

ALTERNATIVE TO STARS: ACCEPTABILITY OF EPICENES IN GENDER-INCLUSIVE GERMAN

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Abstract: German job titles (role nouns) traditionally use the generic masculine (GM), where the male version of a role noun like *Lehrer* ‘teacher’ also represents the generic, default version; femininity is a marked choice with the *-in* suffix. This study gender-inclusive language (GIL) initiatives that explore alternate constructions currently in variation with the GM. The gender star, one popular method, adds an asterisk to represent the gender spectrum, e.g., *Lehrer*in* ‘teacher.DIV’; such diversifying constructions have been found less acceptable by nonbinary people than epicene or participle role nouns (Löhr, 2022), e.g., *Lehrkraft* ‘teacher.NEUT’ or *Lehrende* lit. ‘teaching ones’ respectively. These neutralising forms do not use the *-in* inflection whatsoever and are thus implicitly gender-inclusive. Expanding on Löhr’s findings, this dissertation ran a target pair acceptability judgement task ($n=41$) to determine how a general population perceives neutralisations relative to the gender star. It finds that epicenes were consistently rated above the gender star with an average score of 0.262 ($-1 \leq \text{rating} \leq 1$, where -1 is towards the gender star and 1 is towards neutralisations), as were participles at 0.102. The theme of each question was found to be a significant factor ($p < 0.001$); alongside noted frequency effects, this suggests semantic and pragmatic conditioning outlining the nature of variation in German personal reference. Qualitatively, participants preferred epicenes when they made intuitive sense, and the gender colon form to the gender star, e.g., *Lehrer:in* ‘teacher.DIV’, because they flowed better in text.

Keywords: gender-inclusive language; personal reference; German; sociolinguistics

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1 Introduction

Language reflects the views and models of gender as expressed by a language community. German, like many languages, uses the generic masculine (GM) as its base for personal reference. In (1a), *der Lehrer* ‘the teacher’ has access to a gendered (1ai) and an ungendered, generic (1aii) meaning. By deriving the feminine form with the *-in* suffix (1b), the word loses access to this ungendered reference. The GM, thus, creates androcentric bias in the language with effects on cognitive processing (Körner *et al.*, 2022; Schmitz, 2024; Glim *et al.*, 2025) and real-world consequences on employment opportunities (Sczesny *et al.*, 2016; Kleiss and Waiguny, 2025).

- (1a) Der Lehrer muss nett sein.
 - a. ‘The (male) teacher must be nice.’
 - b. ‘Teachers (generally) must be nice.’
- (1b) Die Lehrerin muss nett sein.
 - a. ‘The (female) teacher must be nice.’

Exactly how German—and French, English, Italian, Arabic, and more—move away from the GM has been subject to political and linguistic debate. In English, generic *he* (*A good policeman serves his community*) is being phased out as singular *they* becomes more explicitly recognised (Paterson, 2011), and neutral role noun alternatives like *police offer* are easy to derive. German speakers, using a grammatically gendered language, must account for the deeply-embedded gender agreement. Following amendments to the civil law (BGBI I, 2018), so too must any official changes account for nonbinary and intersex people for whom the gender binary does not fit.

To achieve these goals, German speakers may opt for multigendering neomorphology. By inserting an asterisk (*, *das Gendersternchen* ‘gender star’) or colon (:, *der Gender-Doppelpunkt* ‘gender colon’) between the base noun and the *-in* suffix, e.g., *Lehrer*in* ‘teacher.’, the producer makes women and nonbinary people explicitly visible in the language. While popular (Ochs and Rüdiger, 2025), these forms (henceforth **diversifying forms**) have become politicised and, in seven of Germany’s 16 states, banned in schools, universities, and state documents (Antidiskriminierungsstelle des Bundes, 2024). Many, including the Rat für Deutsche Rechtschreibung (in short RfdR, in English the Council for German Orthography), a non-prescriptivist, international institution overseeing German, want and recognise the need for the language to update and reflect new values (Rat für deutsche Rechtschreibung, 2021). Diversifying forms are central in the political debate, representing to the public the entire concept of gender-inclusive language (GIL), and are subject to backlash (Zacharski, 2024).

Instead of retrofitting a spectral view of gender into personal reference nouns, one alternative is degendering—removing social gender agreement. **Neutralising forms** are overlooked in GIL research, but fulfil all criteria as needed (Cruz Neri and Siems-Muntoni, 2026). Lühr (2021, 2022) surveyed 321 nonbinary people on their GIL preferences and found neutralisations were the most preferable option. Since then, little work has considered how they compare to the gender star, and whether they could be more suitable in German GIL policy.

This dissertation expands on Löhr's findings and asks whether neutralisation is favourable for a general German audience through an acceptability judgement task (AJT). In sec. 2, it explores the political backlash to GIL, the field's research goals, and German GIL typology. Section 3 describes the creation of an AJT for a topic with limited materials available; sec. 4 presents the results of the exploratory study. In sec. 5 I respond to participants' comments with a pilot of a lexical frequency-based analysis and evaluate the limitations of the AJT. Last, in sec. 6, I answer in which contexts neutralisation may be viable, the necessary research to determine its efficacy, and revise the goals of GIL research with a ground-up, community-driven approach.

2 Background

GIL research aims not to impose a new idea of what, in this case, German should be, but to analyse how language users are adapting deeply-embedded features of language that no longer fit their values. Feminists have been calling for change to sexist language since at least the 1970s. Bosmajian (1972), primarily a researcher of the rhetoric of the civil rights movement, discussed sexist language as a tool of oppression by the patriarchy. From metaphors like *balls* meaning 'courage' to saying *men and women* as an ordered pair putting men first, he called for linguistic and social hierarchies perpetuating sexism to be dismantled. At the same time, Lakoff (1973) analysed prosody and register imposed onto women. She analysed how women were pressured into speaking with less assertion, greater hedging and politeness, and the sexualisation of terms surrounding women (e.g., senses I.7 and I.2.g of *mistress*, OED, 2023).

Formally recognising that languages were used androcentrically led to further, empirical work testing gender encoding in the semantics (Gygax *et al.*, 2008) and morphosyntax (Foertsch and Gernsbacher, 1997). Both studies found contradictions to institutional suggestions. Gygax *et al.* showed the GM was biased in French, despite the claims of the Académie Française who oversee the standardised version of the language. Foertsch and Gernsbacher demonstrated that singular *they* was not only acceptable compared to *he* or *she*, but was processed on par with the expected pronoun, despite style guides claiming it was ambiguous. As these claims were further tested and contradicted, the idea of implementing GIL became politicised and promoters experienced backlash.

2.1 Backlash against change

Backlash has continued to dominate the discussion (cf. in French: Stevenson, 2026; in Italian: Nodari and Gemelli, 2026; and in English: Martino and Ingrey, 2026), especially as the field adapts to include a spectrum of gender, not just the binary. In German, language protection organisations like the Verein Deutsche Sprache, 'self-declared protectors' of the language (Pfalzgraf, 2024, p. 183), use the topic as a political weapon. *Sprachterroristen* 'language terrorists' are both the 'freaks' promoting 'nonsensical' language (ibid, p. 192–3) and the powerful elite imposing 'dysfunctional', 'authoritarian' ideas that 'creates unnecessary conflicts between people' (Payr, 2021, points 7, 10, 20, own translations). More recently, seven

states, led by the Christian Democratic and Social Unions¹ (henceforth CXU, a conservative party), banned GIL in schools, universities, and councils (Antidiskriminierungsstelle des Bundes, 2024). The desire to be inclusive and fair with language is penalised as improper spelling, despite widespread popularity of these forms (cf. Ochs and Rüdiger, 2025; Kolek, 2025). Political parties like the Alternative für Deutschland (AfD) and CXU, continuing to drive sentiment against language reform, only discuss the negative effects on society and language, framing change as a hostile enemy to attack (Fleischhauer, 2026).

While the majority of this resistance is ideological (Pfalzgraf, 2024, 2026), the second most dominant rhetoric focuses on the stylistic implementation of this language. The Rfdr rejects the current implementations of GIL but remains open to finding a solution (Rat für deutsche Rechtschreibung, 2021; Reiche, 2023). They claim the gender star is hard to read and teach (despite contradictory evidence to all claims, Zacharski *et al.*, 2025; Cruz Neri and Siems-Muntoni, 2026) and that punctuation cannot be a part of the orthography.

The goal of this dissertation is not to fight this backlash directly, but to explore alternatives that may better fit these institutions and the language community they oversee. Institutional and legislative approval has previously normalised GIL to an otherwise wary community. After Germany recognised in law nonbinary and intersex people as neither male nor female (BGBI I, 2018), use of nonbinary-inclusive language increased dramatically in written texts (Ochs and Rüdiger, 2025). When the Swedish Academy's dictionary introduced *hen* 'they.', public opinion and usage of the pronoun also improved (Gustafsson Sendén *et al.*, 2021).² Presenting GIL as everyday language with clear benefits encourages more people to use it (Koeser and Szesny, 2014; Koeser *et al.*, 2015).

2.2 Expanding on GIL strategies: the typology of role nouns

Today, gender-inclusive role nouns (RNs) follow one of three strategies to move away from the generic masculine (GM), as summarised by Table 1. The most intuitive is to **feminise** the masculine role noun by using the feminine counterpart in a pair form, e.g., *Lehrerinnen und Lehrer* 'teachers. and teachers.', or in short as *Lehrer/innen*.³ Feminisation has been shown to reduce androcentric bias the most (Xiao *et al.*, 2023; Tibblin *et al.*, 2023; Storme and Storme, 2026), but fails to include nonbinary people (Löhr, 2021, 2022).

¹ The CDU is the larger party and operates across Germany; the CSU operates in Bavaria only.

² In France, the popular dictionary *Le Robert* added *iel* 'they.3SG' in 2021 and had the opposite reaction (Swann, 2025). The Académie Française had four years prior described GIL as putting the language into 'mortal peril' (Académie Française, 2017, own translation); unlike its Swedish equivalent, it sees these changes as an attack to its language ideology of heritage and preservation.

³ For a more exhaustive list of options in German, see Duden (2021).

Table 1: Three strategies to say ‘teachers’ in generic reference.

Type	Example
Feminisation	Lehrerinnen und Lehrer
Diversification	Lehrer*innen
Neutralisation	Lehrkräfte

2.2.1 Diversifying forms

Diversifying forms solve the representation issue of a feminisation approach with the multigendering neomorphology approach. They are designed to be nonbinary-inclusive, and have been shown to reduce bias across written and spoken modalities (realised as [?], Körner *et al.*, 2024, 2022; Glim *et al.*, 2025; Chalyvidou and Weber, 2025). These forms have quickly become the most popular option in media and press, especially for politically left-leaning sources (Waldendorf, 2024; Ochs and Rüdiger, 2025; cf. Storme *et al.*, 2026).

Diversification presents a multigendering approach: by representing everyone, language is gender-inclusive. The **in* suffix inherits the productivity of the traditional *-in* derivation, but retains access to generic reference (1a_{ii}). However, as the *de facto* representative of GIL, their use has become politicised, thus hindering further adoption (2.1).

2.2.2 Neutralising forms

Another strategy is to degender the language. Neutralising forms are implicitly gender-inclusive—they do not inflect for social gender as other role nouns must. A *Fachkraft* ‘expert’ is grammatically feminine regardless of the gender of the referent.

This dissertation focuses on epicenes and present participles, two examples of morphosemantic neutralisations (see Kolek, 2025, p. 5 for examples on syntactic neutralisations, e.g., *those who work*). Both are morphologically reproducible like the gender star and colon. Participles derive from the verb, e.g. (2). While their singular forms inflect for gender, the plural versions are syncretic and thus neutral.

(2) Lehrende

Lehr	-end	-e
teach	-PTCP.PRS	-PL
‘Teachers’		

Similarly, epicenes regularly form with the agentive *-kraft* and *-hilfe* suffixes⁴, e.g., *Lehrkraft* ‘teacher’, *Führungskraft* ‘manager’, or *Bürohilfe* ‘office hand’—all of which are grammatically feminine⁵. Despite this fixed gender, epicenes have been found to reduce bias: Steriopolo and Schütze (2025) ran a sentence continuation task in which participants were

⁴ The *-person* suffix, used for some questions in this dissertation’s AJT, seems to be rarer (although exact distributions, and subtleties between each suffix, are an open question).

⁵ As a semantic, not morphological, category, simplex role nouns like *der Gast* (‘guest.’) also count as epicenes.

encouraged to use a gendered personal pronoun based on either an epicene or GM antecedent. They found epicenes elicited forms that either avoided discussing gender, e.g., further epicenes like *der Mensch* ‘the human.M.NEUT’ or *die Person* ‘the person.F.NEUT’; or made reference to both men and men, e.g. through paired pronouns, with and without a star or colon (*er/sie*, *er:sie*, and *er*sie* ‘he/she’).

In the wake of GIL bans, city websites have used neutralisation instead of the generic masculine (Müller-Spitzer and Ochs, 2026), and nonbinary people prefer them to all other role noun options (Löhr, 2022). If the GM is outdated, feminisation is insufficient, and the gender star and colon are politically controversial, neutralisation may present a suitable option that pleases all stakeholders; yet they remain overlooked and under-researched. Ochs and Rüdiger (2025) did not include any type of neutralisation in their corpus analysis, but Ochs *et al.* (2026) demonstrates them as the dominant form in theirs.⁶

2.3 Current Study

Together, these neutralising forms present a GIL strategy where the public, linguistic criticisms of diversifying forms do not apply. Without neomorphology or punctuation, they conform to the criteria of the Council for German Orthography; as already integrated elements in German, they neither change the language nor express an explicit, political statement in their use. Given their precedence (Ochs *et al.*, 2026), high ratings in the nonbinary community (Löhr, 2022), and experimental successes (Steriopo and Schütze, 2025), this dissertation asks how a general group of German speakers views neutralisation in the context of GIL, taking a snapshot of the current attitudes between two strategies: one of implicit degendering (neutralisation) and one of explicit multigendering (diversification). It asks:

RQ1. How do German language users rate and compare two competing strategies in socially-motivated language change?

