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Training Grammaticality: Can people be taught to perceive the singular ‘they’ as grammatical?

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Abstract

As the usage of personal pronouns other than he and she becomes more mainstream, debates about their usage have become more and more common. Many of the reasons discouraging their use are rooted in negative attitudes toward people who prefer to be referred to as such (Patev, et al 2019). However, prior research has also found that perceptions of singular gender-neutral pronouns like they/them as being grammatically confusing can be an obstacle toward their use, even by people who otherwise hold positive opinions towards transgender and gender non-conforming (TGNC) individuals (Patev, et al 2019). Given the role that language use plays in gender inclusion, this study aims to see if individuals can be trained to perceive “they," “them," “their," and other pronouns in the set, as more grammatically acceptable. In particular, I examine whether people view the singular “they’” as more grammatical after being given explicit instruction about the rules of their use by comparing grammaticality judgments of sentences using these pronouns before and after receiving training explaining grammar rules. I compare these judgments to those of people who receive diversity-focused trainings, as is the norm for many organizational trainings. While participants in both groups demonstrated an increase in their acceptability ratings of these sentences two weeks after completing the training, the groups improved to a similar degree, indicating that it is the act of thinking about pronoun usage, rather than any particular justification for its acceptability, that affects grammaticality perception. Furthermore, this indicates that this perception of grammatical confusingness is likely an overt justification for covert sociolinguistic attitudes against the use of such pronouns, rather than a true reflection of the mental grammar.

1.0 Introduction

“They," “them," “their," and other pronouns in the set, referred to throughout this paper as “singular neutral pronouns," have a long history in English, both for linguistic-functional reasons and social reasons, with particular ties to the women’s rights movement and TGNC advocacy. In particular, their use is found to reduce bias against women and LGBT+ individuals (Tavits & Perez 2019) and is vital for the mental and emotional well-being of TGNC individuals who identify with them (McLemore 2018; Mitchell & MacArthur 2021). Additionally, while there are several legitimate linguistic barriers making pronouns more resistant to change than other lexical items, these barriers are not as strong as they are often conceptualized as being. While pronouns are considered a closed class, this does not wholly prevent change, and English is not a particular exception in its introduction of singular neutral pronouns; furthermore, while English is thought of as having subject-verb number agreement, this seems to not apply in the case of pronouns, as demonstrated by the pronoun “you," which takes bare verb inflections, which are normally conceptualized as plural. Finally, existing research has indicated that singular neutral pronouns are indeed learnable by adult native speakers of a language (Patev, et al 2019; Gustafsson Sendén, et al 2021).

The experimental portion of this study consists of a grammaticality judgment pre-test, followed by one of two types of training, with a second grammaticality judgment test completed two weeks later. The grammaticality tests consist of a series of questions that participants are asked to rate the naturalness of on a 5-point Likert scale. The trainings consist of either a diversity, equity, and inclusion-focused training designed to mimic typical organizational inclusion trainings or explicit grammar instruction with practice using singular neutral pronouns, modeled after traditional language classes. Comparing these two types of training can be used to develop a theory of the processes by which adult grammars change, which can hopefully be used to make gender-inclusive language initiatives more effective in the future.

2.0 Background

2.1 History of Singular Neutral Pronouns

They/them/their and other forms of the pronoun have a long history of use in the English language. Oxford English Dictionary (2023a) cites the first instance of "they" being used to refer to a singular referent as occurring 1375CE, being first used as an epicene pronoun—that is, referring to an indefinite antecedent (see 1a) or with an unknown gender (see 1b). It is also sometimes used to refer to definite nouns (see 1c), though with less frequency (Baranowski 2002).

(1) a. Everyone did their homework.
b. A student's diligence can be seen in their attendance.
c. My neighbor walks their dog past my house every morning.

Despite this colloquial usage, generic "he" dominated prescriptive rules for English. (Legal documents are a prominent example of this usage.) This was not without criticism, and the 19th and 20th centuries experienced a boom of suggestions for alternatives (Baron 2020). Some were other words already existing in English, including "one," "it," and avoiding pronoun usage altogether, instead repeating the noun. Baron explains that dozens of novel pronouns were also created to be used in place of the generic "he"—"thon," a contraction of "that one," gained some popularity, although clearly fell out of usage; most others have been forgotten, though some, like the pronoun sets zie/hir and ey/em/eir are rare but still used.

The discussion surrounding gender-neutral pronouns was, in many ways, motivated practically, since the so-called generic "he" was never truly generic in the minds of English speakers (Hekanaho 2020), and advocates for neutrality sought a more eloquent replacement. However, there was also a strong social motivation for neutrality—it is not a coincidence that this surge in pronoun coinages coincided with the growth of women's rights movements in the United States and England. In both countries, pronoun usage in legal writing became central in discussions of equal legal rights (Baron 2020). In addition to the examples listed above that try to

avoid gendering altogether, “he or she," “s/he," and even using “she” as a generic singular pronoun gained popularity. Despite these alternatives, recent studies have found “they” to be the most-accepted generic pronoun, accepted by almost all participants surveyed, including native and non-native speakers of English (Hekanaho 2020).

In recent decades, the conversation has shifted to center TGNC individuals in discussions of pronouns. However, the use of singular neutral “they” for people outside of the gender binary is not a recent development: 17th-century medical texts have used “they” to refer to intersex individuals (Stamper 2018). This use has become widespread as awareness of identities that fall outside of the gender binary increases: in the 2023 Gender Census which documents language preferences of people who partially or wholly do not identify with the gender binary, 74.5% of respondents selected they/them and other forms of the set were among the pronouns they used for themselves (2023 Gender Census). (13.8% indicated that they are fine with any pronouns, so the actual number of they/them users is likely higher.) These results were measured from a sample size of 40,375 participants, with data collected via snowball sampling methods through the Internet. While the survey was available internationally, it was only available in English, and participants from the United States made up the majority of the responses.

