommen zu dieser Umfrage!

Guten Tag!

Ich möchte Ihnen herzlich dafür danken, dass Sie an meiner Studie teilnehmen, die ich im Rahmen meiner Masterarbeit an der Universität Wien durchführe. Ziel ist es, zu erfassen, wie Personen denken und fühlen, wenn sie einen Text lesen. Die Studie richtet sich im Besonderen an Lehramtsstudierende, die aktuell an einer Universität/Hochschule inskribiert sind.

Bitte lesen Sie alle Fragen genau durch und beantworten Sie diese spontan und vollständig. Es gibt keine falschen Antworten – von Interesse ist ausschließlich Ihre persönliche Einschätzung.

Die Beantwortung des vorliegenden Fragebogens erfolgt vollkommen freiwillig. Sie sind nicht verpflichtet, an der Untersuchung teilzunehmen und können die Beantwortung des Fragebogens jederzeit ohne Angabe von Gründen abbrechen. Die Auswertung erfolgt anonym, und alle Antworten werden streng vertraulich behandelt. Die erhobenen Daten werden ausschließlich zu Forschungszwecken verwendet und enthalten keinerlei Informationen, die zu Ihrer Identifikation führen könnten. Nach Abschluss der Datenerhebung ist eine gezielte Löschung Ihres Datensatzes nicht mehr möglich, da dieser nicht zugeordnet werden kann.

Auf der nächsten Seite bekommen Sie einen Text zu lesen, der ein neues, interdisziplinäres Schulprojekt vorstellt. Im Anschluss sollen Sie diesen Text mithilfe eines Fragebogens bewerten. Außerdem werden Ihnen einige Fragen zu Ihrer Person gestellt. Die Teilnahme dauert insgesamt 10-15 Minuten.

Bei Fragen stehe ich Ihnen gerne zur Verfügung. Sie können mich unter folgender E-Mail-Adresse kontaktieren: a11723764@unet.univie.ac.at.

Ich danke Ihnen nochmals für Ihre Teilnahme!

Laura Mathilde Pabst, MEd BEd BSc

Hinweis: Wenn Sie auf den „Weiter"-Knopf drücken, bestätigen Sie, dass Sie über die Teilnahmebedingungen informiert wurden und an der Studie teilnehmen möchten.

Weiter

Lesen Sie den nachfolgenden Text bitte aufmerksam. Im Anschluss werden Ihnen ein paar Fragen an den Text gestellt und Sie sollen den Text mit Hilfe eines Fragebogens bewerten.

Weiter

Interdisziplinäres Schulprojekt

Im Rahmen eines innovativen Projekts arbeiten Polizisten und Krankenpflegerinnen eng mit Schulen zusammen, um das Bewusstsein der Schüler für Sicherheit und Gesundheit zu fördern. Das Projekt setzt auf interaktive Workshops, in denen die Teilnehmer unter Anleitung erfahrener Fachkräfte lernen, wie sie in Notsituationen richtig handeln. Die Initiative startet mit den Polizisten, die durch praktische Übungen das Selbstvertrauen der Schüler stärken und ihnen wichtige Selbstverteidigungstechniken beibringen. Ein erfahrener Polizist, Herr Müller, leitet die Übungseinheit an und betont, wie bedeutend es ist, dass jeder Schüler weiß, wie man sich in gefährlichen Situationen schützt. „Es ist entscheidend, schnell zu reagieren, wenn es nötig ist“, erklärt er und zeigt den Jugendlichen, wie man Bedrohungen erkennt und ihnen ausweicht.

In einer weiteren Übungseinheit zeigen die Polizisten den Klassenkollegen, wie sie in Ernstfällen einen Notruf absetzen können. „Selbst ein kurzer Anruf kann Leben retten“, erklärt Herr Müller mit Nachdruck, nachdem besprochen worden ist, wie man klar und ruhig mit der Notrufzentrale spricht. Die Schüler nehmen die Übung sehr ernst und arbeiten engagiert daran, das richtige Vorgehen zu verinnerlichen. Sie spielen verschiedene Notsituationen durch und lernen, wie wichtig klare Kommunikation und schnelles Handeln in Krisen sind.