RQ2. What criteria are important to language users for effective GIL?

RQ3. Under which conditions is neutralisation viable for gender-inclusive German?

3 Methodology

3.1 Participants

41 adult proficient German speakers took part in an target pair acceptability judgement task (AJT). They were recruited via social media and snowball sampling—friends of friends and their social networks. The survey link was posted to Reddit (r/samplesize and r/samplesize_DACH, communities for researchers to advertise studies, the latter for the Germany, Austria, and Switzerland region), Bluesky (a Twitter-like platform with strong tagging support, further increasing reach), and the Linguist List (a mailing list for professional linguists). All recruitment texts emphasised that any *proficient* speaker could participate, not just native speakers, following recent criticisms of the vague term (Cheng *et al.*, 2021).

⁶ Neither study focuses on the distribution of neutralisation but rather diachronic change in neomorphology and regional and textual factors on language choice respectively. Both are based on scripted language; the question of how everyday speakers use GIL (if at all), including neutralisation, remains unanswered.

Participants could enter a lottery for £10 as compensation, drawn at the end of the data collection period.

3.2 Materials

54 questions were created, of which 36 were experimental items and 18 were fillers. Each question was formed of a pair of minimally contrastive sentences. One sentence used a diversifying form and the other a neutralising form. Questions were created in a 2 (epicene/participle) $\times$ 2 (star/colon) $\times$ 2 (singular/plural) $\times$ 6 (theme) factorial design as shown in 2. The star and colon were chosen because they were the most common of their representative strategies (Ochs and Rüdiger, 2025).

Table 2: Levels for factorial design. *only available in the plural. All examples translate to ‘teacher(s)’.

Factor	Levels
Diversifying form (2)	Gender star (<i>Lehrer*in</i>); Colon (<i>Lehrer:in</i>)
Neutralising form (2)	Epicene (<i>Lehrkraft</i>); Participle* (<i>Lehrende</i>)
Plurality (2)	Singular (<i>Lehrer*in</i>); Plural (<i>Lehrer*innen</i>)
Theme (6)	Boss; Expert; Nurse; Office colleague; Teacher; Museum visitor

Viable themes were difficult to collate. For a given RN, there had to be a synonymous epicene and present participle, all of which could be used in a pragmatically similar situation. The neutralising conditions, as an underresearched aspect of GIL, became the limiting factor. To address this, some epicenes were taken from the Orthographische Kernkorpus (OKK) (Diewald *et al.*, 2024), available online on the KorAP, using a regex query for the *-kraft* and *-hilfe* suffixes. KorAP is an easily accessible corpus tool and the OKK compiles professional texts, such as newspapers and journals.

I also adapted some of the questions from Steriopolo and Schütze (2025) who noted that certain epicenes, e.g., *Bürohilfe* ‘office hand.NEUT’ carried additional connotations that may make them less synonymous with the original RN. They write that the difference in semantics has been treated as negligible (*ibid*, footnote 9). In this experiment, directly measuring acceptability, I included *Bürohilfe* ‘office hand.NEUT’ (office theme), *Lehrkraft* ‘teacher.NEUT’ (teacher theme), and *Betreuungsperson* ‘carer.NEUT’ (nurse theme) from their stimuli.

I also wanted to test the commonly used *Studierende* ‘students.NEUT’, but could not find a complete paradigm for the RNs. Consequently, the expert theme represented both experts (*Expert:innen* and *Fachkräfte*, epicene) and in the participle form students (*Student:innen* and *Studierende*, participle).

The sentences were generated with the same algorithm (source code in the Appendix C). Each follows the structure of RN subject, modal verb, adjunct, and infinitive. They were

presented as general statements about occupations or roles within society where the content was unlikely to be judged. This structure put the RN nouns in a natural context and facilitated comparison across themes.

To reduce the homogeneity, fillers had three conditions and no variation in GIL strategy. Two filler questions per theme had sentences whose subjects were in initial (3a) and medial position (3b). The other placed the adjunct after the infinitive (3c), which is less grammatical in writing than in speech. The syntactic variation was expected to engage the participants more as inverting the subject and adding a post-infinitival tag are discursively emphatic; their acceptability is context-dependent. Moreover, option (3c) provided a clearly unacceptable option with the hopes that this would encourage participants to notice each question was individually worth evaluating.

- (3) a. Eine Krankenpflegerin muss in der Uni auch praktisch lernen.

Ein-e Krankenpfleger-in muss in der Uni
auch praktisch lernen
a.NOM-F nurse-FEM have_to.3SG.PRS at the.DAT uni
also practically learn.INF
'A nurse must also learn practically at uni.'

- b. In der Uni muss eine Krankenpflegerin auch praktisch lernen.

In der Uni muss ein-e Krankenpfleger-in auch
praktisch lernen
at the.DAT uni have_to.3SG.PRS a.-F nurse-FEM also
practically learn.INF
'At uni, a nurse must also learn practically.'

- c. * Eine Krankenpflegerin muss auch lernen praktisch in der Uni.

Ein-e Krankenpfleger-in muss auch lernen praktisch in der Uni
a.-F nurse-FEM have_to.3SG.PRS also learn.INF practically at the.DAT uni
'A nurse must learn at uni also practically.'

The questions were pseudorandomised such that there were never more than 3 of the same condition (the pairing of each diversifying and neutralising form) in a row. An "equally preferable" option was included. Example (4) shows an example of what participants saw.

(4) Ist Satz **A** oder **B** besser geschrieben?

‘Is sentence **A** or **B** better written?’

a. **Expert*innen** können oft komplizierte Themen beschreiben.

‘Experts (gender star, DIV) can often discuss complicated topics.’

b. **Fachkräfte** können oft komplizierte Themen beschreiben.

‘Experts (epicene, NEUT) can often discuss complicated topics.’

c. Beide Sätze sind gleichermaßen annehmbar.

‘Both sentences are equally acceptable.’

(translations, and formatting on a–b, added here)

I did not include any experimental items with the GM, to prevent participants from just evaluating whether they liked GIL or not. Likewise, fillers avoided GIL and comprised of possessives (*mein Chef* ‘my boss’), generic feminines (*eine Krankenpflegerin* ‘a nurse.F’), and two GMs (*ein Besucher* ‘a visitor.M’). Generic feminines have been shown to elicit the most bias (Körner *et al.*, 2024), so their inclusion as fillers did not disrupt the experimental items.

While the target pair approach is more reliable than Likert scales (Langsford *et al.*, 2018), and fits the RQs, this implementation was flawed. Option C presupposed that participants found both A and B acceptable; some participants found neither acceptable but had no clear option to express that. In future, a *no preference* wording over *equally acceptable* would avoid this.

Moreover, while the sentence pairs option did place the RNs in their natural context, the focus on minimal contrast created a distinctly experimental atmosphere. Larger texts to read, wider variation in sentence order (with counterbalancing and controls), and including other contexts of generic reference would have provided more naturalistic environments for the RNs. For example, a sentence (structure) like (5) places the gender-inclusive tokens into an environment where the participant must judge case, whether the referent is generic, the referent’s relation to the subject, and, as reported speech, whether it sounds natural to hear as a quote. In this example, too, the *zum:zu der* preposition, changing between a contracted *zum* for ‘to the.M.DAT’ and an uncontracted *zu der* ‘to the.F.DAT’ is not standardly defined for diversification, so participants have multiple factors to decide in which syntactic contexts GIL strategies succeed. A future version of this study will include greater syntactic variations in the experimental items.

(5) Tali sagt, sie müsse zum:zu der Ärzt:in gehen

Tali sagt	sie	müss-e	zu-m
/ zu der	Ärtz:in	gehen.	
Tali says.3SG.PRS	3SG.F.NOM	have_to.3SG.PRS-SUBJ	to-ART.DEF.DAT.M to
ART.DEF.DAT.F	doctor.div	go.INF	

‘Tali says she has to go to the doctor.’

3.3 Procedure

Participants read the information sheet and completed the consent form before beginning the task. Both instructional sheets were presented in English and German, and the task itself was conducted entirely in German. Conditions were tested within-subjects; all participants saw the

same stimuli in the same order. After selecting a choice in one question, the next appeared underneath; the questions were also blocked into three pages. This structure was intended to provide a sense of progression in an otherwise homogenous task.

After the AJT, participants could optionally provide demographic information, including first language, age (in categories), and gender⁷. Finally, participants could discuss in an open textbox which forms they preferred and their views on GIL. This order was chosen to reduce priming about GIL in the AJT; the instructions also discussed variation in personal reference nouns (*Variation von Personalbezeichnungen*) for this purpose.

3.4 Analysis

All analysis was scripted in R with tidyverse (Wickham *et al.*, 2019; R Core Team, 2025). The survey data arrived in a wide format (one participant per row) and was first transposed to a long format (one trial per row, total $n_{\text{trials}} = 2214$). Each question was coded with the GIL strategies it used, demographic information of the participant, and the response. This rating was coded as 1 for a preference to the neutralising form; 0 for no preference; and -1 for a preference to the diversifying form. There were no exclusionary criteria.

⁷ I asked participants whether they identified best as masculine, feminine, or nonbinary, and then in a second question whether they consider themselves transgender. This method does not distinguish between e.g. trans and cis men from the wider umbrella of being men.

4 Results

4.1 Participant demographics

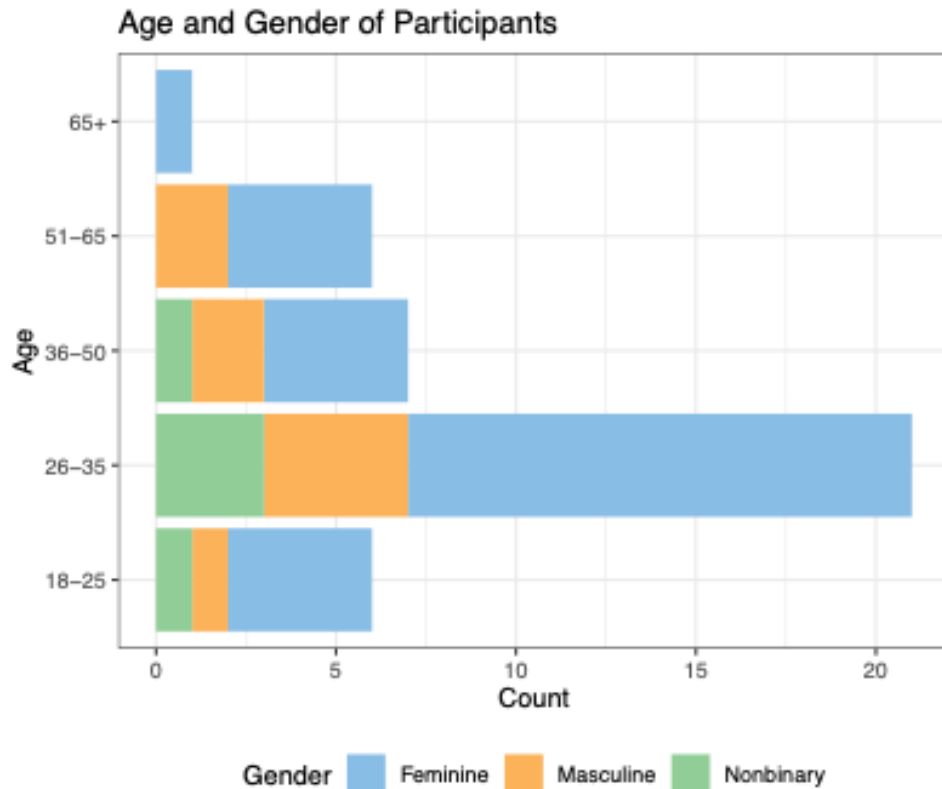


Figure 1: Age and gender of participants. Total $n = 41$.

Figure 1 shows age and gender information of the sample. Of 41 participants, 27 (65.85%) identified as women; 9 (21.95%) identified as men; 5 (12.20%) identified as nonbinary. Nobody identified as transgender. Most were native speakers: of 7 (17.07%) non-native speakers, 3 spoke English as their L1, 2 spoke Russian, and 1 spoke both Ukrainian and Russian.

Age was binned into 18–25, then subsequent 10 year increments until 65+. The majority of participants were in the 26–35 age range (21, 51.20%). There were at least 6 participants in each other bin, except for only one participant in the 65+ bin.

The effects of social factors were not the primary interest in this exploratory study, but the uneven gender distribution prevents further analysis in this dataset; greater care needs to be placed on recruitment for men and trans people. Age was adequately stratified in the 18–65 range.