2.2 Background in Gender Studies

Given this history and the inherent relationship between gender and pronouns in English, pronoun use has become a key consideration in critical gender studies. Tavits and Pérez (2019) found experimentally that using gender-neutral pronouns in Swedish reduces the mental saliency of males and is associated with improved attitudes towards women and LGBT+ individuals compared to using masculine pronouns, indicating that inclusive language use plays an important role in decreasing bias and highlighting the importance of its use not only when referring to specific individuals, but in the generic form as well. The use in the specific is significant, too, and studies have found that misgendering (that is, referring to individuals by gendered terms, including pronouns, that they don’t associate with) is associated with psychological distress including depression, anxiety, stress, body dissatisfaction, and dietary restraint (McLemore 2018; Mitchell, et al 2021). As a result, naturalizing usage of personal pronouns beyond “he” and “she” is vital for the well-being of TGNC individuals.

2.3 Linguistic Considerations

Regardless of any social advocacy for the use of singular neutral pronouns, there are linguistic considerations that can be barriers to their use. Certainly, the preexisting semantic range of “they” and its variants in the mental grammars of speakers of English is an obstacle, although adults frequently rewrite their semantic understandings of words (for example, in the past twenty years “tweet” has transformed from being the sound a bird makes to being primarily a post on the now-renamed social media platform Twitter). However, there are morphosyntactic

barriers to the singularization of “they” as well. For example, English is generally conceptualized as inflecting verbs morphologically based on whether the subject is singular or plural, as in (2):

(2) a. The girl goes for a run.
b. The girls go for a run.
d. *The girl go for a run.
c. *The girls goes for a run.

However, there are several reasons to think that this rule is less strict than it is typically considered to be. To begin with, the fact that “they” has been used with indefinite singular referents for centuries indicates that people can be perfectly comfortable using “plural” verb forms with grammatically singular referents.

(3) a. Everyone should know what time they$_{sg}$ have to arrive.
b. *Everyone should know what time they$_{sg}$ has to arrive.

The fact that this use is indefinite may weaken the strength of conceptualization as singular in the minds of speakers (Baranowki 2002), but it is noteworthy that the pronoun “you," which also underwent a historical change from exclusive use in the plural to use in both singular and plural, exclusively pairs with morphologically “plural” verbs, even when the referent is definitively singular. (Note that while estimated dates are given, linguistic change is, of course, gradient.)

(4) pre-circa 1405 form of 2nd person:
a. Who art thou$_{sg}$?
b. Some of you$_{pl}$ might not be able to go today.

(5) Circa 1405–present form of 2nd person (Oxford English Dictionary 2024):
a. Who are you$_{sg}$?
b. Some of you$_{pl}$ might not be able to go today.

Thus, one may posit that, at least in the case of pronouns, verbs do *not* need to match subject in number. That is, “they,” like “you,” is paired with a bare verb (e.g. *walk*, *eat*, etc.), regardless of number.

Additionally, while pronouns are generally conceptualized as being a closed class, this does not wholly prohibit pronoun change in a language. Brazilian Portuguese, for example, is currently undergoing a pronoun shift wherein *a gente*, meaning “the people," is undergoing grammaticalization and increasingly replacing the first-person plural pronoun *nós*, meaning “we” (Zilles 2005), and the dialect of Tai Lue spoken in Chiang Mai, Thailand, is undergoing a change wherein the first person dual pronoun /haw/ is expanding to cover all first person plural contexts,

matching other dialects of the language (Rhekhalilit 2014). Even within English, pronouns have undergone extensive change in the past millennia: “thou," inherited from Proto-Germanic as a once-ubiquitous second-person singular pronoun, has fallen out of use in ordinary speech (Oxford English Dictionary 2023b), as did the second-person plural nominative “ye”; in both cases, this corresponded with a compensatory expansion of the range of contexts that “you,” which was originally only used in the second-person-plural-accusative form, is used in (Oxford English Dictionary 2024). “They” itself was borrowed from Old Scandinavian along with “she," likely in response to functional pressures to disambiguate pronouns (Oxford English Dictionary 2023c). In such cases, the adoption of new pronouns was gradual, much as the expansion of “they” in modern English has been—however, they provide a clear example of English expanding its pronoun usage based on utility (Baron 2020).

Furthermore, there is specific evidence of languages introducing novel third-person singular pronouns precisely for the purpose of neutrality which then enter widespread use. Swedish, which has historically had two third-person singular pronouns (*han*, “he”; and *hon*, “she”), has recently introduced a novel gender-neutral pronoun *hen*, which was first proposed in 2012 as part of gender-fair language initiatives (Gustafsson Sendén, et al 2015). It is worth noting that *hen* is not directly comparable to the English “they," given that Swedish verbs do not inflect based on subject, and the nature of *hen* as a novel innovation shapes the adoption of its use differently from that of “they," which is a semantic extension of an existing pronoun. Nevertheless, its adoption counters the idea that adult grammars are inherently excessively resistant to the adoption of novel pronoun usage—indeed, *hen* has since become widespread in Swedish. It was added to the Swedish Academy’s Dictionary in 2015 (Svenska Akademien 2015), and by 2018 virtually all Swedes (from a representative sample of 1,203 participants) were familiar with its usage, and over half self-reported as using *hen* in their speech (Gustafsson Sendén, et al 2021).

2.4 Learnability

Unsurprisingly, there is very little research in Linguistics on first language acquisition pedagogy: in many ways, this is antithetical to the field, given the focus on description over prescription. Nevertheless, there exists some research on factors influencing language change in adult speakers. Investigations into the innovated neutral pronoun *hen* have found that its usage correlates with youth, interest in gender issues, left-wing politics, and speakers preferring to be referred to with feminine or neutral pronouns themselves (Gustafsson Sendén, et al 2021). Thus, social factors appear to play a role in the adoption of gender-neutral language. Additionally, research has confirmed that exposure to gender-neutral language increases its usage, indicating that training indeed has an effect on adult speakers (Patev, et al 2019). Investigations into by what modes the use of gender-inclusive language increases have found that spontaneous use is guided both by deliberate intentions to do so and past use of such language, indicating that both conscious motivation and previous practice with the use of gender-inclusive language are necessary to increase its use (Sczesny, et al 2015). In theory, this suggests that an ideal training

includes both arguments about the importance of gender-neutral language (thus influencing conscious motivation to use it) and practice using it; however, the present study assumes that there are people who hold consciously positive attitudes towards TGNC individuals pre-training but are simply unpracticed with its use, which matches the populations of prior studies (Patev, et al 2019; Hekanaho 2020).