Im Anschluss übernehmen die Krankenpflegerinnen, die sich auf Prävention und Erste Hilfe spezialisiert haben, das Training. Frau Maier, eine Krankenpflegerin mit langjähriger Erfahrung in der Ausbildung junger Menschen, zeigt den Projekt-Teilnehmern, wie man Verbände anlegt und kleinere Verletzungen richtig behandelt. „Es ist beruhigend zu wissen, wie man in solchen Momenten helfen kann“, erzählt Julia, die klassenbeste Schülerin, nach dem Workshop. Auch die anderen Schüler äußern sich positiv und betonen, wie wichtig es ist, solche Grundlagen zu kennen. Frau Maier betont: „Ich möchte, dass jeder, der hier teilnimmt, die wichtigsten Grundlagen der Ersten Hilfe versteht und anwenden kann.“

Zusätzlich legen die Krankenpflegerinnen großen Wert auf Prävention und klären die Schüler darüber auf, wie man Verletzungen und Unfälle von vornherein vermeiden kann. Sie besprechen Themen wie Hygiene, gesunde Lebensführung und den verantwortungsvollen Umgang mit Medikamenten. Diese Inhalte ergänzen das Sicherheitswissen der Klassenkameraden und vermitteln ihnen eine ganzheitliche Sicht auf ihre Gesundheit.

Zum Abschluss der Schulung erhalten die Schüler die Möglichkeit, das Gelernte zu reflektieren und in einem Quiz anzuwenden. Durch die Kombination der beiden Schwerpunkte – Sicherheit und Gesundheit – fühlen sich die Schüler gut vorbereitet und schätzen die Unterstützung durch die Polizisten und Krankenpflegerinnen. Die Lehrer loben die Zusammenarbeit der Berufsgruppen und berichten, dass die Klassenkameraden jetzt selbstbewusster und sicherer mit schwierigen Situationen umgehen können. Das Projekt soll daher im kommenden Jahr fortgeführt und auf weitere Schulen ausgeweitet werden, um noch mehr Mädchen und Burschen auf reale Herausforderungen vorzubereiten.

Weiter

1. Welches Ziel verfolgt das Projekt hauptsächlich?

- ◯ Ausbildung von Polizisten in Erster Hilfe
- ◯ Förderung des Sicherheits- und Gesundheitsbewusstseins der Schüler
- ◯ Verbesserung der Lehrer-Schüler-Beziehung
- ◯ Unterstützung bei Hausaufgaben

2. Welche abschließende Aktivität führt das Projekt durch?

- ◯ Ein Quiz zur Reflexion des Gelernten
- ◯ Eine weitere Einheit zur Selbstverteidigung
- ◯ Einen Besuch im Krankenhaus
- ◯ Eine Prüfung zur Ersten Hilfe

3. Was lernen die Schüler in der Einheit mit den Krankenpflegerinnen?

- ◯ Selbstverteidigungstechniken
- ◯ Prävention und Erste Hilfe
- ◯ Umgang mit Notrufen
- ◯ Kommunikationsstrategien

4. Herr Maier ist ein erfahrener Lehrer, der sich auf Erste-Hilfe-Kurse für Schüler spezialisiert hat.

- ◯ richtig
- ◯ falsch

5. Das Projekt soll im kommenden Schuljahr auf weitere Schulen ausgeweitet werden.

- ◯ richtig
- ◯ falsch

6. Das Projekt dient ausschließlich der Förderung sportlicher Aktivitäten der Schüler.

- ◯ richtig
- ◯ falsch

Bitte füllen Sie die Lücken aus.

Am Ende des Projekts haben die Schüler die Möglichkeit, das Gelernte in einem _____ anzuwenden. Ein _____ kann laut Herrn Müller Leben retten, wenn man in Notsitutationen schnell und deutlich kommuniziert. Zu Beginn der Initiative führen die Polizisten Übungen durch, die das _____ der Schüler stärken und ihnen Selbstverteidigungskenntnisse vermitteln sollen.