4.2 AJT Ratings

4.2.1 Epicenes

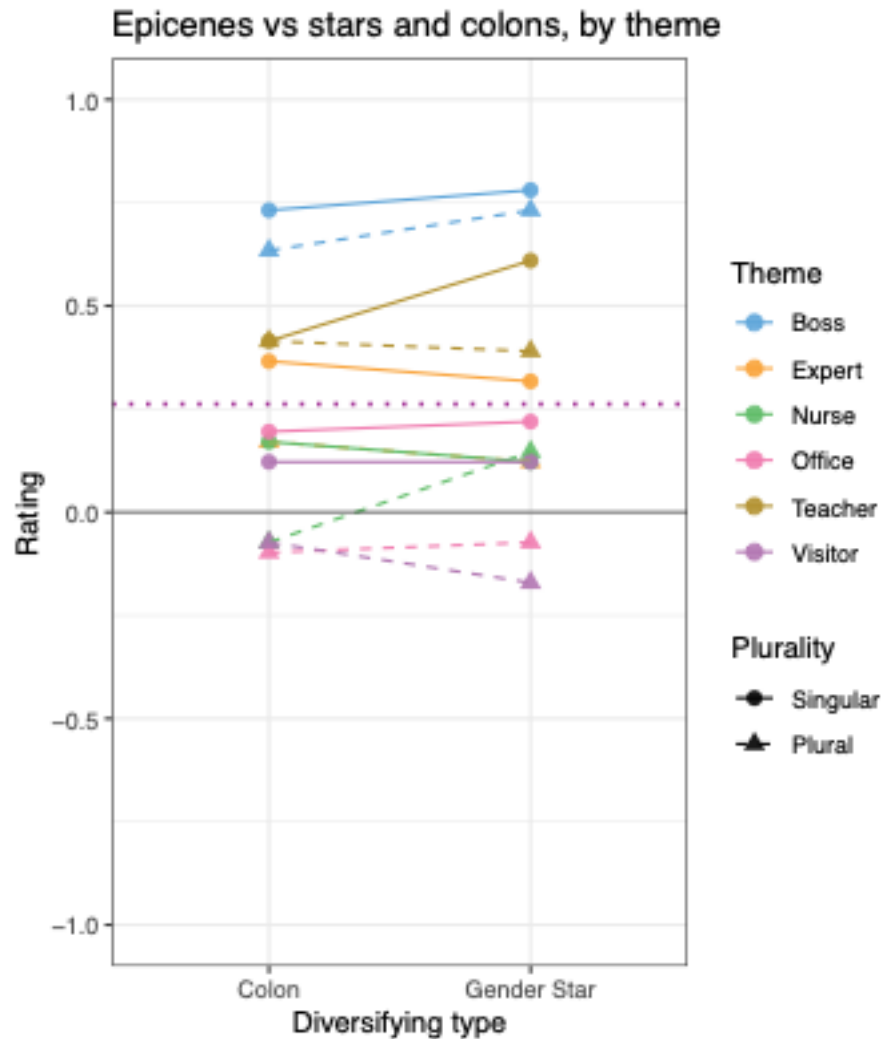


Figure 2: Epicenes vs stars and colon, by theme. Each theme is also separated by plurality. The purple dashed line represents the mean at 0.262. Trial $n = 984$.

Figure 2 shows the mean rating for questions testing epicenes, split by plurality, theme, and the type of diversifying form from each question. In all but 5 conditions, participants preferred the epicenes over the diversifying forms. Epicenes performed best in the boss theme (*Anführer(*:)*in ‘leader.DIV’ vs *Führungskraft* ‘leader.NEUT’) and worst in the visitor theme (*Besucher(*:)*in ‘visitor.DIV’ vs *Gast* ‘guest.M.NEUT’). The lowest rated point, comparing the plural gender star to plural epicene for visitor, is rated at -0.171.

4.2.2 Participles

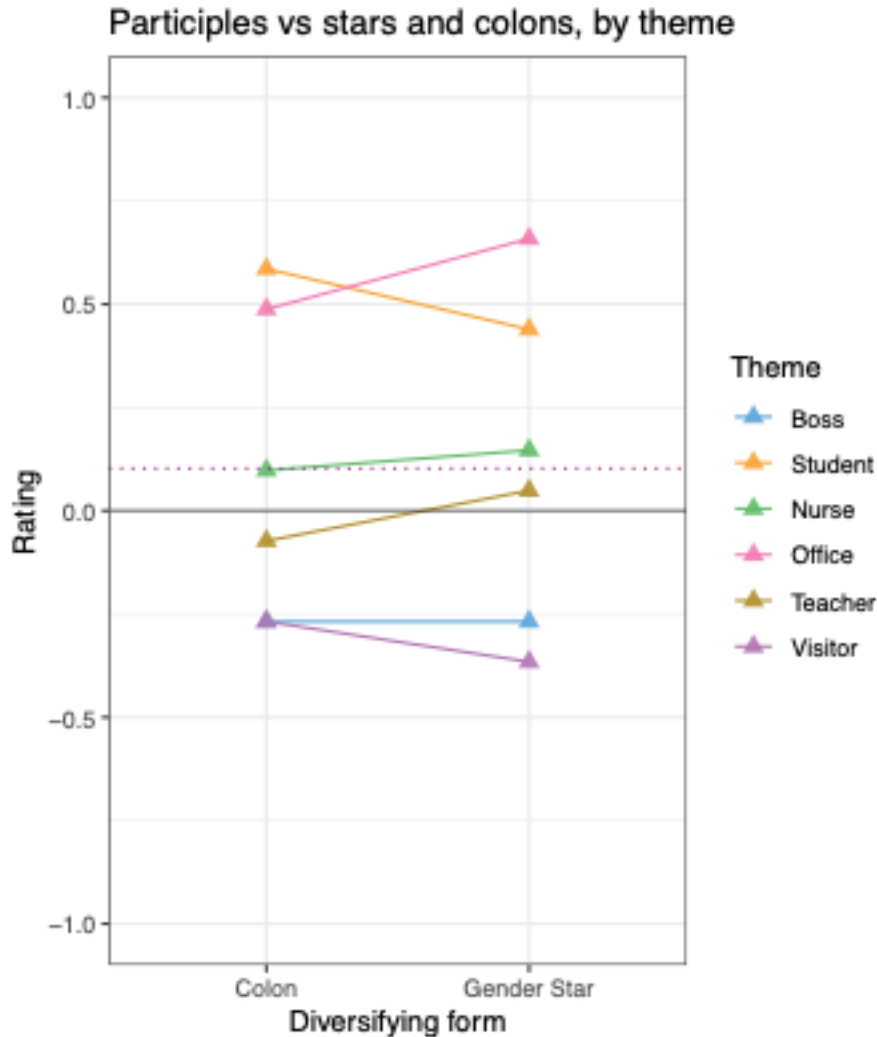


Figure 3: Participles vs stars and colon, by theme. The purple dashed line represents the mean at 0.102. Trial $n = 492$.

Figure 3 shows the mean rating for participles as with 2. The mean rating overall is lower than with epicenes at 0.102 ($\Delta y = -0.158$), and the lowest rated theme, visitor, is rated at -0.366. In the epicene condition, the boss theme was most highly rated; with the participles, it was second lowest (*Anführer(*:innen)* ‘leaders.DIV’ vs *Anführende* lit. ‘leading ones.NEUT’).

4.3 Inferential tests

Regression models were fit separately for the epicene and participle conditions. Epicenes had singular and plural trials, while participles were only available in plural. I tested both a linear mixed-effects model with random effects (LMER, from the lme4 package, Bates *et al.*, 2015 and lmerTest package, Kuznetsova *et al.*, 2017) and a cumulative link mixed model (CLMM, from Christensen, 2025). CLMMs are better suited for ordinal data and measure the probability of a participant choosing a higher level, i.e., the predictors that estimate a shift from no preference to a neutralising preference. Cumulative models may be better suited for AJT data

as it avoids a linear interpolation of ordinal data (Sönning *et al.*, 2024), while LMERs are more standard across general linguistics. Both types of models identified the same sets of predictors as significant. LMER results are reported below as standard, and the CLMMs are available in Appendix A.

Table 3: LMER for Epicenes. Significant predictors marked in bold. Reference levels were arbitrarily set to the gender star, boss theme, 18–25 age bracket, and singular subjects.

Predictor	β	SE	p
DIV: Colon	-0.028	0.041	0.4882
Theme: Expert	-0.476	0.071	<0.0001***
Theme: Nurse	-0.628	0.071	<0.0001***
Theme: Office	-0.659	0.071	<0.0001***
Theme: Teacher	-0.262	0.071	0.0002***
Theme: Visitor	-0.720	0.071	<0.0001***
Age: 26–35	-0.088	0.215	0.6838
Age: 36–50	0.088	0.258	0.7346
Age: 51–65	0.153	0.268	0.5725
Age: 65+	0.535	0.502	0.2937
Plural	-0.171	0.041	<0.0001***

*** $p < .001$, ** $p < .01$, * $p < .05$.

Table 3 shows the LMER results for the epicene condition. Theme was the most dominant predictor for variation. Compared to the reference category, the boss theme, all themes led to a preference towards the diversifying forms. Plurality was also significant: participants preferred epicenes in the singular and diversifying forms in the plural ($\beta = -0.171$, $p < 0.0001$). The type of punctuation used in diversifying forms was not found to be significant.

Age, while not a significant predictor, conformed to expected sociolinguistic patterns: older participants tended to prefer the neutralising forms, which did not include the new punctuation-based inflection (4). This pattern did not hold for the younger half of participants. The 26–35 year olds ($n = 21$) preferred diversifying forms slightly more than the 18–25 year olds ($n = 6$), but this was not found to be significant (in epicenes: $\beta = -0.088$, $p = 0.6838$).

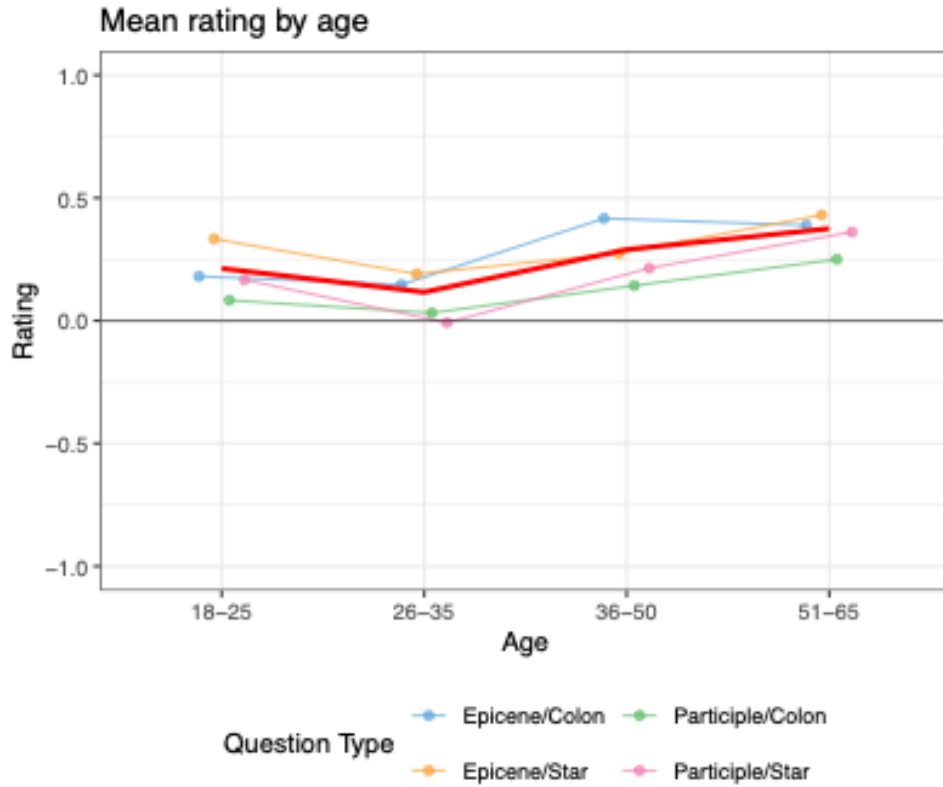


Figure 4: Age effects on AJT rating for both epicenes and participles.

Table 4 reports the LMER regression for the participles. Plurality was removed from the model as this condition was only available in the plural. The visitor theme (*Besucher(*:)innen* ‘visitors.DIV’ vs *Besuchende* ‘visiting ones.NEUT’, $\beta = -0.049$, $p = 0.6115$) was not found to be significant in this condition, but otherwise the results match the epicene condition. However, the expert theme should not be compared to the epicene expert theme (cf. tab. 3).

Table 4: LMER for Participles. Significant predictors marked in bold. Reference levels were arbitrarily set to the gender star, boss theme, and the 18–25 age bracket.

Predictor	β	SE	p
DIV: Colon	-0.016	0.055	0.7693
Theme: Student	0.780	0.096	<0.0001***
Theme: Nurse	0.390	0.096	<0.0001***
Theme: Office	0.841	0.096	<0.0001***
Theme: Teacher	0.256	0.096	0.0079**
Theme: Visitor	-0.049	0.096	0.6115
Age: 26–35	-0.113	0.234	0.6320

Predictor	β	SE	p
Age: 36–50	0.054	0.281	0.8501
Age: 51–65	0.181	0.292	0.5403
Age: 65+	-0.042	0.546	0.9396

*** $p < .001$, ** $p < .01$, * $p < .05$.

4.4 Participants' comments

Table 5: Categories of comments from participants.

Category	n
Neutralising preference	10
Neutralising exclusively	6
Conditional preferences	5
No preference	4
Diversifying preference	4
Against GIL	3
Unclear	2
Question criticism	2
Diversifying exclusively	1
<i>Total</i>	<i>37</i>

37 participants left comments about their thoughts on GIL; 5 categorises them by opinion. 16 (43.24%) said that they preferred neutralising forms, of which 6 participants (16.22% of total) exclusively promoted them. Neutralisation was consistently identified as viable for GIL only when the meaning was congruent with the standard GM form (e.g., *Lehrer* 'teacher' vs *Lehrkraft*, 'teacher.') or already commonplace (e.g., *Studierende* 'students'). Despite the attention on diversification (2), participants tended to prefer the alternatives. One mentioned they liked the gender star, but preferred the spelling regulations more, and thus avoided it. Another participant said the following, which characterised many of the responses:

Ich finde der Genderstern unterbricht den Lesefluss und macht grammatikalisch teilweise keinen Sinn. Gender neutrale Wörter wie Lehrende, Studierende, Pflegekräfte haben für mein empfinden den gleichen Effekt wie der Genderstern machen das lesen aber einfacher.

I find the gender star breaks up the reading flow and sometimes makes little grammatical sense. Gender neutral words like *Lehrende*, *Studierende*, *Pflegekräfte* [teachers, students (both participles), nurses, (epicene)] have the same effect in my experience as the gender star, but are easier to read.

(own translation)

Within the umbrella of diversifying forms, participants seemed to prefer the colon. This contrast was not found to be significant within the quantitative analysis, but 6 participants (16.22%) mentioned how the colon fit better or interrupted their reading flow less than the star. 2 participants (5.41%) specifically mentioned they had no preference between them.