Given the lack of research on first language acquisition pedagogy, this study draws from second language acquisition pedagogy in its design. Meta-analysis of pedagogy research has found that explicit teaching is more effective in second language acquisition than implicit teaching (Norris and Ortega 2000). Furthermore, prior research indicates that systematic practice is essential to automating the implementation of information that is known explicitly (in this case, being able to use logically understood grammar rules fluently in actual speech) (DeKeyser 2017), indicating that practice using singular neutral pronouns is essential to their adoption. Combined, these theories from second language acquisition corroborate the findings by Sczesny, et al (2015) that indicate that conscious knowledge and previous practice are essential to increase the use of gender-inclusive language.

2.5 The Present Approach

This study compares the efficacy of two different types of gender-inclusive language promotion initiatives. One, mimicking what is found in many organizational diversity, equity, and inclusion trainings, approaches the issue from a lens of inclusivity, validates singular neutral pronouns from a linguistic standpoint, and argues for their importance in the inclusion of and reduction of bias towards women and TGNC people. The second takes a more novel approach, attempting to address the perceived lack of grammatical regularity in the use of singular neutral pronouns (Patev, et al 2019) by teaching grammar rules explicitly, mimicking how second languages are taught. Comparing the relative efficacy of these two approaches can help make such initiatives more effective in the future, ideally increasing the use of singular neutral pronouns overall.

Given the perception of inconsistent grammar rules as an obstacle to the use of singular neutral pronouns irrespective of attitudes towards TGNC individuals (Patev, et al 2019), as well as the importance of previous practice with the use of gender-inclusive language on its overall use (Sczesny, et al 2015), the importance of explicit training in language acquisition (Norris and Ortega 2000), and the importance of practice in automating explicitly known grammar (DeKeyser 2017), I hypothesize the following:

> H1: Any training will increase the perceived acceptability of singular neutral pronouns by directing participants to think explicitly about their perceptions of language use.
>
> H2: Training that is grammar-based and includes an element of practice will be more effective than training that is solely lecture-based and does not discuss grammar.

3.0 Methods

3.1 Participants

50 participants participated in the study, recruited from the online survey distribution platform Prolific. Participants include a mixture of native and non-native speakers of English. Participants were compensated monetarily.

Demographic information was collected on participant age, gender, race/ethnicity, education level, self-identification as LGBT+, political orientation, country of origin, and whether or not they were native speakers of English. Participants ranged from ages 22-55 (average age = 42.5). 62% of participants were men and 38% were women (no participants self-identified as nonbinary). Participants were separately asked if they preferred to be referred to with they/them pronouns, to which none answered yes; in the event that there were a participant who answered yes, their data would have been excluded. 64% participants were white, 14% were Asian, 12% were Black, 4% were Latin American, and 6% self-described as having another racial/ethnic identity. 16% of respondents had high school educations, 18% had some university education, 46% had Bachelor's degrees, 16% had Master's degrees, and 4% had doctorate degrees. 82% self-identified as not LGBT+, 14% of participants self-identified as LGBT+, 2% answered that they were unsure or it's complicated, and 2% declined to answer. 6% of participants self-described as very conservative, 14% as somewhat conservative, 32% as neither conservative nor progressive, 34% as somewhat progressive, and 14% as very progressive. Participants came from 17 different countries, with the most represented being the United Kingdom (26%), Australia (14%), South Africa (12%), the United States (8%), and Mexico (6%); the remaining 34% of participants are from countries representing less than 5% of the total participant pool or have multiple countries of origin. 78% of participants were native speakers of English (defined as having learned English before the age of 6) and 22% were not. Native speaker status was not found to have a statistically significant impact on results; the remaining social variables were not examined for correlation.

3.2 Study Design

The experiment was split into two sessions with the first consisting of a grammaticality judgment pre-test and one of two possible trainings, and the second consisting of a grammaticality judgment post-test. Participants were randomly split into two groups, termed the "Information Group" and "Practice Group," which determined which training they received. The Information Group received training similar to standard diversity trainings, advocating for the use of singular neutral pronouns for the purpose of inclusivity and validating their usage historically. The Practice Group received explicit grammar instruction on the use of singular neutral pronouns and was directed to practice using them. These are further elaborated on in the following section. Having both groups was necessary to test the hypothesis that there will be some improvement in response to training regardless of training type, as well as that grammar

training with practice will be more effective than other types of training. These trainings were completed in the same sitting as the grammaticality pre-test.

Two weeks after the completion of the first part of the experiment, the same participants were invited via Prolific to participate in the second part, which consisted of the grammaticality post-test. This interval was chosen in order to measure if the training had any lasting effect on grammaticality judgment.

3.3 Assessments

Participants were given grammaticality judgment tests assessing their perceived grammaticality of singular neutral pronouns in a variety of contexts both before receiving treatment as well as two weeks following the submission of the first survey. Data were collected through Qualtrics.

The grammaticality pre-test, administered before participants received their respective trainings, consisted of 55 statements in total, divided into 18 statements using singular neutral pronouns, 18 ungrammatical or grammatically ambiguous statements, and 18 grammatical statements. Additionally, there were two attention check questions. Participants were asked to rate the sentence on a 5-point scale based on how natural the sentence is to *hear/read* and how natural it would be to *say*. These were examined jointly during analysis.

The singular neutral pronoun questions were divided into three sets of six sentences. The first set was sentences in which a singular neutral pronoun was used in the indefinite singular, referring to an unknown referent:

(6) Generic
a. Somebody left <u>their</u> wallet on the bench.
b. Every client got a care package delivered to <u>them</u>.

The second set used singular neutral pronouns to refer to a definite but unnamed referent:

(7) Unnamed
a. My roommate always locks the door when <u>they</u> leave.
b. Even though the professor is very nice, I don't really enjoy <u>their</u> class.

The third used singular neutral pronouns to refer to a referent given a constructed name:

(8) Constructed name
a. Prene put the keys to <u>their</u> car on the table.
b. Maval isn't the best at cooking, but <u>they</u>'re trying to learn.