Weiter

7. Beurteilen Sie nun bitte den gelesenen Text anhand der nachstehenden Kriterien.

	Stimmt nicht				Stimmt genau
Ich fand den Text verständlich.	◯	◯	◯	◯	◯
Der Text vermittelt seinen Inhalt meines Erachtens sehr gut.	◯	◯	◯	◯	◯
Der Text könnte deutlich verständlicher sein.	◯	◯	◯	◯	◯
Es fiel mir schwer, diesen Text zu verstehen.	◯	◯	◯	◯	◯
Alles in allem war der Text leicht zu verstehen.	◯	◯	◯	◯	◯

8. Beurteilen Sie nun bitte den gelesenen Text anhand der nachstehenden Kriterien.

	Stimmt nicht				Stimmt genau
Die Worte waren einfach zu verstehen.	◯	◯	◯	◯	◯
Bei manchen Wörtern war ich mir nicht sicher, was sie bedeuten.	◯	◯	◯	◯	◯
Ich fand die Worte im Text schwierig.	◯	◯	◯	◯	◯
Viele Worte kannte ich nicht.	◯	◯	◯	◯	◯
Ich wusste bei allen Wörtern gleich, was sie bedeuten.	◯	◯	◯	◯	◯

9. Beurteilen Sie nun bitte den gelesenen Text anhand der nachstehenden Kriterien.

	Stimmt nicht				Stimmt genau
Die Sätze waren leicht zu verstehen.	○	○	○	○	○
Die Sätze waren kompliziert gebaut.	○	○	○	○	○
Ich fand die Sätze schwierig zu verstehen.	○	○	○	○	○
Manche Sätze musste man mehrmals lesen, um sie zu verstehen.	○	○	○	○	○
Viele Sätze im Text sind sehr lang.	○	○	○	○	○

10. Beurteilen Sie nun bitte den gelesenen Text anhand der nachstehenden Kriterien.

	Stimmt nicht				Stimmt genau
Die Sprache des Texts war nicht schön.	○	○	○	○	○
Die Sprache des Texts war sehr schön.	○	○	○	○	○
Der Text war abwechslungsreich geschrieben.	○	○	○	○	○
Der Text war monoton.	○	○	○	○	○
Der Text war nicht schön geschrieben.	○	○	○	○	○

Weiter

11. Geschlecht:

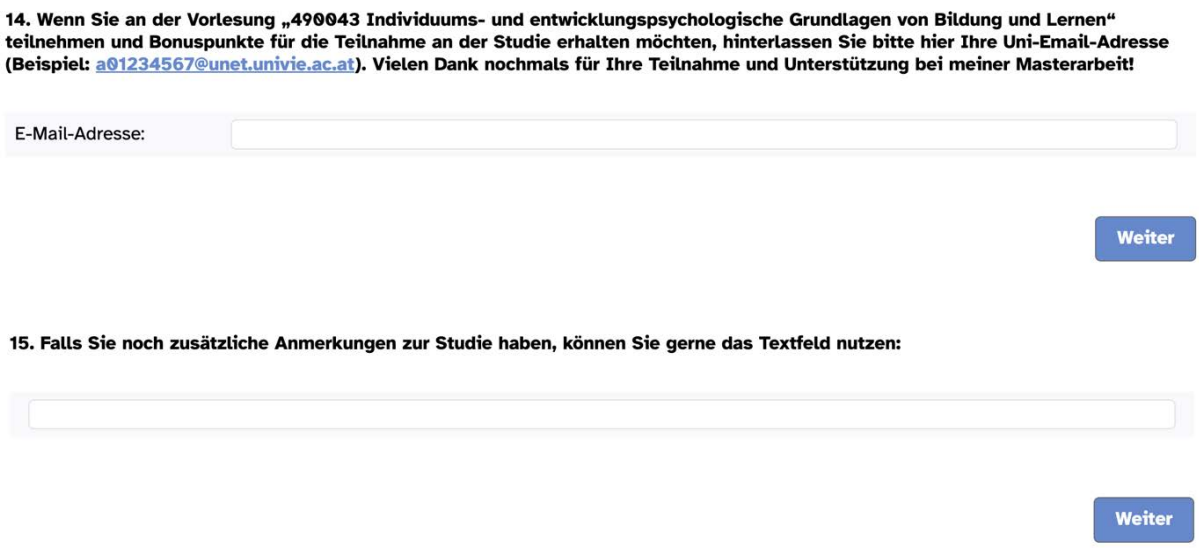
- ○ männlich
- ○ weiblich
- ○ nicht-binär/genderqueer
- ○ kein Geschlecht
- ○ keine Angabe
- ○ hier nicht angeführt