Crucially, one participant discussed how the colon disrupts screenreaders, which recognise it as the introduction to a list; the star does not have this issue and is therefore more accessible. The accessibility of GIL is an ongoing discussion (cf. Giovine, 2026).

In short, participants accepted neutralising forms when they were appropriately synonymous with the typical RNs, and found diversifying forms acceptable so long as they were minimally visually disruptive. Reading flow, ease of use, accessibility, and intuitive meaning were the key criteria for using GIL.

5 Discussion

In sec. 4, I discussed how German speakers rate GIL strategies (RQ1) and the criteria that matter to them (RQ2). Here, I discuss frequency effects, overlooked in the original design of the study, and methodological limitations. In sec. 6 I will discuss the viability of neutralisation in GIL contexts (RQ3).

The results reported here and in Löhr (2021, 2022) demonstrate that neutralisation is the preferred GIL option of nonbinary people and the general public. Epicenes—nouns with a fixed grammatical gender and no social gender inflection—were rated higher in an acceptability judgement task than nominalised present participles (also neutral) and, critically, the gender star and colon, both of which were taken as the baseline expectation for GIL use in German. Regression tests showed that plurality (for epicenes) and theme were highly significant.

In the case of theme, these findings contradict Steriopolo and Schütze (2025, footnote 9)’s assumption of equal status between epicene and traditional role nouns lemmas. For example, one participant said the following:

Zum Beispiel ist ein*e Kolleg*in / Mitarbeitende nicht das gleiche wie eine Bürohilfe, nicht alle Lehrenden sind Lehrer*innen und ich würde bei einem Muse[u]m nicht von Gästen sprechen.

For example, a colleague/worker [star/participle] is not the same as an office hand [the epicene version in the office theme], and I wouldn’t talk about guests in a museum.

(own translation)

I verified with my language informant that a *Gast* ‘guest’ does make sense in a museum context, albeit as a rare alternative to *Besucher*in* and *Besuchende* ‘visitors, DIV/NEUT’. The

office question set was designed to test this assumption; in fig. 5, only this theme shows a higher rated participle over the epicene.

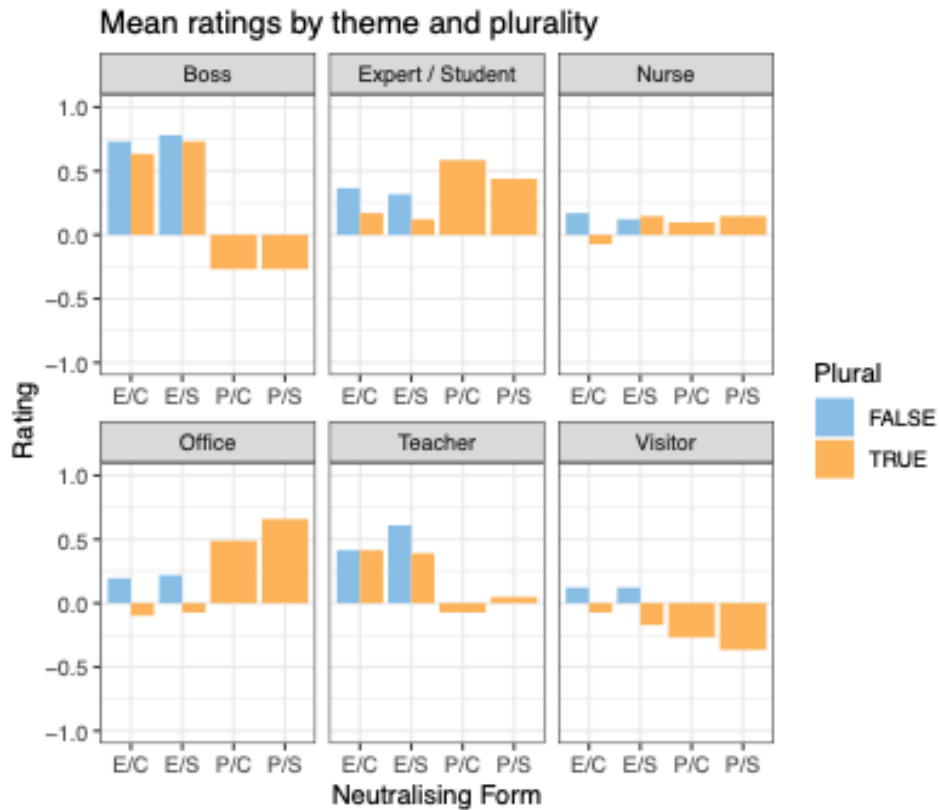


Figure 5: AJT rating by theme and plurality. The expert/student theme is not comparable across the epicene and participle conditions, cf. 3. *x*-axis labels shortened to initials of epicene, participle, star and colon.

5.1 Frequency effects

Regardless, theme remains the principal predictor for these findings. Some participants mentioned how neutralisations work only when ‘anpassend [fitting]’ or ‘gebräuchlich [common]’. To test this quantitatively, I re-used the KorAP corpus tool (Diewald *et al.*, 2024) via the RKorAPClient package (Kupietz *et al.*, 2020) to quickly compare whether lexical frequency was a quantifiable predictor, not just a qualitative one. I queried for the lexical frequency of each neutralising form’s lemma (code available in Appendix D) and calculated the log relative frequency as shown in 6. I fit a new linear model predicting AJT rating by this frequency, with participant ID as a random effect, and found a small but significant effect ($\beta = 0.09956$, $p < 0.0001$), illustrated in 6.

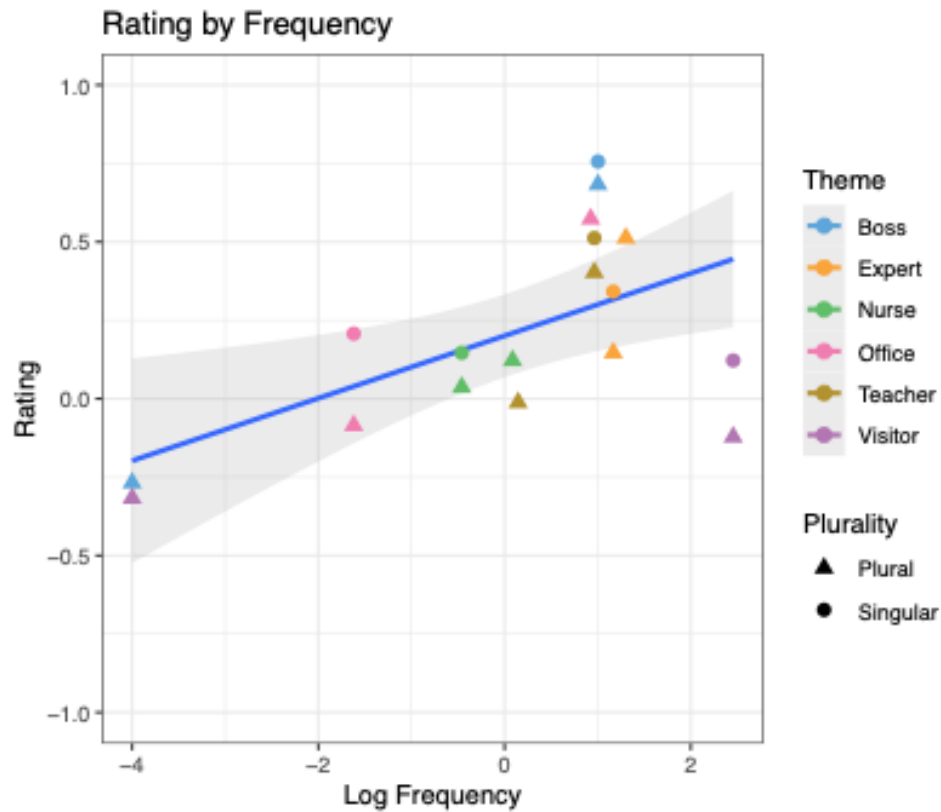


Figure 6: AJT rating by log frequency for both epicenes and participles. Points are split by theme and plurality; regression models only rating and frequency.

Table 6: KorAP frequency results, ordered most to least frequent. The asterisk * marks epicenes. Lemmas in *italics* denote the typical agentive forms of participles (i.e., nominalised with the more common *-er* suffix).

Lemma	Theme	$\log_{10}(\text{Freq})$	Total <i>n</i>
Gast*	Visitor	2.4549927	7051330
Mitarbeiter	Office	2.3589569	5652430
Besucher	Visitor	2.2523044	4421633
Lehrer	Teacher	1.9220753	2067061
Studierende	Expert/STUDENT	1.3029594	496862
Fachkraft*	EXPERT/Student	1.1673806	363627
Führungskraft*	Boss	1.0034185	249283
Lehrkraft*	Teacher	0.9634460	227363
Mitarbeitende	Office	0.9247524	207982

Lemma	Theme	$\log_{10}(\text{Freq})$	Total <i>n</i>
Anführer	Boss	0.8556885	177403
Pfleger	Nurse	0.7591305	142037
Lehrende	Teacher	0.1459918	34613
Pflegende	Nurse	0.0855544	30116
Betreuungsperson*	Nurse	-0.4600711	8572
Bürohilfe*	Office	-1.6198773	591
Anführende	Boss	-4.0000000	0
Besuchende	Visitor	-4.0000000	0

Frequency explains why *Studierende* ‘students.NEUT’ and *Mitarbeitende* ‘employees.NEUT’ are rated markedly more acceptable than the rarer participles. *Mitarbeitende* itself was somewhat uncommon, but the log frequency of its agentive form, *Mitarbeiter* was 2.359. From this quick pilot, it appears that a higher frequency agentive form promotes participle adoption if there is no epicene already in use: *Lehrkraft* ‘teaching team’ is already common and thus *Lehrende*, lit. ‘teaching ones’ is masked. One participant also said that *Lehrende* also scopes instructors, not just teachers, while *Lehrer* is strictly the latter.

Habituation effects have previously been reported with GIL (Gustafsson Sendén *et al.*, 2021); further research should investigate frequency and semantic theme and denotation interactions as this study was not designed around differentiating these finer factors. Moreover, for assessing frequency, a more suitable and recent corpus would be more appropriate. The OKK and, more widely, KorAP, focus on professional texts across the DACH region (Germany, Austria, and Switzerland), so the frequency data here does not reflect how often the population use GIL in everyday contexts.

5.2 Methodological improvements

Two methodological issues limited the results of this study. First, the questions I wrote were near-native but included some idiomatic or slight functional mistakes, as some participants noted. In this case, as sentences were minimally paired, both options per question would have the same issue and cancel each other out. Greater work will be placed on verifying and proofreading with other German speakers for future tasks.

Second, the pseudo-forced choice AJT procedure used here included only an ‘equally acceptable’ option, meaning participants could not indicate when neither option was acceptable. I wanted to avoid opportunities to generally evaluate GIL until the end. In the open text box at the end, some participants did express they preferred the GM, but the lack of an option for similar people to express that sooner may have caused them to give up. One potential participant contacted me to say the language mistakes and lack of an unacceptable option did

cause them to close the survey. A future version of the task will be designed to prevent more cases like this.

6 Conclusion: the viability of neutralisation

Throughout, this dissertation has explored how neutralisation avoids the current political backlash against GIL (2.1) and is rated as well as, if not more acceptably, than diversifying forms like the gender star. In this study, *acceptable* has referred to being well-written and thus indirectly as a measure of comprehensibility and familiarity.

From these results it is clear that neutralisation cannot be ignored as an option in GIL research and policy. Participants found this language acceptable, and nonbinary people find it more affirming and representative than the current options available. By using epicenes and participles, the gender spectrum model is integrated into the lexicon; neutralisation normalises nonbinarity. To adopt this language more, three outstanding issues must be solved.

First, neutralisation is not nearly as productive as the multigendering approaches, which have the current inflection system as foundation. To date, no list of epicenes or participles has been collated and no corpus tags them. In order to understand how German speakers understand and use neutral language, they must be given the same attention in corpus work as the star and colon. In future, I plan to do so through social media mining, which has been shown to reflect everyday language use (cf. Tagliamonte and Denis, 2008).

Second, the denotations of each noun needs to be explored with greater detail. *Lehrende*'s scope is wider than *Lehrer:innen*, and a *Bürohilfe* 'office hand' has different connotations (and indeed sits lower in the office hierarchy) to a *Kolleg:in* 'colleague' or *Mitarbeiter:in* 'employee'. In which other contexts does this matter? What are the status associations of epicenes, and what are the stereotypes outside of gender ratios?

Last, the field must change how it approaches GIL. The most available corpora are sourced from newspapers and professional texts; affirmative language policy for gender minorities does improve employment opportunities (Sczesny *et al.*, 2016; Kleiss and Waiguny, 2025) and wellbeing (Di Luigi *et al.*, 2025). However, these contexts and research goals ignore everyday language use and the environments where individuals will use gendered / gender-inclusive language. If the goal of the field is to promote equality and inclusion for gender minorities, it must take a ground-up approach. The field must listen to the primary stakeholders—women, transgender, and gender diverse people—and investigate how the wider language community already treats and uses this language, instead of just the attitudes of policymakers, political activists, and publishers. Löhr (2021, 2022) found that the *de facto* default for GIL, the gender star, was not as fitting for nonbinary people—whom diversification strategies is designed to include—as previously expected. I found that neutralisation, their preference, makes little difference for the wider language community.

Overall, GIL research has shown that backlash is ever present to language change, especially for deeply-embedded features such as gender agreement. This study represented one exploration into GIL implementation practice; the work done here will be taken into further studies to explore the everyday use of GIL, outstanding issues that prevent further adoption,

and the ways in which nonbinary people in particular use and relate to this language. Future research must now explore exactly where alternatives succeed and fail from a ground-up approach, starting with the community, before focusing on policy. As researchers of a politicised minority group, our approach must promote justice, good ethical practice, especially with the poor state of transgender and gender-diverse language (see T'Sjoen *et al.*, 2020). Advocating for, and researching, neutral alternatives like epicenes and participles may achieve these goals and please all stakeholders at the same time.