Names were constructed similarly to nonce words, following a precedent set by Bradley, et al (2019), and verified to not be documented as names in order to prevent participants from

associating the name with a gender via association with a person they know. Each of these sets of sentences contained sentences using pronouns in the subject (“they”), object (“them”), and possessive (“their”) positions.

The 18 ungrammatical/grammatically ambiguous sentences were also subdivided. Six questions used names that are typically gendered, but mismatched pronouns such that he/him/his pronouns were used to refer to traditionally feminine names and she/her/hers pronouns were used to refer to traditionally masculine names. Like the singular neutral pronouns, these were used in a variety of grammatical positions.

(9) Ellie always forgets when he has assignments due.

Another five sentences include subject-verb number mismatches. These were included to provide a baseline for how participants rate subject-verb and subject-pronoun mismatches (or perceived mismatches).

(10) The students does their work very diligently.

Additionally, three sentences were utterances that resemble natural language, but on a closer look are either ungrammatical or semantically meaningless and four sentences were garden-path sentences. These sentences, combined with the 18 grammatical sentences, serve as distractor questions to obscure the focus of the study.

The grammaticality post-test was set up similarly, with the same format of three sets of six sentences using singular neutral pronouns to refer to unknown referents, known but unnamed referents, and referents with constructed names. As before, each set of sentences had items using singular neutral pronouns in the subject, object, and possessive position. There were also four statements containing subject-pronoun gender mismatches, three statements containing subject-verb number mismatches, one garden-path sentence, nine grammatical statements, and two attention checks, for 38 questions in total. As before, participants were asked to rate the sentence on a 5-point scale based on how natural the sentence is to *hear/read* and how natural it would be to *say*.

3.4 Treatments

After assessing participants’ perceived grammaticality of sentences using singular neutral pronouns in a variety of contexts, participants were randomly sorted into one of two treatment groups, termed the “Information Group” and the “Practice Group."

The Information Group was given a short video to watch that highlighted reasons why using singular neutral pronouns was linguistically valid and socially inclusive. The video began by explaining that the use of these pronouns in the singular was not a recent innovation, but that they have been used in such contexts for centuries, listing specific examples from classic literature as an appeal to authority. The video then explained that language change is natural and

inevitable, citing the historical changes that the pronoun “you” underwent as evidence for this inevitability. Finally, the video gave a summary of the role that advocacy for singular neutral pronouns has played in social movements, beginning with the women’s rights movement, mentioning other alternatives that are found in written language sometimes (“he or she," “s/he," and “thon”), but continue to be difficult to use in spoken language, which was contrasted with “they,” which is easier to implement due to already being in use as a singular neutral pronoun. The presentation concluded by explaining the role singular neutral “they” plays in TGNC inclusion, noting that misgendering has been empirically linked to psychological distress including anxiety, depression, and disordered eating (McLemore 2018). The video lasted around 7.5 minutes, and participants were not allowed to continue until that time had elapsed.

The Practice Group was also given a video to watch, though the scope differed. It explained the grammatical contexts in which singular neutral pronouns are used (i.e. “grammar rules”), highlighting that the use of neutral pronouns in the singular is exactly the same as the use in the plural, including that verbs conjugate the same whether the pronoun is used in the singular or plural. The video lasted around 4.5 minutes, and as with the previous group, participants were not allowed to continue until the time elapsed.

Following the video, the Practice Group is additionally given a short scenario about a character with pronouns removed and asked to fill in the blank with the appropriate singular neutral pronoun (i.e. “they," “them," or “their," etc.). A sample is shown below (the full scenario is longer than shown and can be found in the Appendix).

(11) Haru is a university student who works part-time at a cafe near their university on the weekends. They had the opening shift on Saturday, and had arranged to carpool with (1)_____ coworker, who usually picks (2)_____ up for work at 6:15am.

They are then asked a series of questions about the character based on the scenario and asked to write responses in full sentences, practicing the use of singular neutral pronouns in their response, as the questions below.

(12) a. When was Haru supposed to be at work?
b. How was Haru supposed to get to work?

Participants were then given a second scenario and asked to repeat the exercise, but responding verbally and recording answers instead. The recordings were collected through the website SpeakPipe (speakpipe.com), which was embedded in the Qualtrics survey, but were not analyzed.

4.0 Results

The data were sorted by which treatment (information or practice) each participant received, then broken down by sentence type (generic, unnamed, and constructed name, as

defined in Section 3.3). These results can be found in Table 1 below. The ratings are averaged from a 5-point Likert scale asking participants to assess naturalness. The points of the scale are very unnatural, somewhat unnatural, neither natural nor unnatural, somewhat natural, and very natural, with 1 corresponding to very unnatural and 5 corresponding to very natural.

Table 1: Results by Treatment & Sentence Type

	Pretest Acceptability (1-5)	**Posttest Acceptability (1-5)**	**Difference**
information	**3.7479**	**3.8025**	**0.0545**
Generic	4.2593	4.2685	0.0093
Unnamed	3.7037	3.6975	-0.0062
Constructed name	3.2809	3.4414	0.1605
practice	**3.7162**	**3.8116**	**0.0954**
Generic	4.3297	4.4638	0.1341
Unnamed	3.7754	3.8514	0.0761
Constructed name	3.0435	3.1196	0.0761

With the exception of the unnamed sentence type in the information group, a slight increase in acceptability rating across sentence types is found in both groups.

A cumulative link model was run in R Statistical Software (R Core Team 2021 and RStudio Team 2022) with dependent variable *Acceptability* and independent variables *Time* (two levels: pre-test and post-test), *Sentence Type* (three levels: generic, unnamed, and constructed name), *Training Type* (two levels: practice and information), and all the interaction terms. *Subject* was included as a blocking factor.