12. Alter:

13. Studieren Sie derzeit Lehramt an einer Universität bzw. Hochschule?

- ○ ja
- ○ nein

Weiter

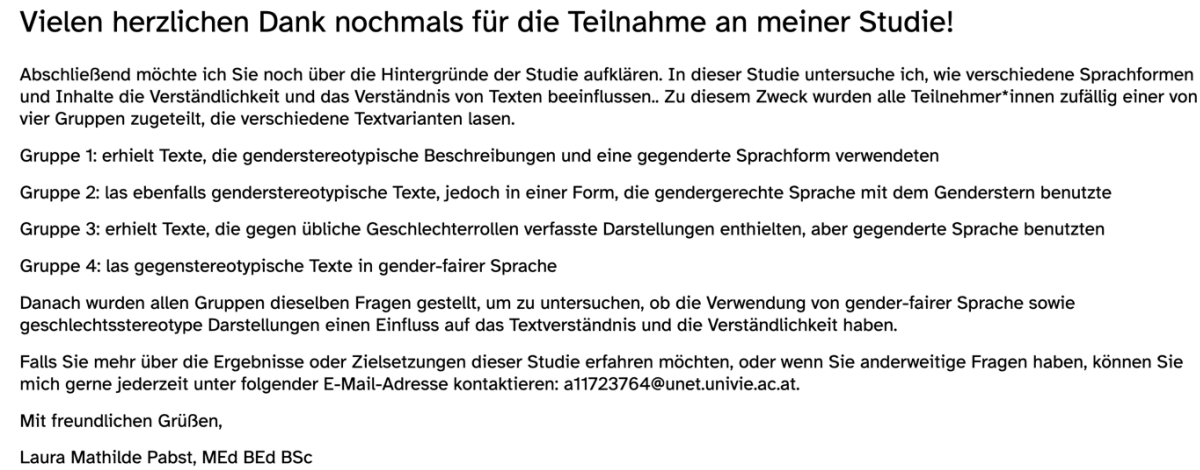

14. Wenn Sie an der Vorlesung „490043 Individuums- und entwicklungspsychologische Grundlagen von Bildung und Lernen“ teilnehmen und Bonuspunkte für die Teilnahme an der Studie erhalten möchten, hinterlassen Sie bitte hier Ihre Uni-Email-Adresse (Beispiel: a01234567@unet.univie.ac.at). Vielen Dank nochmals für Ihre Teilnahme und Unterstützung bei meiner Masterarbeit!

E-Mail-Adresse:

Weiter

15. Falls Sie noch zusätzliche Anmerkungen zur Studie haben, können Sie gerne das Textfeld nutzen:

Weiter


Vielen herzlichen Dank nochmals für die Teilnahme an meiner Studie!

Abschließend möchte ich Sie noch über die Hintergründe der Studie aufklären. In dieser Studie untersuche ich, wie verschiedene Sprachformen und Inhalte die Verständlichkeit und das Verständnis von Texten beeinflussen.. Zu diesem Zweck wurden alle Teilnehmer*innen zufällig einer von vier Gruppen zugeteilt, die verschiedene Textvarianten lasen.

Gruppe 1: erhielt Texte, die genderstereotypische Beschreibungen und eine gegenderte Sprachform verwendeten

Gruppe 2: las ebenfalls genderstereotypische Texte, jedoch in einer Form, die gendergerechte Sprache mit dem Genderstern benutzte

Gruppe 3: erhielt Texte, die gegen übliche Geschlechterrollen verfasste Darstellungen enthielten, aber gegenderte Sprache benutzten

Gruppe 4: las gegenstereotypische Texte in gender-fairer Sprache

Danach wurden allen Gruppen dieselben Fragen gestellt, um zu untersuchen, ob die Verwendung von gender-fairer Sprache sowie geschlechtsstereotype Darstellungen einen Einfluss auf das Textverständnis und die Verständlichkeit haben.