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Appendix A CLMM results

Table 7: CLMM regression for Epicenes. Significant predictors marked in bold. Reference levels were arbitrarily set to the gender star, boss theme, 18–25 age bracket, and singular subjects.

Predictor	β	SE	p
–1 0	-4.421	0.855	<0.0001***
0 1	-2.646	0.846	0.0018**
DIV: Colon	-0.106	0.140	0.4494
Theme: Expert	-1.856	0.268	<0.0001***
Theme: Nurse	-2.298	0.270	<0.0001***
Theme: Office	-2.464	0.277	<0.0001***
Theme: Teacher	-1.207	0.269	<0.0001***
Theme: Visitor	-2.669	0.283	<0.0001***
Age: 26–35	-0.721	0.912	0.4293
Age: 36–50	-0.022	1.089	0.9838
Age: 51–65	0.204	1.132	0.8571
Age: 65+	1.710	2.124	0.4206
Plural	-0.638	0.142	<0.0001***

Table 8: CLMM regression for Participles. Significant predictors marked in bold. Reference levels were arbitrarily set to the gender star, boss theme, and the 18–25 age bracket.

Predictor	β	SE	p
–1 0	-0.658	0.933	0.4805
0 1	1.480	0.937	0.1144
DIV: Colon	-0.044	0.199	0.8249
Theme: Expert	2.689	0.372	<0.0001***
Theme: Nurse	1.435	0.348	<0.0001***
Theme: Office	3.027	0.387	<0.0001***
Theme: Teacher	0.983	0.341	0.0040**
Theme: Visitor	-0.185	0.351	0.5982
Age: 26–35	-0.733	1.011	0.4685
Age: 36–50	0.058	1.217	0.9621
Age: 51–65	0.388	1.256	0.7575
Age: 65+	-0.541	2.299	0.8138

*** $p < .001$, ** $p < .01$, * $p < .05$.

Appendix B Paired questions data

Table 9: Sentence pairs in order of appearance.

Q	Theme	Sentence 1	Sentence 2	Filler
1	Expert	Expert*innen können oft komplizierte Themen besprechen.	Fachkräfte können oft komplizierte Themen besprechen.	
2	Teacher	Lehrerinnen müssen mit vielen Studierenden auf der Hut sein.	Mit vielen Studierenden müssen Lehrerinnen aufmerksam sein.	*
3	Office	Eine Bürohilfe soll jede Woche an Meetings teilnehmen.	Ein*e Kolleg*in soll jede Woche an Meetings teilnehmen.	
4	Nurse	In der Uni müssen Krankenpflegende auch praktisch lernen.	Krankenpflegende müssen in der Uni auch praktisch lernen.	*
5	Expert	Ein*e Expert*in kann oft komplizierte Themen besprechen.	Eine Fachkraft kann oft komplizierte Themen besprechen.	
6	Nurse	Pflegende müssen im Miteinander sehr einfühlsam sein.	Krankenpfleger*innen müssen im Miteinander sehr einfühlsam sein.	
7	Teacher	Eine Lehrkraft muss durch das ganze Jahr fleißig arbeiten.	Ein*e Lehrer*in muss durch das ganze Jahr fleißig arbeiten.	
8	Visitor	Ein Souvenir dürfen Gäste am Ende der Tour kaufen.	Gäste dürfen am Ende der Tour ein Souvenir kaufen.	*

Q	Theme	Sentence 1	Sentence 2	Filler
9	Boss	Anführer:innen sollen mit gutem Beispiel vorangehen.	Führungskräfte sollen mit gutem Beispiel vorangehen.	
10	Expert	Studierende können oft komplizierte Themen besprechen.	Student:innen können oft komplizierte Themen besprechen.	
11	Nurse	Krankenpfleger:innen müssen im Miteinander sehr einfühlsam sein.	Pflegende müssen im Miteinander sehr einfühlsam sein.	
12	Boss	Mein Chef sollte mir Emails schicken weniger!	Mir sollte mein Chef weniger Emails schicken!	*
13	Nurse	Betreuungspersonen müssen im Miteinander sehr einfühlsam sein.	Krankenpfleger*innen müssen im Miteinander sehr einfühlsam sein.	
14	Teacher	Lehrer:innen müssen durch das ganze Jahr fleißig arbeiten.	Lehrkräfte müssen durch das ganze Jahr fleißig arbeiten.	
15	Nurse	In der Uni muss eine Krankenpflegerin auch praktisch lernen.	Eine Krankenpflegerin muss in der Uni auch praktisch lernen.	*
16	Office	Ein:e Kolleg:in soll jede Woche an Meetings teilnehmen.	Eine Bürohilfe soll jede Woche an Meetings teilnehmen.	
17	Office	Mein Kollege soll alle unserer Dokumente durchlesen.	Durch alle Dokumente soll mein Kollege lesen.	*
18	Teacher	Lehrkräfte müssen durch das ganze Jahr fleißig arbeiten.	Lehrer*innen müssen durch das ganze Jahr fleißig arbeiten.	

Q	Theme	Sentence 1	Sentence 2	Filler
19	Visitor	Gäste dürfen die Exponate im Museum nicht anfassen.	Besucher:innen dürfen die Exponate im Museum nicht anfassen.	
20	Visitor	Ein Besucher darf ein Souvenir kaufen am Ende der Tour.	Ein Souvenir darf ein Besucher am Ende der Tour kaufen.	*
21	Boss	Mir sollte mein Chef weniger Emails schicken!	Mein Chef sollte mir Emails weniger schicken!	*
22	Teacher	Lehrende müssen durch das ganze Jahr fleißig arbeiten.	Lehrer:innen müssen durch das ganze Jahr fleißig arbeiten.	
23	Visitor	Ein*e Besucher*in darf die Exponate im Museum nicht anfassen.	Ein Gast darf die Exponate im Museum nicht anfassen.	
24	Office	Durch alle Dokumente sollen meine Kolleg*innen lesen.	Meine Kolleg*innen sollen alle unserer Dokumente durchlesen.	*
25	Expert	Eine Fachkraft kann oft komplizierte Themen besprechen.	Ein*e Expert*in kann oft komplizierte Themen besprechen.	
26	Teacher	Mit vielen Studierenden muss eine Lehrerin aufmerksam sein.	Eine Lehrerin muss mit vielen Studierenden auf der Hut sein.	*
27	Office	Kolleg*innen sollen jede Woche an Meetings teilnehmen.	Mitarbeitende sollen jede Woche an Meetings teilnehmen.	
28	Visitor	Besuchende dürfen die Exponate im Museum nicht anfassen.	Besucher:innen dürfen die Exponate im Museum nicht anfassen.	

Q	Theme	Sentence 1	Sentence 2	Filler
29	Office	Kolleg*innen sollen jede Woche an Meetings teilnehmen.	Bürohilfen sollen jede Woche an Meetings teilnehmen.	
30	Boss	Die Führungskräfte hier sollten mir Emails weniger schicken!	Mir sollten die Führungskräfte hier weniger Emails schicken!	*
31	Nurse	Eine Betreuungsperson muss im Miteinander sehr einfühlsam sein.	Ein:e Krankenpfleger:in muss im Miteinander sehr einfühlsam sein.	
32	Office	Kolleg:innen sollen jede Woche an Meetings teilnehmen.	Mitarbeitende sollen jede Woche an Meetings teilnehmen.	
33	Visitor	Ein Souvenir darf ein Besucher am Ende der Tour kaufen.	Ein Besucher darf am Ende der Tour ein Souvenir kaufen.	*
34	Teacher	Lehrer*innen müssen durch das ganze Jahr fleißig arbeiten.	Lehrende müssen durch das ganze Jahr fleißig arbeiten.	
35	Boss	Eine Führungskraft soll mit gutem Beispiel vorangehen.	Ein:e Anführer:in soll mit gutem Beispiel vorangehen.	
36	Expert	Einer Expertin können Interviews helfen, um die Öffentlichkeit besser zu erreichen.	Interviews können einer Expertin helfen, die Öffentlichkeit zu erreichen.	*
37	Boss	Führungskräfte sollen mit gutem Beispiel vorangehen.	Anführer*innen sollen mit gutem Beispiel vorangehen.	

Q	Theme	Sentence 1	Sentence 2	Filler
38	Nurse	Eine Krankenpflegerin muss auch lernen praktisch in der Uni.	In der Uni muss eine Krankenpflegerin auch praktisch lernen.	*
39	Visitor	Besucher*innen dürfen die Exponate im Museum nicht anfassen.	Gäste dürfen die Exponate im Museum nicht anfassen.	
40	Boss	Anführer:innen sollen mit gutem Beispiel vorangehen.	Anführende sollen mit gutem Beispiel vorangehen.	
41	Nurse	Ein*e Krankenpfleger*in muss im Miteinander sehr einfühlsam sein.	Eine Betreuungsperson muss im Miteinander sehr einfühlsam sein.	
42	Teacher	Eine Lehrerin muss aufmerksam sein mit vielen Studierenden.	Mit vielen Studierenden muss eine Lehrerin aufmerksam sein.	*
43	Expert	Studierende können oft komplizierte Themen besprechen.	Student*innen können oft komplizierte Themen besprechen.	
44	Office	Bürohilfen sollen jede Woche an Meetings teilnehmen.	Kolleg:innen sollen jede Woche an Meetings teilnehmen.	
45	Visitor	Ein:e Besucher:in darf die Exponate im Museum nicht anfassen.	Ein Gast darf die Exponate im Museum nicht anfassen.	
46	Expert	Expert:innen können Interviews helfen, um die Öffentlichkeit besser zu erreichen.	Interviews können Expert:innen helfen, die Öffentlichkeit zu erreichen.	*

Q	Theme	Sentence 1	Sentence 2	Filler
47	Boss	Eine Führungskraft soll mit gutem Beispiel vorangehen.	Ein*e Anführer*in soll mit gutem Beispiel vorangehen.	
48	Boss	Anführende sollen mit gutem Beispiel vorangehen.	Anführer*innen sollen mit gutem Beispiel vorangehen.	
49	Visitor	Besuchende dürfen die Exponate im Museum nicht anfassen.	Besucher*innen dürfen die Exponate im Museum nicht anfassen.	
50	Expert	Interviews können einer Expertin helfen, die Öffentlichkeit zu erreichen.	Einer Expertin können Interviews um die Öffentlichkeit besser zu erreichen helfen.	*
51	Nurse	Krankenpfleger:innen müssen im Miteinander sehr einfühlsam sein.	Betreuungspersonen müssen im Miteinander sehr einfühlsam sein.	
52	Office	Durch alle Dokumente soll mein Kollege lesen.	Mein Kollege soll unsere Dokumente durch alle lesen.	*
53	Teacher	Eine Lehrkraft muss durch das ganze Jahr fleißig arbeiten.	Ein:e Lehrer:in muss durch das ganze Jahr fleißig arbeiten.	
54	Expert	Expert*innen können oft komplizierte Themen besprechen.	Fachkräfte können oft komplizierte Themen besprechen.	

Appendix C Sentence generation code

```
from weakref import WeakSet

class NounSet:
    """Contains all information associated with a lexical item in the survey."""

    instances = WeakSet()
    index = 0

    def __init__(self, name: str, verb: tuple, sentence: str, filler: dict, **kwargs: tuple) -> None:
        self.name = name
        """Associated theme."""
        self.verb = self._encode(verb)
        self.sentence = sentence
        self.filler = filler

        NounSet.frame_properties = ['name', 'verb', 'sentence', 'filler']
        NounSet.instances.add(self)
        self.__dict__.update((attr, self._encode(val)) for attr, val in kwargs.items() if attr not in NounSet.frame_properties)
        pass

    def _encode(self, bare_form) -> dict[str, str]:
        """Turn a list of declined forms into a dictionary."""
        return {'s': bare_form[0], 'p': bare_form[1]}

    def generate_paradigm(self) -> list[str]:
        """Generate individual paradigm, i.e., all combinations of sentence + subject."""
        output = []

        for attr, val in self.__dict__.items(): # Go through all the constructions
            if attr in NounSet.frame_properties: #Filter out non-noun properties
                continue
```

```
for key, value in val.items():
    if str(value) == '0': # Skip a non-existing form
        continue

    output.append(' '.join([value,self.verb[key],self.sentence])) # Noun + verb (s/p) + sentence end
return output

@classmethod
def collect_paradigms(cls) -> list[str]:
    """Write all paradigms to a list."""
    output = []

    instances = list(NounSet.instances)
    noun: NounSet
    for noun in instances:
        paradigm = noun.generate_paradigm()
        output += paradigm
    return output

@classmethod
def generate_by_condition(cls,condition: str, plural: bool):

    if condition in NounSet.frame_properties:
        raise ValueError(f'{NounSet.frame_properties} are reserved.')
    instances = list(NounSet.instances)
    pl = 'p' if plural is True else 's'
    noun: NounSet
    for noun in instances:
        if condition == 'participle' and not plural:
            continue
        attr = getattr(noun,condition) # type: tuple
```

```
sentence = ' '.join([attr[pl],noun.verb[pl],noun.sentence]) # type: ignore
yield (noun.name,sentence)
NounSet.index += 1
```

@classmethod

def write_to_csv(cls) -> None:

"""Write all stimulae (including fillers) in an ordered csv format."""