Table 2: Effects between *Time*, *Sentence Type*, and *Training Type*

	LR Chisq	Df	Pr(>Chisq)
Training Type	0.017	1	0.896

Time	4.847	1	0.028
Sentence Type	711.236	2	<0.001
Training Type:Time	1.561	1	0.211
Training Type:Sentence Type	34.039	2	<0.001
Time:Sentence Type	1.001	2	0.606
Training Type:Time:Sentence Type	1.901	2	0.387

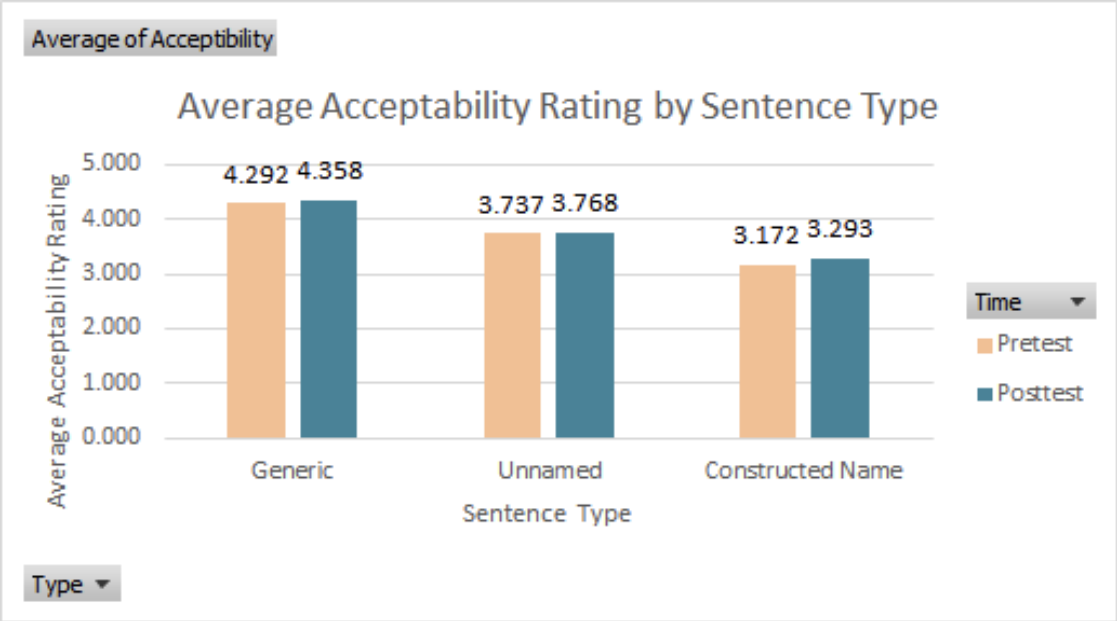
Of these, *Time* was found to have a significant effect ($p = 0.028$)—that is, participants in both groups were found to have statistically significantly different acceptability ratings between the pre-test and post-test. *Sentence Type* was also found to vary significantly ($p < 0.001$), indicating that the generic, unnamed, and constructed name sentence types were found to be acceptable at different rates. Notably, *Training Type* did not have a main effect ($p > 0.05$), indicating that in general, the two types of training were similarly effective, countering the hypothesis that the grammar training would be more effective and thus the Practice Group would show a greater difference in acceptability ratings between the pre-test and post-test.

In investigating interactive effects, *Training Type* and *Sentence Type* interact at statistically significant levels ($p < 0.001$). However, as this interaction doesn't include *Time* as a variable, meaning this did not affect the amount that acceptability ratings changed between the pre-test and post-test, this only shows that the two groups were statistically different from each other overall, rather than being affected differently by the training.

A cursory view of the data indicates that while most items improve only slightly or not at all, the constructed name sentence type in the Information Group and the generic sentence type in the Practice Group improve substantially more. The latter is statistically significant ($p = 0.022$), despite the interaction of *Training Type*, *Time*, and *Sentence Type* not being significant overall; however, the constructed name sentence type in the Information Group was not statistically significant, despite the notable difference.

Pairwise comparisons in ratings by *Sentence Type* show that all three levels are significantly different from each other ($p < 0.001$). Their ratings, broken down by pre- and post-test are shown in the graph below. Note that there was not a significant interaction between *Time* and *Sentence Type*.

Figure 1: Results by Sentence Type and Time



The generic sentence type is rated the most favorably overall, followed by the unnamed sentence type, and then the constructed name sentence type. This is consistent with what we would expect to find, given the naturalization of the generic singular they in English, and the presence, though not ubiquitousness, of the singular they with unnamed definite referents.

A second cumulative link model was run in R, with the same dependent variable *Acceptability*, and independent variables *Time* and *Sentence Type*, along with the new independent variable *Case* (three levels: subject, object, and possessive), and all the interaction items. *Subject* was included as a blocking factor. New items and interactions are shown below.

Table 3: Effects between *Time*, *Sentence Type*, and *Case*

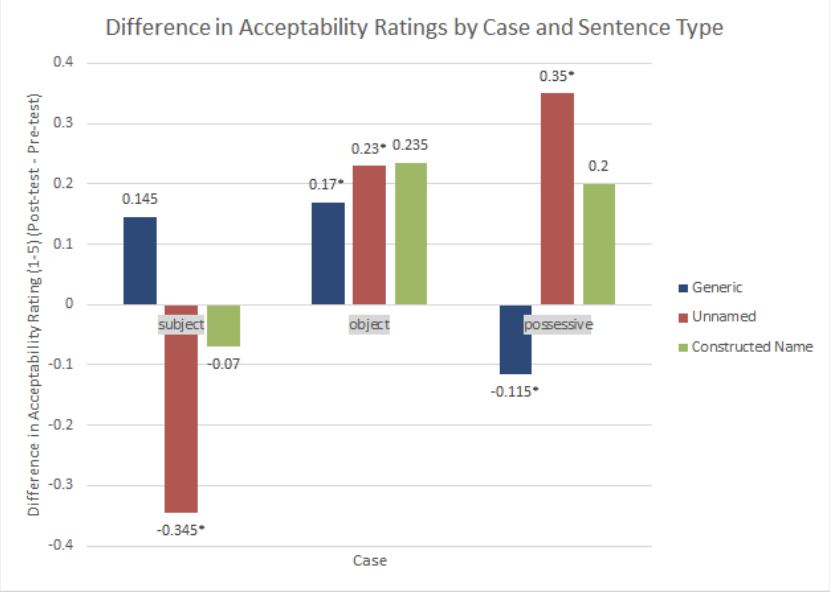
	LR Chisq	Df	Pr(>Chisq)
Case	9.643967	2	0.008
Time:Case	15.56036	2	<0.001

Case:Sentence Type	6.222358	4	0.183
Time:Case:Sentence Type	28.81833	4	<0.001

From this, it can be seen that *Case* has a main effect ($p = 0.008$), an interactive effect with *Time* alone ($p < 0.001$), and an interactive effect with *Time* and *Sentence Type* jointly ($p < 0.001$). Again, there were no statistically significant interactions with *Training Type* ($p > 0.05$). Thus, while the type of training does not make a difference, different pronoun cases respond to training differently from one another, and this also depends on the sentence type.

