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Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 48(0)

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Publication Date

2026

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Peer reviewed

Processing and Acceptability of Singular They: Evidence from Eye Tracking

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Abstract

Singular *they* has a long history in English. Generic uses of singular *they* refer to nonspecific individuals, whereas referential uses refer to specific persons. This study examined acceptability and processing of singular *they* and the role of individual differences. Fifty-one native English speakers read sentences containing gendered pronouns or singular *they* in generic and definite contexts while their eye movements were recorded. Participants also completed measures of gender role attitudes, prescriptive grammar attitudes, attitudes toward singular *they*, and the Bem Sex Role Inventory. Singular *they* was rated as highly acceptable in both contexts, with generic uses preferred over gendered pronouns. Eye-tracking data revealed no overall processing cost for singular *they*. These findings indicate that singular *they* is largely standardized in Canadian English, and any processing cost is brief and influenced by evaluative monitoring rather than comprehension difficulty.

Keywords: singular *they*; gender-neutral pronouns; eye-tracking; language processing

Processing and Acceptability of Singular They: Evidence from Eye Tracking

The use of *they* as a singular pronoun has a long and well-documented history in English. Examples can be found as early as the late fourteenth century, including Geoffrey Chaucer's *The Canterbury Tales* (c. 1386), where *they* is used to refer to a grammatically singular but semantically generic antecedent (Newman, 1992). Singular *they* appears consistently throughout Middle and Early Modern English. Authors including William Shakespeare, Jane Austen, and Lord Chesterfield regularly used *they*, *them*, and *their* to refer to singular individuals whose gender was unknown, irrelevant, or deliberately unspecified (Curzan, 2003; Newman, 1992). Historically, singular *they* did not function as an explicit marker of gender neutrality in the contemporary identity-based sense. Instead, it served a pragmatic and grammatical role, allowing speakers and writers to refer to a person occupying a particular role or position without specifying gender (Curzan, 2003). Importantly, there is little evidence that this usage attracted criticism prior to the eighteenth century. Linguistic analyses suggest that for several centuries, singular *they* was perceived as unremarkable and fully grammatical within the English pronominal system (Balhorn, 2004).

Attitudes toward singular *they* shifted with the rise of prescriptive grammar in the eighteenth century. Grammarians began to argue that plural pronouns should not refer to singular antecedents. As a result, generic *he* was promoted as the preferred form for referring to individuals of unknown or unspecified gender, particularly in formal writing (Curzan, 2003). Despite this prescriptive intervention, singular *they* persisted in actual language use, creating a divergence between prescriptive rules and descriptive patterns that continues to be documented in modern linguistic research (Balhorn, 2004). Contemporary research demonstrates that singular *they* is now used with a broad range of antecedents, including both generic (e.g., *someone*, *anyone*) and definite antecedents, reflecting its grammatical flexibility in modern English (Paterson, 2014).

Bjorkman (2017) distinguishes between at least two types of singular *they*: (1) generic uses, in which *they* refers to a hypothetical or nonspecific individual, and (2) referential uses, in which *they* refers to a specific, identifiable person. English speakers generally judge generic uses of singular *they* to be more frequent and acceptable than referential uses involving a definite antecedent. For example, Bradley (2020) found that singular *they* received the highest acceptability ratings among generic singular pronouns; however, its use with definite referents was judged to be less grammatical than its generic use. Moreover, sentences containing definite *they*/*them* were rated as significantly more acceptable when the referent had no name than when the referent had feminine, masculine, or ambiguous names. Individual differences also play a significant role in the acceptance of singular *they*. Individuals with more egalitarian attitudes toward gender roles (Bradley, 2020; Conrod, 2019; 2020) and lower levels of sexist attitudes (Bradley, 2020) show greater acceptance of singular *they*. In contrast, speakers with more prescriptive grammatical orientations (i.e., individuals who place greater value on traditional agreement rules) are less likely to accept singular *they* in either written or spoken language (Hernandez, 2020).

Beyond explicit acceptability judgments, psycholinguistic research has examined how singular *they* is processed in real time. In one of the earliest studies, Foertsch and Gernsbacher (1997) reported longer reading times for singular *they* when it referred to a definite antecedent with stereotypically masculine or feminine gender, suggesting increased processing demands in such contexts. Further,