NounSet.index = 0

with open('stim_gen/stimulae_ordered.csv','w+',encoding='utf-8') as f:

f.write('idx;condition;theme;pl;sentence\n')

for condition in ['epicene','participle','star','colon']:

[f.write(f'{NounSet.index};{condition};{_[0]};FALSE;{_[1]}\n') for _ in NounSet.generate_by_condition(condition,False)]

[f.write(f'{NounSet.index};{condition};{_[0]};TRUE;{_[1]}\n') for _ in NounSet.generate_by_condition(condition,True)]

[f.write(f'{NounSet.index};filler_obj;{_[0]};FALSE;{_[1]}\n') for _ in NounSet.write_filler('obj',False)]

[f.write(f'{NounSet.index};filler_obj;{_[0]};TRUE;{_[1]}\n') for _ in NounSet.write_filler('obj',True)]

[f.write(f'{NounSet.index};filler_alt;{_[0]};FALSE;{_[1]}\n') for _ in NounSet.write_filler('alt',False)]

[f.write(f'{NounSet.index};filler_alt;{_[0]};TRUE;{_[1]}\n') for _ in NounSet.write_filler('alt',True)]

[f.write(f'{NounSet.index};filler_odd;{_[0]};FALSE;{_[1]}\n') for _ in NounSet.write_filler('odd',False)]

@classmethod

def write_filler(cls,condition,plural: bool):

instances = list(NounSet.instances)

pl = 'p' if plural is True else 's'

noun: NounSet

for noun in instances:

-- OBJ condition --

if condition == 'obj':

yield (noun.name,' '.join(

[

noun.filler['obj'][0],noun.filler['verb'][pl],noun.filler['noun'][pl],noun.filler['obj'][1]

]

```
))
NounSet.index += 1

# -- ALT condition --
elif condition == 'alt':
    # Captialisation
    subj = noun.filler['noun'][p][0].upper() + noun.filler['noun'][p][1:]

    yield (noun.name, ''.join(
        [
            subj, noun.filler['verb'][p], noun.filler['alt']
        ]
    ))
    NounSet.index += 1

elif condition == 'odd':
    subj = noun.filler['noun'][p][0].upper() + noun.filler['noun'][p][1:]

    yield (noun.name, ''.join(
        [
            subj, noun.filler['verb'][p], noun.filler['odd']
        ]
    ))
    NounSet.index += 1

else:
    raise ValueError
```

```
# ---- Noun Sets ---- #
```

```
teacher = NounSet(  
    name='teacher',  
    epicene=('Eine Lehrkraft', 'Lehrkräfte'),  
    participle=(0, 'Lehrende'),  
    star=('Ein*e Lehrer*in', 'Lehrer*innen'),  
    colon=('Ein:e Lehrer:in', 'Lehrer:innen'),  
    verb=('muss', 'müssen'),  
    sentence='durch das ganze Jahr fleißig arbeiten.',  
    filler={  
        'noun': {'s': 'eine Lehrerin', 'p': 'Lehrerinnen'},  
        'obj': ('Mit vielen Studierenden', 'aufmerksam sein.'),  
        'alt': 'mit vielen Studierenden auf der Hut sein.',  
        'odd': 'aufmerksam sein mit vielen Studierenden.',  
        'verb': {'s': 'muss', 'p': 'müssen'}  
    }  
)
```

```
office = NounSet(  
    name='office',  
    epicene=('Eine Bürohilfe', 'Bürohilfen'),  
    participle=(0, 'Mitarbeitende'),  
    star=('Ein*e Kolleg*in', 'Kolleg*innen'),  
    colon=('Ein:e Kolleg:in', 'Kolleg:innen'),  
    verb=('soll', 'sollen'),  
    sentence='jede Woche an Meetings teilnehmen.',  
    filler={  
        'noun': {'s': 'mein Kollege', 'p': 'meine Kolleg*innen'},  
        'obj': ('Durch alle Dokumente', 'lesen.'),  
        'alt': 'alle unserer Dokumente durchlesen.',  
        'odd': 'unsere Dokumente durch alle lesen.',  
        'verb': {'s': 'soll', 'p': 'sollen'}  
    }  
)
```

```
nurse = NounSet(  
    name='nurse',  
    star=('Ein*e Krankenpfleger*in','Krankenpfleger*innen'),  
    colon=('Ein:e Krankenpfleger:in','Krankenpfleger:innen'),  
    epicene=('Eine Betreuungsperson','Betreuungspersonen'),  
    participle=('0','Pflegende'),  
    verb=('muss','müssen'),  
    sentence=('im Miteinander sehr einfühlsam sein.'),  
    filler={  
        'noun':{'s':'eine Krankenpflegerin','p':'Krankenpflegende'},  
        'obj':('In der Uni','auch praktisch lernen.'),  
        'alt':('in der Uni auch praktisch lernen.'),  
        'odd':('auch lernen praktisch in der Uni.'),  
        'verb':{'s':'muss','p':'müssen'}  
    }  
)
```

```
boss = NounSet(  
    name='boss',  
    star=('Ein*e Anführer*in','Anführer*innen'),  
    colon=('Ein:e Anführer:in','Anführer:innen'),  
    epicene=('Eine Führungskraft','Führungskräfte'),  
    participle=('0','Führende'),  
    verb=('soll','sollen'),  
    sentence=('mit gutem Beispiel vorangehen.'),  
    filler={  
        'noun':{'s':'mein Chef','p':'die Führungskräfte hier'},  
        'obj':('Mir','weniger Emails schicken!'),  
        'alt':('mir Emails weniger schicken!'),  
        'odd':('mir Emails schicken weniger!'),  
        'verb':{'s':'sollte','p':'sollten'}  
    }  
)
```

)

```
expert = NounSet(  
    name='expert',  
    star=('Ein*e Expert*in', 'Expert*innen'),  
    colon=('Ein:e Expert:in', 'Expert:innen'),  
    epicene=('Eine Fachkraft', 'Fachkräfte'),  
    participle=('0', 'Studierende'), # Exclude this one from its own analysis, since different word  
    verb=('kann', 'können'),  
    sentence=('oft komplizierte Themen besprechen.'),  
    filler={  
        'noun': {'s': 'einer Expertin', 'p': 'Expert:innen'},  
        'obj': ('Interviews', 'helfen, die Öffentlichkeit zu erreichen.'),  
        'alt': 'Interviews helfen, um die Öffentlichkeit besser zu erreichen.',  
        'odd': 'Interviews um die Öffentlichkeit besser zu erreichen helfen.',  
        'verb': {'s': 'können', 'p': 'können'} # n is dativ  
    }  
)
```

```
visitor = NounSet(  
    name='visitor',  
    star=('Ein*e Besucher*in', 'Besucher*innen'),  
    colon=('Ein:e Besucher:in', 'Besucher:innen'),  
    epicene=('Ein Gast', 'Gäste'),  
    participle=('0', 'Besuchende'),  
    verb=('darf', 'dürfen'),  
    sentence=('die Exponate im Museum nicht anfassen.'),  
    filler={  
        'noun': {'s': 'ein Besucher', 'p': 'Gäste'},  
        'obj': ('Ein Souvenir', 'am Ende der Tour kaufen.'),  
        'alt': 'am Ende der Tour ein Souvenir kaufen.',  
        'odd': 'ein Souvenir kaufen am Ende der Tour.',  
        'verb': {'s': 'darf', 'p': 'dürfen'}  
    }
```

```
}  
)
```

```
NounSet.write_to_csv()
```

Appendix D Analysis code

Data cleaning, coding, and wrangling

Load libraries.

```
library(tidyverse)
library(readxl)
```

Define questions by which condition was A or B.

```
div_first <- as.character(c(1, 5, 9, 11, 14, 16, 23, 27, 29, 32, 34, 39, 40, 41, 45, 51, 54)) # A = div
neut_first <- as.character(c(3, 6, 7, 10, 13, 18, 19, 22, 25, 28, 31, 35, 37, 43, 44, 47, 48, 49, 53)) # A = neut
fillers <- as.character(c(1:54))
fillers <- fillers[!fillers %in% c(div_first, neut_first)]
```

Load all data.

```
# Question data to merge later
q_data <- read_excel('./stim_gen/Stimulae_paired.xlsx', sheet = 'Questions') %>%
  mutate(.keep='unused', Q = Qidx) %>%
  select(c(Q, Factor, Theme, Plural, Filler))

# Responses
df <- read_excel('./Data/DISS_DATA.xlsx')

# Pull out comments
comments <- pull(.data = df,
  var = `Diese Frage enthielten eine Vielfalt gendergerechter Strategien (zB der Genderstern). Welche
passt Sie am Besten? Haben Sie andere Bemerkungen?`)
write.csv(x=comments, file='./Output/comments.txt')

df <- df %>%
  # Remove emails, comments and consent (it's required to progress, so all received participants have
  consented)
  select(!c(Email, Name, Language, 'Weiterer Kontakt', 'E-mail', 'Consent / Zustimmung', `Diese Frage enthielten
eine Vielfalt gendergerechter Strategien (zB der Genderstern). Welche passt Sie am Besten? Haben Sie andere
Bemerkungen?`)) %>%

  # Calculate duration ----
  mutate_at(.vars=c('Start time', 'Completion time'), .funs = ~(strptime(., format = "%Y-%m-%d %H:%M:%S"))) %>%
  rowwise() %>%
  mutate(.after='Start time', .keep='unused', Duration=as.numeric(difftime(time1 = `Completion time`, `Start
time`, units='s')))) %>%
  ungroup() %>%

  # Change Q names to the Q number ----
  rename_with(.cols=starts_with("Ist Satz"), .fn = ~as.character(seq_along(.))) %>%

  # Code social data ----
```

```

mutate(.keep='unused',Deutsch_L1=ifelse(`Meine Erstsprache ist...`=='Deutsch',yes = TRUE,no =
FALSE))%>%
mutate(.keep='unused',Age=`Ich bin ... Jahre alt`)%>%
mutate(.keep='unused',Gender=`... beschreibt am Besten mein Geschlecht.`)%>%
mutate(.keep='unused',Trans=ifelse(`Würden Sie sich als Trans* bezeichnen?`=='Ja',TRUE,FALSE))%>%

# Code questions to c(-1,0,1) rating (from A,B,C) ----
rowwise()%>%
mutate_at(.vars=as.character(c(1:54)),.funs = ~substr(.,0,1))%>% #Turns to just A, B, C
mutate_at(.vars=div_first,.funs=~switch(.,'A'=-1,'B'=1,'C'=0))%>%
mutate_at(.vars=neut_first,.funs=~switch(.,'A'=1,'B'=-1,'C'=0))%>%
mutate_at(.vars=fillers,.funs=~switch(.,'A'=1,'B'=-1,'C'=0))%>% # Meaningless
mutate_at(.vars=as.character(c(1:54)),.funs = ~as.numeric(.))%>% # Formats to all numerical
ungroup()%>%

# Transpose to long ----
pivot_longer(cols = as.character(c(1:54)),names_to='Q',values_to='Rating')%>%

# Add in question type data
mutate(Q=as.numeric(Q))%>%
left_join(y=q_data,by = 'Q')%>%
mutate(across(c(Rating,Id,Q,Duration),as.integer))%>%
mutate(across(Id,.fns = ~.-2))%>%

# Decode factor ----
mutate(
  Star=ifelse(Factor %in% c(0,2),TRUE,FALSE),
  Colon=ifelse(Factor %in% c(1,3),TRUE,FALSE),
  Epicene=ifelse(Factor %in% c(0,1),TRUE,FALSE),
  Participle=ifelse(Factor %in% c(2,3),TRUE,FALSE),
  Filler_Type=case_match(Factor, c(0:3)~0, 4~1, 5~2)
)%>%

# Rearrange
select(Q, Id, Duration, Deutsch_L1, Age, Gender, Trans, Theme, Plural, Filler, Filler_Type, Factor, Star, Colon,
Epicene, Participle, Rating)%>%
write_excel_csv(file = './Output/TIDIED_DATA.csv')

# Export summaries ----
export_sums<-df%>%
filter(Filler==F)%>%
# Rename for clarity
mutate(Factor=case_when(
  Factor==0~'0: Epicene/Star',
  Factor==1~'1: Epicene/Colon',
  Factor==2~'2: Participle/Star',
  Factor==3~'3: Participle/Colon'))%>%
group_by(Factor,Plural)%>%
summarise(Rating=mean(Rating))
write_csv(export_sums,file='Output/factorsum.csv')

```

Frequency data

For sec. 5. Integrated into the regression models later so included here.

```
library(RKorAPClient)
# installed from here ↓
# install.packages("RKorAPClient", repos = "https://cloud.r-project.org/")

# Using TreeToken syntax to get lemmas - so the SG/PL forms and case agreement
gil.types<-c(
  '[tt/l=Lehrkraft]',
  '[tt/l=Lehrende]',
  '[tt/l=Bürohilfe]',
  '[tt/l=Mitarbeitende]',
  '[tt/l=Fachkraft]',
  '[tt/l=Studierende]',
  '[tt/l=Betreuungsperson]',
  '[tt/l=Pflegende]',
  '[tt/l=Anführende]',
  '[tt/l=Führungskraft]',
  '[tt/l=Besuchende]',
  '[tt/l=Gast & tt/pos=NN]', # avoid conjugations of gasen
  '[tt/l=Mitarbeiter]',
  '[tt/l=Pfleger]',
  '[tt/l=Lehrer]',
  '[tt/l=Anführer]',
  '[tt/l=Besucher]'
)

kcon <- KorAPConnection(verbose = TRUE)%>%auth() # opens in browser
# might not need auth() for just frequency, but might change copyright access

freqs <- frequencyQuery(kcon,gil.types)%>%
  ipm()%>% #relative frequency calculation
  as_tibble()%>%
  write_csv("Data/KorAP_freqs_synchronic.csv")

korap.freqs<-read_csv("../Data/KorAP_freqs_synchronic.csv")%>%
  mutate(Lemma=str_extract(query, "\\[tt/l=([^\]]& ]+)", group = 1),
         Freq=log10(ipm+0.0001)
  )%>%
  select(Lemma,Freq,totalResults)%>%
  arrange(desc(Freq))

korap.freqs%>%
  knitr::kable(format = 'latex',booktabs=T)
```