Falls Sie mehr über die Ergebnisse oder Zielsetzungen dieser Studie erfahren möchten, oder wenn Sie anderweitige Fragen haben, können Sie mich gerne jederzeit unter folgender E-Mail-Adresse kontaktieren: a11723764@unet.univie.ac.at.

Mit freundlichen Grüßen,

Laura Mathilde Pabst, MEd BEd BSc

12.3. Materials

12.3.1. Materials Condition 1: Gender-Stereotypical Cues and Gendered Language

Im Rahmen eines innovativen Projekts arbeiten Polizisten und Krankenpflegerinnen eng mit Schulen zusammen, um das Bewusstsein der Schüler für Sicherheit und Gesundheit zu fördern. Das Projekt setzt auf interaktive Workshops, in denen die Teilnehmer unter Anleitung erfahrener Fachkräfte lernen, wie sie in Notsituationen richtig handeln. Die Initiative startet mit den Polizisten, die durch praktische Übungen das Selbstvertrauen der Schüler stärken und ihnen wichtige Selbstverteidigungstechniken beibringen. Ein erfahrener Polizist, Herr Müller,

leitet die Übungseinheit an und betont, wie bedeutend es ist, dass jeder Schüler weiß, wie man sich in gefährlichen Situationen schützt. „Es ist entscheidend, schnell zu reagieren, wenn es nötig ist“, erklärt er und zeigt den Jugendlichen, wie man Bedrohungen erkennt und ihnen ausweicht.

In einer weiteren Übungseinheit zeigen die Polizisten den Klassenkollegen, wie sie in Ernstfällen einen Notruf absetzen können. „Selbst ein kurzer Anruf kann Leben retten“, erklärt Herr Müller mit Nachdruck, nachdem besprochen worden ist, wie man klar und ruhig mit der Notrufzentrale spricht. Die Schüler nehmen die Übung sehr ernst und arbeiten engagiert daran, das richtige Vorgehen zu verinnerlichen. Sie spielen verschiedene Notsituationen durch und lernen, wie wichtig klare Kommunikation und schnelles Handeln in Krisen sind.

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12.3.2. Materials Condition 2: Gender-Stereotypical Cues and Gender-Fair Language

Im Rahmen eines innovativen Projekts arbeiten Polizisten und Krankenpflegerinnen eng mit Schulen zusammen, um das Bewusstsein der Schüler*innen für Sicherheit und Gesundheit zu fördern. Das Projekt setzt auf interaktive Workshops, in denen die Teilnehmer*innen unter Anleitung erfahrener Fachkräfte lernen, wie sie in Notsituationen richtig handeln. Die Initiative startet mit den Polizisten, die durch praktische Übungen das Selbstvertrauen der Schüler*innen stärken und ihnen wichtige Selbstverteidigungstechniken beibringen. Ein erfahrener Polizist, Herr Müller, leitet die Übungseinheit an und betont, wie bedeutend es ist, dass jede*r Schüler*in weiß, wie mensch sich in gefährlichen Situationen schützt. „Es ist entscheidend, schnell zu reagieren, wenn es nötig ist“, erklärt er und zeigt den Jugendlichen, wie mensch Bedrohungen erkennt und ihnen ausweicht.

In einer weiteren Übungseinheit zeigen die Polizisten den Klassenkolleg*innen, wie sie in Ernstfällen einen Notruf absetzen können. „Selbst ein kurzer Anruf kann Leben retten“, erklärt Herr Müller mit Nachdruck, nachdem besprochen worden ist, wie mensch klar und ruhig mit der Notrufzentrale spricht. Die Schüler*innen nehmen die Übung sehr ernst und arbeiten engagiert daran, das richtige Vorgehen zu verinnerlichen. Sie spielen verschiedene Notsituationen durch und lernen, wie wichtig klare Kommunikation und schnelles Handeln in Krisen sind.