Pairwise comparisons of the interaction term *Time*:*Case*:*Sentence Type* in this model find that the statistically significant variation in the efficacy of training can be found in the subject case when used in the generic ($p = 0.036$) and unnamed sentence types ($p = 0.001$), the object case when used in the generic sentence types ($p = 0.013$) and the constructed name ($p = 0.044$), and the possessive case when used in the unnamed sentence type ($p < 0.001$). Of particular note is that the acceptability rating of the subject case was found to have *decreased* in the unnamed context. These differences are represented in the graph below (items that are statistically significant at the $p \leq 0.05$ level are marked with an asterisk).

Figure 2: Difference in Acceptability Ratings by Case and Sentence Type



5.0 Discussion

While the results show an overall increase in acceptability ratings between the pre-test and post-test across contexts, the lack of statistically significant difference between the Information Group and the Practice Group indicates that this increase is not a result of the

different type of training, but rather the presence of any training at all. That is, it seems to be the mere act of thinking about pronoun use that has a, generally positive, effect on grammaticality perceptions. Thus, while the H1 that any form of training will increase acceptability ratings is supported, the H2 that grammar-based instruction with an element of practice has a greater effect on grammaticality perceptions than inclusivity-based initiatives is not supported.

While previous research has indicated that a lack of grammar rules is a perceived obstacle to use even among people who hold positive attitudes towards TGNC individuals (Patev, et al 2019), the results of the present study challenge that. Assuming that the two treatment groups in the present study hold similar attitudes towards TGNC individuals, one would expect both groups to include a group of people who fit this description, holding positive attitudes towards TGNC but perceiving a lack of rules surrounding singular neutral pronouns, and thus would not benefit from inclusivity training but would benefit from grammar training. Given that the reverse is not true (there is little reason to believe that there exists a group of people who rate singular neutral pronouns as grammatically acceptable but hold negative attitudes towards TGNC individuals, and thus would benefit from inclusivity training but not grammar training), one would expect the grammar training to have a greater effect overall. It is possible that while this grammatical discomfort is an overt justification for the lack of use of singular neutral pronouns, this is an explicit justification for implicit gender bias (either against TGNC individuals or towards an unmarked masculine). This finding echoes previous research on attitudes toward gender-inclusive language (Hekanaho 2020).

This explanation is supported when comparing the results of this study to research on pedagogy, which values explicit instruction (Norris and Ortega 2000) and practice (DeKeyser 2017). If the difficulty in use reflected a true lack of relevant rules in the mental grammar rather than interference from language ideologies, one would expect such pedagogy to be effective. The fact that it is not substantially more effective than the training received by the Information Group indicates that a lapse in grammar is not the cause (although it is also possible that even as adults, native speakers of a language acquire new grammar structures in their native language differently from in a second language, and as a result research from second language pedagogy is not necessarily applicable in the native-language context).

Furthermore, if the acceptability judgment reflected a pure lapse in the mental grammar of participants, one would expect the difference in acceptability judgment between the pre- and post-test to vary based on sentence type—given that the generic case was already rated as generally acceptable, it is clear that they do not have a perceived lack of grammatical rules surrounding their use. Consequently, if the grammar training increased acceptability scores by providing rules where there was previously an absence, it would not be effective in the generic sentence type. However, the opposite effect was found—the only instance in which the treatment group is found to have a significant interactive effect with sentence type and change in acceptability rating is in the generic sentence type with the Practice Group. Consequently, it seems likely that the efficacy of the grammar training does not come wholly from teaching new grammar rules as it was designed to; rather, grammaticality develops by thinking about usage,

regardless of whether this takes the form of considering grammar rules or the reasons for use thereof.

Given that prior research has indicated that both conscious motivation and practice are vital to increasing the use of gender-inclusive language (Sczesny, et al 2015), it is possible that grammar instruction alone did not provide a conscious motivation for changing perceptions (assuming a correlation between grammaticality perceptions, as examined in the present study, and usage, as examined by Sczesny, et al), and as a result, each training accounted for one of the two items but not both. It is possible that training that includes both arguments towards inclusion (i.e. the Information Group) and grammar practice (i.e. the Practice Group) would be more effective than a training of equal length that includes one but not the other.

One abnormality found in the results is that while the constructed name sentence type in the Information Group demonstrated the highest mean increase in acceptability ratings of any category when grouped by *Time* and *Sentence Type*, this increase was not statistically significant. A closer inspection of the data shows that the distribution was notably right-tailed, with several more receptive individuals skewing the mean difference high. Interestingly, this group had notable outliers in both directions, with one participant having an increase of 2.833, from a mean rating of 1 (that is, rating every instance of the constructed name sentence type as “very unnatural”) to 3.833, and one participant having a 2.064 decrease, from a mean rating of 4.231 to 2.167, highlighting the influence of social ideology on language attitudes. It is possible that these above-average increases are the result of attempting to give the “correct” answer; however, given that every participant had some sentences they rated highly on naturalness and some they rated lowly on naturalness, this seems unlikely.

The difference based on sentence type (generic, unnamed, or constructed name) is consistent with what one would expect to find based on descriptive linguistics in English. The generic, epicene they has a long-documented history and is widely used and accepted in English; the definite epicene “they” (i.e. the unnamed sentence type) is also documented, but less widely, with using epicene pronouns for definite referents being less frequent than “he” or “she” (Baranowski 2002). Using singular neutral pronouns to refer to specific named individuals, however, is a recent innovation, and as such one would expect low acceptability rates.