Significance testing

Load libraries and visualisation function.

```
library(tidyverse)

# Ordinal regression
library(ordinal) # For CLMM
library(car) # For Anova() -- chi2. Was not used in final work

# Linear regression
library(lme4)
library(lmerTest) # adds p-values (Satterthwaite's df method)

#Visualisation
library(broom.mixed) # helps output tables

convert_to_latex<-function(model_output=NULL, bold_sig=F){
  tidy(model_output, effects="fixed")%>% #convert to dataframe
  select(term, estimate, std.error, p.value)%>%
  filter(term!='(Intercept)')%>%

  mutate(
    across(c(estimate, std.error), ~sprintf("%.3f", .)), #round
    stars = case_when(
      p.value < 0.001 ~ "****",
      p.value < 0.01 ~ "***",
      p.value < 0.05 ~ "**",
      TRUE ~ ""
    ),
    sig=p.value<0.05, #evaluate if significant

    #add stars to p
    p.value = ifelse(p.value<0.0001,
      paste0('<0.0001',stars),
      paste0(sprintf("%.4f", p.value), stars))
  )%>%
  mutate( #Format as bold if significant
    across(c(term, estimate, std.error, p.value),
      ~if (bold_sig)
        ifelse(sig, paste0("\textbf{", ., "}"), .)
        else .)
    )%>%
  select(-c(sig,stars))%>%
  knitr::kable(format = 'latex', booktabs = T, escape = FALSE)
}
```

Prepare df for modelling.

```
premodel<-df%>%
  filter(Filler==F)%>%
```

```
mutate(
  Neut_Type = case_when(
    Factor %in% c("0", "1") ~ "Epicene",
    Factor %in% c("2", "3") ~ "Participle"
  ),
  Div_Type = case_when(
    Factor %in% c("0", "2") ~ "Star",
    Factor %in% c("1", "3") ~ "Colon"
  ),
  # Type conversion - dealing with factors/categorical/ordinal data
  Rating=as.numeric(Rating),
  Div_Type=as.factor(Div_Type,levels=c('Star','Colon'),ordered=F),
  Neut_Type=as.factor(Neut_Type,levels=c('Epicene','Participle'),ordered=F),
  across(.cols=c(Gender, Age, Plural, Theme, Id, Factor),.fns=~factor(.)))%>%

# Attach freq data to model
# Work out which word appeared by theme/factor
rowwise()%>%
mutate(Lemma=case_when(
  Theme == "boss" & Epicene ~ "Führungskraft",
  Theme == "boss" & Participle ~ "Anführende",
  Theme == "expert" & Epicene ~ "Fachkraft",
  Theme == "expert" & Participle ~ "Studierende",
  Theme == "nurse" & Epicene ~ "Betreuungsperson",
  Theme == "nurse" & Participle ~ "Pfleger",
  Theme == "office" & Epicene ~ "Bürohilfe",
  Theme == "office" & Participle ~ "Mitarbeiter",
  Theme == "teacher" & Epicene ~ "Lehrkraft",
  Theme == "teacher" & Participle ~ "Lehrende",
  Theme == "visitor" & Epicene ~ "Gast",
  Theme == "visitor" & Participle ~ "Besuchende",
  .default = NA
))%>%
left_join(y=korap.freqs,by = 'Lemma')%>%
ungroup()%>%
select(Q, Id, Age, Gender, Theme, Plural, Neut_Type, Div_Type, Rating, Factor, Participle, Epicene, Star,
Colon, Deutsch_L1, Freq, Lemma)
```

Epicenes

```
# LMER
e.lmer <- lmer(Rating~Div_Type+Theme+Age+Plural+(1|Id),
  filter(premodel,Epicene==T))
summary(e.lmer)
car::Anova(e.lmer,type=2) # not used in final work
convert_to_latex(e.lmer,bold_sig=T)

# CLMM
e.clmm<-clmm(Rating~Div_Type+Theme+Age+Plural+(1|Id),
  filter(premodel,Epicene==T))%>%
  mutate(Rating=as.factor(Rating,levels=c('-1','0','1'),ordered=T))) # Ordinal data conversion
```

```
summary(e.clmm)
car::Anova(e.clmm,type=3) # not used in final work
convert_to_latex(e.clmm,bold_sig = T)
```

Participles

```
# LMER
p.lmer <- lmer(Rating~Div_Type+Theme+Age+(1|Id),
              filter(premodel,Participle==T))
summary(p.lmer)
car::Anova(p.lmer,type=2) # not used in final work
convert_to_latex(p.lmer,bold_sig=T)
```

```
# CLMM
```

```
p.clmm<-clmm(Rating~Div_Type+Theme+Age+(1|Id),
             filter(premodel,Participle==T)%>%
             mutate(Rating=factor(Rating,levels=c('-1','0','1'),ordered=T))) # Ordinal data conversion

summary(p.clmm)
car::Anova(p.clmm,type=2) # not used in final work
convert_to_latex(p.clmm,bold_sig = T)
```

Frequency

```
f.lmer<-lmer(Rating~Freq+(1|Id),premodel)
summary(f.lmer)
convert_to_latex(f.lmer,bold_sig = T)
```

Graphing and visualisation

Load libraries and define constants.

```
library(ggplot2)
library(ggthemes)
```

```
SAVE_PATH<-'C:/.../04 Media/'
DOT_SIZE<-2.5
```

Demographics

Respondents demographics.

```
plot.demographics<-df%>%
  mutate(Gender=case_match(Gender,
                           'Feminin'~'Feminine',
                           'Maskulin'~'Masculine',
```

```

    'Nichtbin\u00e4r'~'Nonbinary'))%>%
group_by(Age,Gender)%>%
summarise(n=n())%>%
ggplot(aes(x=Age, y=n/54, fill=Gender))+ #n/54 because 54 questions
geom_col()+
coord_flip()+
scale_fill_few(palette='Light')+
labs(title='Age and Gender of Participants',
      y='Count')+
theme_bw()+
theme(legend.position = "bottom")

plot.demographics
ggsave(filename=paste(sep = ",SAVE_PATH",'Demographics','.pdf'),width=14,height=12,units='cm')

```

Rating by age.

```

plot.age<-df%>%
  filter(Filler==F, Age!='65+')%>% # n=1 at 65+
  mutate(Factor=case_match(Factor,
    0~'Epicene/Star',
    1~'Epicene/Colon',
    2~'Participle/Star',
    3~'Participle/Colon'
  ))%>%

ggplot(aes(
  x=Age,
  y=Rating,
  colour=Factor,
  group=interaction(Factor)
))+
geom_line(stat='summary',
  fun=mean,
  alpha=0.7,
  position=position_dodge(width=0.3)
)+

#Because calculating error bars in ggplot, need to take the "raw" data
geom_point(alpha=0.7,
  stat="summary",
  fun=mean,
  position=position_dodge(width=0.3)
)+
stat_summary(
  aes(group=1),
  fun=mean,
  geom='line',
  color='red',
  linewidth=1
)+

```

```
labs(  
  title='Mean rating by age',  
  color='Question Type'  
) +  
  
coord_cartesian(ylim=c(-1, 1)) +  
geom_hline(yintercept = 0, alpha=0.5) +  
  
scale_color_few() +  
theme_bw() +  
theme(legend.position="bottom") +  
guides(color=guide_legend(nrow = 2))  
  
plot.age  
ggsave(filename=paste(sep = " ", SAVE_PATH, 'Age_sums', '.pdf'), width=14, height=12, units='cm')
```

AJT ratings

Epicene ratings.

```
plot.epicene<-df%>%  
  # Rename factor  
  mutate(Factor=case_when(  
    Factor==0~'Gender Star',  
    Factor==1~'Colon'),  
    Theme=str_to_title(string=Theme))%>%  
  filter(Filler==F, Epicene==T)%>%  
  
  # Convert plural to dbl  
  rowwise()%>%  
  mutate(Plural=ifelse(Plural,'Plural','Singular'))%>%  
  ungroup()%>%  
  
  # Get mean ratings  
  group_by(Theme, Factor, Plural)%>%  
  summarise(Rating=mean(Rating), sd=sd(Rating))%>%  
  
  # Plot  
  ggplot(aes(x=Factor,  
    y=Rating,  
    color=Theme,  
    group=interaction(Theme, Plural),  
    linetype=Plural,  
    shape=Plural  
  )) +  
  
  geom_point(size=DOT_SIZE, alpha=0.9) +  
  geom_line() +  
  
  ylim(-1, 1) +
```

```

ggtitle('Epicles vs stars and colons, by theme')+
scale_colour_few()+

# Legends
guides(linetype= guide_legend(reverse=T), shape = guide_legend(reverse=T))+
labs(
  shape='Plurality',
  linetype='Plurality',
  x='Diversifying type')+

# SG = --*, PL = - -tri- -
scale_shape_manual(values=c('Singular'=16,'Plural'=17))+
scale_linetype_manual(values=c('Singular'='solid','Plural'='dashed'))+

# Add mean and y=0
geom_hline(yintercept = 0.262,color='#a02b93',linetype='dotted',linewidth=0.75)+
geom_hline(yintercept = 0,alpha=0.5)+
theme_bw()

plot.epicene
ggsave(filename=paste(sep = ",SAVE_PATH','Epicles_general','pdf'),width=12,height=14,units='cm')

```

Participle ratings.

```

plot.participle<-df%>%
# Rename factor
mutate(Factor=case_when(
  Factor==2~'Gender Star',
  Factor==3~'Colon'),
  Theme=str_to_title(string= Theme),
  Theme=ifelse(Theme=='Expert',yes='Student',no=Theme), # split for expert/student
  Theme=factor(Theme,levels = c('Boss','Student','Nurse','Office','Teacher','Visitor'),ordered = T))%>%
filter(Filler==F, Participle==T)%>%

# Convert plural to dbl
rowwise()%>%
mutate(Plural=ifelse(Plural,'Plural','Singular'))%>%
ungroup()%>%
group_by(Theme,Factor)%>%
summarise(Rating=mean(Rating))%>%

# Plot
ggplot(aes(x=Factor,
  y=Rating,
  color=Theme,
  group=Theme
))+

geom_point(size=DOT_SIZE,alpha=0.9,shape=17)+
geom_line()+

```

```
ylim(-1,1)+

labs(
  title='Participles vs stars and colons, by theme',
  x='Diversifying form'
)+

scale_colour_few()+

# Mean and y=0
geom_hline(yintercept = 0.102,color='#a02b93',linetype='dotted')+
geom_hline(yintercept = 0,alpha=0.5)+

theme_bw()

plot.participle
ggsave(filename=paste(sep = ",SAVE_PATH','Participles_general','pdf'),width=12,height=14,units='cm')
```

Frequency and rating.

```
plot.frequency<-premodel%>%
group_by(Lemma, Plural)%>%
summarise(
  Rating=mean(Rating),
  Freq=mean(Freq),
  Theme=unique(Theme)%>%str_to_title()
)%>%
mutate(
  Plural=as.character(Plural),
  Plural=ifelse(Plural=='TRUE','Plural','Singular')
)%>%
ggplot(aes(
  x=Freq,
  y=Rating,
  colour=Theme,
  shape=Plural
))+

# Show regression
geom_smooth(
  aes(
    x=Freq,
    y=Rating,
    color=NULL,
    shape=NULL
  ),
  alpha=0.2,
  method='lm'
)+
geom_point(size=DOT_SIZE)+
```

```
ylim(-1,1)+

scale_color_few()+
# SG = --*--, PL = - -tri- -
scale_shape_manual(values=c('Singular'=16,'Plural'=17))+

labs(title='Rating by Frequency',shape='Plurality',x='Log Frequency')+
theme_bw()

plot.frequency
ggsave(filename=paste(sep = ",SAVE_PATH','Frequency_rating','.pdf'),width=14,height=12,units='cm')
```

Appendix E Participant data

Table 10: Participant data: part 1, Q1–31. For space, these tables have been left in wide format—continue the analysis from the `pivot_longer()` function in 4.