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12.3.3. Materials Condition 3: Counter-Stereotypical Cues and Gendered Language

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12.3.4. Materials Condition 4: Counter-Stereotypical Cues and Gender-Fair Language

Im Rahmen eines innovativen Projekts arbeiten Polizistinnen und Krankenpfleger eng mit Schulen zusammen, um das Bewusstsein der Schüler*innen für Sicherheit und Gesundheit zu fördern. Das Projekt setzt auf interaktive Workshops, in denen die Teilnehmer*innen unter Anleitung erfahrener Fachkräfte lernen, wie sie in Notsituationen richtig handeln. Die Initiative startet mit den Polizistinnen, die durch praktische Übungen das Selbstvertrauen der Schüler*innen stärken und ihnen wichtige Selbstverteidigungstechniken beibringen. Eine erfahrene Polizistin, Frau Müller, leitet die Übungseinheit an und betont, wie bedeutend es ist, dass je-

de*r Schüler*in weiß, wie mensch sich in gefährlichen Situationen schützt. „Es ist entscheidend, schnell zu reagieren, wenn es nötig ist“, erklärt sie und zeigt den Jugendlichen, wie mensch Bedrohungen erkennt und ihnen ausweicht.

In einer weiteren Übungseinheit zeigen die Polizistinnen den Klassenkolleg*innen, wie sie in Ernstfällen einen Notruf absetzen können. „Selbst ein kurzer Anruf kann Leben retten“, erklärt Frau Müller mit Nachdruck, nachdem besprochen worden ist, wie mensch klar und ruhig mit der Notrufzentrale spricht. Die Schüler*innen nehmen die Übung sehr ernst und arbeiten engagiert daran, das richtige Vorgehen zu verinnerlichen. Sie spielen verschiedene Notsituationen durch und lernen, wie wichtig klare Kommunikation und schnelles Handeln in Krisen sind.

Im Anschluss übernehmen die Krankenpfleger, die sich auf Prävention und Erste Hilfe spezialisiert haben, das Training. Herr Maier, ein Krankenpfleger mit langjähriger Erfahrung in der Ausbildung junger Menschen, zeigt den Projekt-Teilnehmer*innen, wie mensch Verbände anlegt und kleinere Verletzungen richtig behandelt. „Es ist beruhigend zu wissen, wie mensch in solchen Momenten helfen kann“, erzählt Julia, die klassenbeste Schülerin, nach dem Workshop. Auch die anderen Schüler*innen äußern sich positiv und betonen, wie wichtig es ist, solche Grundlagen zu kennen. Herr Maier betont: „Ich möchte, dass jede*r, die*der hier teilnimmt, die wichtigsten Grundlagen der Ersten Hilfe versteht und anwenden kann.“

Zusätzlich legen die Krankenpfleger großen Wert auf Prävention und klären die Schüler*innen darüber auf, wie mensch Verletzungen und Unfälle von vornherein vermeiden kann. Sie besprechen Themen wie Hygiene, gesunde Lebensführung und den verantwortungsvollen Umgang mit Medikamenten. Diese Inhalte ergänzen das Sicherheitswissen der Klassenkamerad*innen und vermitteln ihnen eine ganzheitliche Sicht auf ihre Gesundheit.

Zum Abschluss der Schulung erhalten die Schüler*innen die Möglichkeit, das Gelernte zu reflektieren und in einem Quiz anzuwenden. Durch die Kombination der beiden Schwerpunkte – Sicherheit und Gesundheit – fühlen sich die Schüler*innen gut vorbereitet und schätzen die Unterstützung durch die Polizistinnen und Krankenpfleger. Die Lehrer*innen loben die Zusammenarbeit der Berufsgruppen und berichten, dass die Klassenkamerad*innen jetzt selbstbewusster und sicherer mit schwierigen Situationen umgehen können. Das Projekt soll daher im kommenden Jahr fortgeführt und auf weitere Schulen ausgeweitet werden, um noch mehr Personen auf reale Herausforderungen vorzubereiten.

12.4. English Abstract

Introduction: The growing use and adoption of gender-fair language (GFL) representing all genders reflects a remarkable development in our fast-changing society. In this context, particular strategies such as the gender asterisk have gained prominence in grammatical gender languages such as German. Although critics argue that GFL can impair text comprehensibility, empirical findings remain inconclusive. Another key theoretical aspect in this context that has been largely overlooked in the scientific discussion involves gender-stereotypical cues in texts: Gender stereotypes shape perceptions and influence how readers interact with GFL. Therefore, they can potentially affect both text comprehension and evaluation. Bringing these concepts together, the present study examines how gender-stereotypical cues and GFL influence readers' comprehension and perceived comprehensibility of texts.