The difference in acceptability based on case is likely a function of saliency. The possessive “their” likely stands out less to participants than either “they” or “them” for both linguistic and cultural reasons. Syntactically, “they” and “them” both occupy NP head positions—“their," by contrast, functions as a determiner for the following noun. As a result, “their” is less salient in the mental representation of sentences. Additionally, in cultural discussions of personal pronouns, discussion of the subject and object is overrepresented in discourse compared to other forms. For example, they are often stated or written in subject-object form (e.g. “they/them”), with possessive and other forms being implied. As a result, people likely have stronger overt language ideologies surrounding the use of the subject and object forms than of the possessive, which may make the subject and object forms both stand out more and be judged as less grammatical. (There may be an interactive effect between the

syntactic and cultural explanations, whereby the reason the subject and object are overrepresented in discussion of pronouns is that they are more syntactically salient; it would also be interesting to see if possessive pronouns are more grammatically flexible in other situations.)

Given this difference in how different parts of speech of the pronoun are processed cognitively, it is unsurprising that they respond differently to training. Specifically, analysis based on change in acceptability score based on case shows that “them” and “their” are both rated as more acceptable after training (regardless of group), whereas “they” appears unaffected by training. However, analysis based on sentence type in addition to case shows this to be an oversimplification: rather than staying unchanged, “they” is rated more favorably in the generic context and less favorably in the unnamed context (thus evening out when viewed jointly). A possible explanation for the decrease in the unnamed condition is that the unnamed condition is largely unnoticed by speakers, and training serves to highlight it in the minds of speakers, thereby making it more susceptible to language ideologies against its use. Combined with the previous analysis of “their” as being a less salient form, this could explain why “they” decreases when “their” increases, although this fails to account for the lack of statistically significant change in acceptability ratings of “them." Regardless, the presence of this interaction effect suggests that initiatives aimed at increasing singular neutral pronoun use would be most effective if they address these categories separately, rather than assuming that understanding or comfort with one form automatically translates to understanding or comfort with another.

Given the sample size of n=50 for this study, the lack of effects found in some situations may be explained simply by a lack of data. In particular, when examining several layers of interactive effects as above, the sample size may be the cause of certain non-effects. Additionally, due to limitations in scope, the trainings were designed to be completed in 10 minutes. This likely restricted their effect—presumably, more in-depth trainings are likely to have a greater effect over a longer period.

6.0 Conclusion

Training, regardless of type, was found to have a statistically significant impact on the acceptability rating of singular neutral pronouns; this indicates that adult grammars can indeed be changed in response to training. Further, the form of training (i.e. the Information Group vs. the Practice Group) had little overall effect on results: similar overall increases were seen between participants who were given training based on prescriptive validation and arguments towards inclusion and participants who were given training based on explanation of the grammar behind singular neutral pronouns. However, when examining the interactive effects of sentence type (e.g. with a generic referent, with an unnamed definite referent, and with a definite referent) and case (e.g. subject, object, or possessive), certain combinations were found to respond more or less to the training, and the acceptability rating even decreased in certain categories.

While many people state a lack of grammatical rules as being an overt explanation for difficulty in using singular neutral pronouns, the present study provides little evidence that this

accurately represents one's covert mental grammar. Were such a lack of grammatical rules to exist, one would expect that explicit education on these grammatical rules would increase acceptability ratings of sentences using singular neutral pronouns more than other types of training. Consequently, this overt explanation may be a justification for more persistent subconscious ideologies against gender-inclusive language or against women and TGNC individuals. (Another possible explanation is that even if such an absence of rules exists, it cannot be filled by direct outside instruction.)

Nevertheless, these results demonstrate that people can change their grammaticality perceptions of pronouns, even as adults, despite the fact that pronouns are considered a closed class. In the case of singular neutral pronouns in English, many of the commonly cited reasons for their ungrammaticality hold little water. While "they" is thought of as requiring a plural referent, it is widely accepted to refer to singular indefinite referents and, to a lesser extent, definite ones as well. Furthermore, while English is conceptualized as having obligatory verb inflection based on subject number, a closer look reveals this to be untrue of pronouns, which instead form pairs with verb inflections, as in the case of "you," which takes bare verb inflections whether used in the singular or plural. The ability for change found in this study also fits in with cross-linguistic studies on the adult adoption of gender-neutral pronouns, such as in Swedish, where gender-neutral language initiatives have been unquestionably successful and the novel neutral pronoun *hen* has been widely incorporated into the mental grammars of adult speakers (Gustafsson Sendén, et al 2015; Gustafsson Sendén, et al 2021).

Given the findings of the present study, and particularly that adult acquisition varies based on sentence type and pronoun case, a potential lens for future research could be investigating different variations on the training. For example, explicit acknowledgment of the different sentence types and pronoun cases may yield a more robust overall effect. Examining the effect of more rigorous training or training that combines methods may also provide insight into how grammaticality develops. Additionally, given that this study used an untimed grammaticality test, which is known to measure explicit, but not implicit knowledge (Vafaee, et al 2017), reproductions that utilize timed grammaticality tests may provide a more complete picture pronoun acquisition.

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Appendix

Grammaticality Pre-Test

<u>They Sentences:</u>

Specific singular they, constructed names:

- Maval isn't the best at cooking, but they're trying to learn.
- When Cayran was a child, they often had trouble focusing in class.
- Prene put the keys to their car on the table.
- Corlen had to run to not miss their bus.
- Vori asked to borrow my leaf blower, but when I went to give it to them, nobody was home.
- Cassil always carries a notebook with them.

Specific singular they, no names:

- My roommate always locks the door when they leave.
- When I first met my neighbor, I thought they didn't like me.
- My best friend always asks me to get coffee for them before work.
- I haven't gotten to know my new coworker yet, but they seem really nice.
- Even though the professor is very nice, I don't really enjoy their class.
- I always see the person with the red coat walking their dog in the morning.

Generic singular they:

- When a new person joins the club, they sometimes feel shy about participating, but we do our best to be welcoming.
- Whoever wrote that must not have known what they were talking about.
- The door was left open; someone must have forgotten to close it behind them.
- Every client got a care package delivered to them.
- Somebody left their wallet on the bench.
- Anyone with common sense knows not to leave their belongings in places where they could be easily stolen.