Id	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
RiMDW	0	-1	1	-1	1	1	1	-1	1	1	1	-1	0	0	-1	1	0	0	1	-1	0	1	1	-1	1	1	0	0	0	-1	1
DkepL	-1	1	1	-1	-1	1	1	-1	-1	1	1	-1	-1	-1	-1	1	1	1	1	1	1	1	1	-1	-1	-1	-1	-1	-1	-1	-1
J8wAF	0	-1	0	0	-1	0	-1	-1	0	0	0	-1	0	0	0	-1	1	0	1	1	-1	-1	1	-1	-1	1	0	-1	-1	1	-1
7flrA	1	-1	1	1	1	1	1	-1	1	1	1	-1	1	1	1	1	1	1	1	1	-1	1	1	-1	1	1	1	1	1	-1	1
8ew60	-1	1	-1	-1	-1	-1	1	-1	1	-1	-1	-1	1	1	-1	-1	1	-1	-1	1	-1	-1	-1	-1	0	-1	1	-1	-1	-1	-1
qhtXp	1	1	1	0	1	-1	1	-1	1	1	-1	-1	1	1	1	1	1	1	1	1	-1	1	1	-1	1	-1	1	-1	1	1	1
6p5dv	1	0	1	-1	1	1	1	-1	1	1	1	-1	1	1	0	1	1	1	1	0	1	1	1	-1	1	-1	1	1	1	-1	1
SO4T6	1	-1	1	1	1	-1	1	-1	1	1	-1	-1	1	1	1	1	1	1	1	1	1	1	1	-1	1	1	1	1	1	-1	1
xrtvE	1	-1	1	-1	1	1	1	-1	-1	-1	-1	-1	-1	-1	-1	1	1	0	1	1	-1	-1	1	-1	1	-1	0	-1	-1	-1	1
WbojF	1	-1	1	0	1	1	1	-1	1	1	1	-1	1	1	0	1	1	1	1	-1	1	1	1	-1	1	1	1	1	1	-1	1
Fh1Sv	0	-1	-1	1	1	0	1	0	1	1	1	-1	0	1	0	-1	1	1	-1	-1	1	-1	-1	-1	1	1	1	0	-1	-1	-1
brKzi	-1	1	1	-1	1	1	1	-1	1	1	1	-1	-1	1	-1	1	1	1	-1	1	-1	-1	1	-1	1	1	1	-1	-1	-1	-1
CizLP	-1	-1	1	1	1	-1	1	-1	1	1	-1	-1	1	1	-1	1	1	1	-1	-1	1	-1	-1	-1	-1	1	1	-1	-1	-1	0
mUsbP	0	0	-1	0	0	0	0	-1	0	0	0	-1	0	0	0	0	1	0	0	0	0	0	0	0	-1	0	0	0	0	-1	0

Id	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
vl3KY	1	-1	-1	0	-1	1	1	-1	1	1	1	-1	0	1	1	-1	1	1	-1	-1	-1	-1	-1	-1	-1	1	1	-1	-1	1	0
NtnfO	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	1	0	0	0	1	0	0	-1	0	0	0	0	0	-1	0
bwhdx	0	1	-1	-1	0	0	0	-1	0	0	0	-1	0	0	-1	0	1	0	0	1	-1	0	0	-1	0	-1	0	0	0	1	0
9gNp5	-1	-1	0	1	1	0	1	-1	1	1	1	-1	-1	1	1	1	1	-1	-1	1	1	-1	-1	-1	0	1	1	-1	-1	-1	0
T7mDQ	1	0	1	0	1	1	1	-1	1	1	1	1	1	1	-1	1	1	1	1	0	1	1	1	-1	1	0	1	1	1	-1	1
rB6nM	-1	-1	0	1	-1	-1	-1	-1	-1	1	-1	-1	0	-1	0	0	1	-1	1	1	1	-1	0	-1	-1	1	1	-1	1	-1	0
ktP94	0	1	1	0	1	1	1	-1	1	1	1	-1	1	1	0	1	1	1	-1	1	1	1	-1	-1	1	1	1	1	1	1	1
VVvCm	1	-1	1	0	1	1	1	-1	1	1	1	-1	1	1	0	1	1	1	-1	1	1	1	-1	-1	1	1	1	-1	1	-1	1
DsCO2	0	1	-1	-1	1	1	1	-1	1	1	1	-1	1	1	1	1	1	1	-1	-1	1	1	-1	-1	-1	-1	1	1	1	-1	1
qEDPA	1	0	-1	0	1	0	1	-1	1	1	-1	-1	-1	1	-1	-1	1	1	1	0	1	-1	1	-1	1	-1	-1	-1	-1	-1	-1
qfrk6	0	-1	-1	-1	0	1	1	-1	1	1	1	0	0	1	-1	-1	1	1	-1	1	-1	-1	-1	-1	0	1	1	1	-1	1	1
TRerM	-1	0	0	-1	0	1	0	-1	1	0	1	-1	0	0	-1	0	1	0	-1	1	-1	0	-1	-1	0	1	1	-1	1	-1	0
zQOIW	1	1	1	1	1	-1	-1	-1	1	1	-1	-1	-1	1	1	1	1	1	-1	-1	-1	-1	-1	-1	1	-1	1	-1	1	-1	-1
uzEZT	0	-1	1	1	0	0	0	-1	1	0	0	1	0	0	1	0	1	0	0	0	-1	0	0	-1	0	1	1	-1	1	1	0
XXAIc	-1	0	1	-1	-1	-1	1	-1	1	0	-1	-1	0	0	-1	0	1	0	-1	-1	1	0	1	-1	1	1	1	-1	0	-1	0
vMWpG	0	-1	0	0	0	0	0	-1	0	0	0	-1	0	0	0	0	1	0	-1	-1	-1	0	-1	-1	0	1	0	-1	0	-1	0
owtpd	1	-1	-1	1	0	-1	1	-1	1	1	-1	-1	0	1	0	-1	1	1	0	-1	1	-1	-1	-1	0	1	1	-1	-1	-1	0

Id	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
UjZle	0	1	-1	-1	0	0	0	-1	1	0	-1	-1	0	0	-1	-1	1	0	0	1	-1	0	0	-1	0	-1	0	0	-1	-1	0
IuUE0	0	-1	-1	0	0	0	1	0	1	1	0	-1	0	1	0	-1	1	0	-1	-1	1	0	-1	-1	0	1	1	-1	-1	-1	0
sMCRB	0	1	1	1	1	0	1	-1	0	0	0	-1	1	0	1	1	1	0	0	-1	-1	0	1	-1	1	0	1	0	-1	-1	1
fpBzR	0	-1	1	-1	1	0	1	-1	1	0	0	-1	0	0	0	1	1	0	0	-1	-1	0	1	-1	1	0	0	0	0	-1	1
gyN1E	1	1	1	1	1	1	1	0	1	1	1	-1	1	0	1	1	1	0	1	-1	1	0	1	-1	1	0	1	1	1	-1	1
Fwv8z	-1	1	-1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	1	-1	-1	1	1	-1	1	-1	-1	-1	1	1	-1	-1	-1
5Bq9F	-1	-1	-1	1	-1	0	0	-1	1	1	0	-1	-1	0	1	-1	1	0	0	1	1	0	-1	-1	-1	1	0	-1	-1	-1	-1
4lhBA	0	1	1	1	1	0	1	-1	0	1	0	1	-1	0	1	0	1	0	-1	0	-1	0	1	-1	1	-1	1	-1	-1	1	0
J0W61	1	-1	1	0	1	1	1	0	1	1	1	0	1	1	0	1	1	1	1	0	1	1	1	-1	1	1	1	1	1	-1	1
uemfy	1	0	1	0	1	-1	1	-1	1	1	-1	-1	1	0	0	1	1	1	0	1	1	-1	1	-1	1	0	1	-1	1	-1	0

Table 11: Participant data: part 1, Q32–54.

Id	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	Deutsch_L1	Age	Gender	Trans
RiMDW	0	-1	0	1	0	1	-1	0	0	1	0	0	0	1	-1	1	1	0	1	0	1	0	0	TRUE	51-65	Feminin	FALSE
DkepL	-1	-1	1	-1	-1	1	-1	-1	-1	-1	1	1	-1	1	-1	1	-1	-1	1	-1	1	1	-1	TRUE	26-35	Maskulin	FALSE
J8wAF	1	-1	-1	1	1	0	1	1	0	-1	-1	0	-1	1	-1	0	0	1	1	-1	-1	-1	-1	FALSE	18-25	Nichtbinär	FALSE
7flrA	1	-1	1	1	-1	1	-1	1	1	1	-1	1	1	1	-1	1	1	1	1	1	1	1	1	TRUE	18-25	Feminin	FALSE

Id	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	Deutsch_L1	Age	Gender	Trans
8ew60	1	-1	-1	1	-1	1	-1	-1	-1	1	1	-1	-1	-1	-1	1	1	-1	-1	-1	1	-1	1	TRUE	18-25	Feminin	FALSE
qhtXp	1	-1	1	1	-1	1	-1	-1	0	1	-1	1	1	-1	-1	1	-1	-1	1	0	1	1	1	TRUE	65+	Feminin	FALSE
6p5dv	1	-1	1	1	0	1	-1	1	1	1	-1	1	1	1	-1	1	1	1	1	1	1	1	1	TRUE	51-65	Feminin	FALSE
SO4T6	1	-1	1	1	-1	1	-1	1	1	1	-1	1	1	1	-1	1	1	1	-1	1	-1	1	1	TRUE	26-35	Maskulin	FALSE
xrtvE	-1	-1	-1	1	-1	1	-1	1	-1	-1	1	-1	-1	1	-1	1	-1	-1	1	-1	1	1	-1	TRUE	36-50	Feminin	FALSE
WbojF	1	-1	1	1	-1	1	-1	1	1	1	-1	1	1	1	-1	1	1	1	1	1	1	1	1	TRUE	18-25	Maskulin	FALSE
Fh1Sv	1	-1	-1	1	-1	1	-1	-1	-1	-1	-1	1	-1	-1	-1	1	-1	0	1	0	0	1	0	TRUE	26-35	Feminin	FALSE
brKzi	1	-1	-1	1	-1	1	-1	-1	-1	-1	-1	1	1	1	-1	1	-1	-1	1	-1	1	1	1	TRUE	36-50	Feminin	FALSE
CizLP	0	-1	-1	1	-1	1	-1	-1	1	-1	-1	-1	0	-1	-1	1	-1	-1	1	-1	1	0	-1	TRUE	26-35	Feminin	FALSE
mUsbP	0	-1	0	0	0	0	-1	0	0	0	0	0	-1	0	0	0	0	0	1	0	1	0	0	TRUE	26-35	Feminin	FALSE
vl3KY	-1	-1	1	1	-1	1	-1	-1	-1	-1	-1	1	-1	-1	-1	1	1	-1	1	-1	1	1	-1	TRUE	51-65	Feminin	FALSE
NtnO	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	TRUE	36-50	Maskulin	FALSE
bwhdx	0	-1	0	0	-1	0	-1	0	0	0	-1	0	0	0	0	0	0	0	1	0	1	0	0	FALSE	26-35	Feminin	FALSE
9gNp5	1	-1	0	1	0	1	-1	-1	-1	0	1	1	0	-1	-1	1	-1	-1	1	0	1	1	0	TRUE	36-50	Feminin	FALSE
T7mDQ	1	-1	1	1	-1	1	-1	1	1	1	1	1	1	1	-1	1	1	1	1	1	1	1	1	TRUE	26-35	Nichtbinär	FALSE
rB6nM	1	-1	-1	-1	0	-1	-1	1	-1	-1	-1	1	1	1	-1	-1	-1	-1	1	0	-1	-1	-1	FALSE	26-35	Feminin	FALSE
ktP94	1	-1	1	1	-1	1	-1	-1	1	1	-1	1	1	-1	-1	1	1	1	1	1	1	1	1	TRUE	36-50	Nichtbinär	FALSE

Id	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	Deutsch_L1	Age	Gender	Trans
VVvCm	1	-1	1	1	-1	1	-1	-1	-1	1	-1	1	1	-1	-1	1	-1	-1	1	1	1	1	1	TRUE	51-65	Maskulin	FALSE
DsCO2	1	-1	1	1	-1	1	-1	-1	1	1	-1	1	-1	-1	-1	1	1	-1	-1	1	1	1	1	FALSE	26-35	Feminin	FALSE
qEDPA	-1	-1	-1	1	1	1	-1	1	-1	-1	-1	1	-1	1	1	1	-1	-1	1	-1	1	1	1	TRUE	26-35	Nichtbinär	FALSE
qfrk6	1	-1	-1	1	-1	1	-1	-1	-1	0	-1	0	-1	-1	-1	1	0	0	1	0	1	1	0	TRUE	26-35	Nichtbinär	FALSE
TRerM	1	-1	0	1	-1	1	-1	-1	-1	0	0	0	1	1	-1	1	-1	-1	1	0	1	0	0	TRUE	36-50	Feminin	FALSE
zQOIW	1	-1	1	1	-1	1	-1	-1	-1	-1	-1	1	-1	-1	-1	1	-1	-1	1	-1	1	-1	1	TRUE	26-35	Maskulin	FALSE
uzEZT	1	-1	0	1	-1	1	-1	0	0	0	0	0	1	0	-1	1	-1	-1	1	0	-1	0	0	FALSE	26-35	Feminin	FALSE
XXAIc	0	-1	0	1	0	1	-1	-1	0	1	-1	0	-1	1	-1	1	-1	-1	1	0	1	0	-1	TRUE	18-25	Feminin	FALSE
vMWpG	0	-1	0	0	0	0	-1	-1	0	0	-1	0	0	0	0	0	0	-1	1	0	1	0	0	TRUE	26-35	Feminin	FALSE
owtpd	1	0	-1	1	-1	1	-1	-1	-1	-1	-1	1	-1	0	-1	1	-1	-1	0	-1	1	1	0	FALSE	26-35	Feminin	FALSE
UjZle	0	-1	0	1	-1	1	-1	-1	-1	-1	-1	0	-1	-1	-1	1	-1	-1	1	-1	-1	0	0	TRUE	18-25	Feminin	FALSE
IuUE0	0	0	0	1	0	1	-1	-1	-1	0	0	0	-1	-1	0	1	-1	-1	1	0	1	0	0	TRUE	51-65	Feminin	FALSE
sMCRB	1	-1	0	1	0	0	-1	0	0	1	0	0	0	0	0	1	-1	0	0	0	1	1	0	TRUE	51-65	Maskulin	FALSE
fpBzR	0	-1	0	1	0	0	-1	0	0	1	0	0	0	1	0	1	-1	0	0	0	1	1	0	TRUE	26-35	Feminin	FALSE
gyN1E	1	-1	0	1	-1	1	-1	1	0	1	0	1	1	1	-1	1	0	0	1	1	1	0	1	TRUE	26-35	Maskulin	FALSE
Fwv8z	1	-1	-1	-1	-1	-1	-1	1	-1	1	1	-1	-1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	FALSE	26-35	Feminin	FALSE
5Bq9F	0	-1	0	1	-1	1	-1	0	-1	-1	-1	0	-1	-1	-1	1	-1	0	1	-1	1	0	-1	TRUE	26-35	Feminin	FALSE

Id	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	Deutsch_L1	Age	Gender	Trans
4lhBA	0	-1	0	1	1	1	-1	-1	-1	0	-1	1	-1	0	-1	1	-1	-1	1	0	1	0	0	TRUE	26-35	Feminin	FALSE
J0W61	1	0	1	1	0	1	0	1	1	1	1	1	1	1	0	1	1	1	0	1	-1	1	1	TRUE	36-50	Maskulin	FALSE
uemfy	0	-1	0	0	0	1	-1	1	-1	1	0	1	0	1	0	1	0	-1	1	0	1	1	1	TRUE	26-35	Feminin	FALSE

This work is dedicated to Rory and Rufus.
You were good cats. Thank you.