Method: In an online survey, 163 Austrian teacher-training students were randomly assigned to one of four conditions based on text type and language type. After reading a text introducing a school project, they answered comprehension questions and rated comprehensibility on a 5-point Likert scale.

Results: The results of the two-way ANOVAs show no significant main or interaction effects on text comprehension and text comprehensibility except for a significant main effect of language type on text comprehensibility. The three-way ANOVAs revealed two significant main effects: First, gender had a small but significant effect on text comprehension, with male participants scoring slightly higher than female participants. Second, there was a significant main effect of language type, with gender-fair texts having been perceived as less comprehensible.

Discussion: To conclude, the findings suggest that there is no evidence of text and language type reducing text comprehension, but that GFL reduces comprehensibility scores in the given sample. Gender differences were only observed for text comprehension.

Keywords: gender-fair language, masculine generics, grammatical gender, text comprehensibility, text comprehension, educational students, gender stereotypes

12.5. German Abstract

Einleitung: Die zunehmende Verwendung und Akzeptanz gender-fairer Sprache, die alle Geschlechter repräsentiert, spiegelt eine bemerkenswerte Entwicklung in unserer sich schnell verändernden Gesellschaft wider. In diesem Zusammenhang haben Strategien wie das Gendersternchen in grammatischen Sprachen wie dem Deutschen an Bedeutung gewonnen. Während Kritiker*innen behaupten, dass gender-faire Sprache die Verständlichkeit von Texten beeinträchtigen kann, sind die bisherigen Forschungsergebnisse hierzu widersprüchlich. Ein weiterer theoretisch zentraler Aspekt, der in der wissenschaftlichen Diskussion bisher übersehen worden ist, betrifft Geschlechterstereotype: Sie prägen Wahrnehmungen und beeinflussen, wie Leser*innen mit gender-fairer Sprache interagieren. Daher können sie potenziell sowohl das Textverständnis als auch die Bewertung von Texten beeinflussen. Vor diesem Hintergrund untersucht die vorliegende Studie, wie Geschlechterstereotype und gender-faire Sprache das Textverständnis und die wahrgenommene Verständlichkeit von Texten beeinflussen.

Methode: In einer Online-Umfrage wurden 163 österreichische Lehramtsstudierende zufällig einer von vier Bedingungen zugewiesen, die auf Texttyp und Sprachtyp basierten. Nach dem Lesen eines Textes, der ein Schulprojekt vorstellte, beantworteten sie Verständnisfragen und bewerteten die Verständlichkeit auf einer 5-Punkte-Likert-Skala.

Ergebnisse: Die Ergebnisse der zweifaktoriellen ANOVAs zeigen keine signifikanten Haupteffekte oder Interaktionseffekte auf Textverständnis und Textverständlichkeit, mit Ausnahme eines signifikanten Haupteffekts des Sprachtyps auf die Textverständlichkeit. Die dreifaktoriellen ANOVAs zeigten zwei signifikante Haupteffekte: Erstens hatte das Geschlecht einen kleinen, aber signifikanten Effekt auf das Textverständnis, wobei männliche Teilnehmende etwas besser abschnitten als weibliche. Zweitens gab es einen signifikanten Haupteffekt des Sprachtyps, wobei gender-faire Texte als weniger verständlicher wahrgenommen wurden.

Diskussion: Zusammenfassend deuten die Ergebnisse darauf hin, dass es keine Hinweise darauf gibt, dass Text- oder Sprachtyp das Textverständnis verringern. Allerdings führt gender-faire Sprache in der untersuchten Stichprobe zu niedrigeren Verständlichkeitsbewertungen. Geschlechterunterschiede wurden lediglich beim Textverständnis festgestellt.

Keywords: gender-faire Sprache, generisches Maskulinum, grammatikalisches Geschlecht, Textverständlichkeit, Textverständnis, Lehramtsstudierende, Geschlechterstereotype