Ambiguous grammaticality:

Perceived subject-pronoun mismatches:

- Ellie always forgets when he has assignments due.
- When Victor got home, she realized she forgot to stop at the grocery store.
- Jack always remembers her friends' birthdays.
- Luisa is an amazing baker, his cookies are the best!
- Mike brings a computer to class with her to take notes.
- Aliyah makes sure to always carry some money on him, just in case.

Perceived subject-verb mismatches:

- Clara like to go for a jog before work every morning.

- The students does their work very diligently.
- My son get home from school by bus in the afternoon.
- My boss are strict about tardiness, but nice other than that.
- The employees seems very busy today.

Other confusing sentences, ungrammatical, natural-ish:

- More people have been to Detroit than I have.
- The keys to the cabinet is on the table.
- About two-thirds of the households in the United States has pets.

Garden path sentences:

- The old man the boats.
- The girl told the story cried.
- The raft floated down the river sank.
- The man who hunts ducks out on weekends.

Acceptable sentences:

1. I don't think my neighbors are usually home in the evenings.
2. The girl who's speaking doesn't know what she's talking about.
3. My boyfriend works as a lawyer in employment law.
4. My uncle drives his daughter to school every morning.
5. Sarah is a seasonal worker at state and national parks.
6. My roommate has to go to physical therapy once a week for her scoliosis.
7. I've never seen anyone run as fast as him.
8. I was more of a dog person growing up, but now I prefer cats.
9. They're putting up a new apartment building down the street from us.
10. I wish I had more time to cook in the evenings.
11. I got a prescription for new meds from my doctor the last time I saw her.
12. Marcus invited a bunch of people over for a party, but he forgot to tell his roommates.
13. Francisco tries to walk his dogs twice a day.
14. Out of our friend group, Rohan has the easiest time meeting new people.
15. Chloe's friends know her to be a very thoughtful and giving person.
16. I love Erika's outfits—I always wonder where she gets her clothes from.
17. Caitlyn started learning to skateboard during the pandemic.
18. Leah has a bagel with butter for breakfast every morning.

Grammaticality Post-Test

They Sentences (18):

Specific singular they, constructed names:

- When Vori moved, they wanted to find an apartment accessible by public transportation.
- Cassil wouldn't say they are shy, but other people tend to disagree.
- Corlen asked if I could lend them a pen.
- Cayran carried an umbrella to protect them from the rain.
- Maval always bites their lip when concentrating hard.
- Prene has a reputation among their friends for always being late.

Specific singular they, no names:

- I like the bus driver on my morning commute, because they always wait at the stop if they see someone running to catch the bus.
- My coworker is known for the brownies they make every year for the holiday party.
- My roommate asked me to pick up pasta sauce for them when I went to the grocery store.
- I bought a new blender to replace the one my old roommate took with them when moving out.
- The customer ordered their coffee with soy milk and no sugar.
- My boss was out of the office for the day but said I should leave my report on their desk.

Generic singular they:

- I don't know who made the playlist for the party, but they have a great taste in music.
- When someone loses their credit card, the first thing they should do is call the bank to deactivate it.
- Whenever a new employee joins the company, the senior employees take them out to lunch.
- Every student was asked to bring a pen with them to the test.
- Anyone trying to order alcohol should be prepared to show their ID.
- The table was empty, but someone had left their stuff there to claim it.

Ambiguous grammaticality (9):

Perceived subject-pronoun mismatches:

- Ethan is kind of shy, but she's talkative around her friends.
- Francesca left his keys on the bus.
- Carlos never remembers to bring her keys with her.
- Lucy asked me to bring him some medicine when he was sick.

Perceived subject-verb mismatches:

- Taylor have two kittens she adopted recently.
- Hannah are in the progress of writing of a book.

- My friends goes on a trip to the beach every year.
- My parents lives half an hour away from me.

Garden path sentences:

- The cotton clothing is made of grows in Mississippi.

Acceptable sentences (9):

1. Keisha started learning how to knit so she could have something to do with her hands while watching TV.
2. Jin started dating his girlfriend three years ago.
3. My brother works at a cafe on the weekends.
4. The test was easier than the students expected it to be.
5. My friends always come to me with their problems, because they know I can keep a secret.
6. Chris hosts a party for his entire extended family every summer.
7. When Ena was in a long-distance relationship, she would have a video call with her boyfriend every night.
8. My son tries hard in school, but sometimes has trouble focusing.
9. Even though he works from home, Ali makes sure he leaves the house at least once every day.

Practice Group Scenarios

Scenario 1:

Fill-in-the-blank:

Haru is a university student who works part-time at a cafe near their university on the weekends. They had the opening shift on Saturday, and had arranged to carpool with (1)____ coworker, who usually picks (2)____ up for work at 6:15am. Knowing this, (3)____ made sure to go to bed early on Friday, but (4)____ were startled to wake up to sunlight entering (5)____ room at 6:47. Checking (6)____ phone, (7)____ realized that (8)____ had forgotten to set their alarm and, as a result, (9)____ were late for work. To make things worse, (10)____ had missed (11)____ carpool, and had to take the bus to work by (12)____, without the company of (13)____ coworker.

Open-ended questions:

1. When was Haru supposed to be at work?
2. Why did Haru oversleep?
3. How was Haru supposed to get to work?
4. What woke Haru up?

5. How did Haru end up getting to work?

Scenario 2:

Fill-in-the-blank:

Nasim lives in the suburbs of a major city with their spouse and two-year-old son. Prior to becoming a parent, (1)____ had a busy social life, and were part of (2)____ local adult rec soccer league, and (3)____ went to monthly book club meetings at (4)____ local library. Since becoming a parent, however, (5)____ haven't had as much free time, and most of (6)____ friends are other new parents. Of course, prior to (7)____ son being born, (8)____ friends had told (9)____ to expect this, but it was more of a change than (10)____ were expecting. However, (11)____ son will start preschool soon, and (12)____ are looking forward to having more free time to play soccer again, or even just being able to spend some time by (13)____, without (14)____ kid.

Open-ended questions:

1. Who does Nasim live with?
2. What social groups was Nasim a part of?
3. Why is Nasim so busy lately?
4. What social group is Nasim mostly a part of now?
5. What is Nasim looking forward to with their son starting preschool soon?

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