some research using eye tracking has provided evidence that singular they can elicit a plural–singular mismatch effect, making it more difficult to process than gender-marked pronouns that align with antecedent gender information (Sanford & Filik, 2007). Number agreement between a pronoun and its antecedent plays a crucial role in processing, with singular pronouns generally expected to refer to a single person or entity (Jäggi et al., 2025). Consistent with this, Sanford and Filik (2007) found longer reading times for they than for he/she when the antecedent was singular, whereas the reverse pattern emerged for plural antecedents. The authors argued that encountering they triggers a search for a plural antecedent in the discourse representation, rather than for a referent that could be either singular or plural, thereby increasing processing cost in singular contexts. More recent neurocognitive evidence further showed that explicit acceptance of singular they does not necessarily eliminate processing costs. Using event-related potentials (ERPs), Chen et al. (2021) demonstrated that even English speakers who reported explicit acceptance of singular they exhibited increased neural processing difficulty when encountering the pronoun. Specifically, singular they elicited ERP signatures associated with increased integration or reanalysis demands, suggesting that acceptance at the attitudinal level does not fully translate into automatic processing ease. Crucially, however, this processing difficulty was significantly attenuated for participants with greater exposure to environments that embrace non-binary identities. This finding indicates that familiarity and sustained linguistic experience can modulate the cognitive effort required to process singular they, supporting usage-based accounts in which repeated exposure facilitates more efficient grammatical integration. However, findings from other languages demonstrate that gender-neutral pronouns are not inherently harder to process. In a study of Swedish, Vergoossen et al. (2020) investigated the processing cost associated with *hen*, a relatively new gender-neutral pronoun. Their results showed no overall increase in reading difficulty for sentences containing *hen* compared to gendered pronouns, suggesting that the pronoun itself is not inherently disruptive to sentence processing. Importantly, any observed processing cost was localized to the pronoun spillover region rather than the pronoun itself, indicating a brief, downstream adjustment rather than sustained difficulty. Furthermore, individual-difference factors, such as self-identified feminist orientation and self-rated prior experience with *hen*, did not significantly modulate processing cost, suggesting that early stages of pronoun processing may be relatively insensitive to explicit attitudes.

While existing research has demonstrated that individual differences can influence language processing including grammatical gender (e.g., Casado et al., 2023; Chen et al. 2021), the specific role of these differences in the processing of singular they remains largely unexplored. This study aims to address this gap by using an eye-tracker to explore how factors such as gender role attitudes, masculine and feminine traits, attitudes towards singular they and linguistic

prescriptivism affect the processing of singular they. Building on previous research, we hypothesized that English speakers would rate acceptability of singular they higher in generic context than definite context. Further, participants would find the processing of singular they more challenging in definite contexts compared to generic contexts. Additionally, we predicted participants exhibiting higher levels of egalitarian gender role attitudes, positive attitudes towards singular they, feminine traits, and less linguistic prescriptivism to rate the acceptability of singular they higher and would have less difficulty processing singular they than their less egalitarian counterparts who possess masculine traits and demonstrate more linguistic prescriptivism.

Methods

Participants

Data was collected from 60 participants. Nine participants were excluded due to insufficient eye-tracking data ($N = 7$) or because they reported a dominant language other than English ($N = 2$). The final sample consisted of 51 native English speakers with no reported vision-related problems (38 female, 9 male, 3 nonbinary, 1 genderfluid; $M_{age} = 21.1$, $SD_{age} = 3.39$, $range_{age} = 17\text{--}36$), all residing in Canada. Participants received course credit for their participation.

Materials

BEM Sex Roles Inventory (BSRI) The BSRI, developed by Sandra Bem in 1974, is a widely used psychological tool designed to assess individuals' identification with traits culturally associated with masculinity, femininity, or both. The inventory includes 60 items: 20 traits traditionally associated with masculinity (e.g., assertive, self-reliant), 20 associated with femininity (e.g., compassionate, gentle), and 20 neutral traits serving as fillers. Participants rate themselves on these traits using a Likert scale (1: Never or almost never true, 7: always or almost always true).

Prescriptive Grammar Attitudes Scale (PGAS) Developed by Hernandez (2020), the scale assesses individuals' attitudes toward language usage norms and adherence to traditional linguistic rules. It assesses the degree to which a person values strict conformity to standard language conventions versus tolerance for linguistic variation. Participants rate their approval of statements related to prescriptive grammar on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

Attitudes Toward ‘they’ as a Singular Pronoun Scale (ATTSPS) This 16-item scale, developed by Hernandez (2020), measures attitudes toward the use of they in a singular context. It includes two subscales: generic they attitudes and

queer they attitudes. Participants rated themselves on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

Gender Roles Attitudes Scale (GRAS) The GRAS was developed by García-Cueto and colleagues (2015) to assess attitudes towards gender roles of both females and males in young Spanish adults. The scale consists of 20 items (e.g., Boys have the same obligations to help with household chores as girls) that are rated on a Likert scale of 1-5 (totally agree, totally disagree). The items are divided into two categories: transcendent attitudes vs. sexist attitudes and these categories are divided into three subareas: family, social interrelations, and employment.

Sentences The stimuli consisted of 54 sentences adapted from Bradley (2020). The critical set included 36 sentences containing *she/her*, *he/him*, or *they/them* pronouns (12 per pronoun type), referring to either generic antecedents (e.g., a student) or definite antecedents (e.g., the teacher). Definite antecedents included stereotypically male names (e.g., Bob), stereotypically female names (e.g., Sharon), and invented gender-neutral names (e.g., Ven). In the present analyses, *she/her* and *he/him* were grouped together as gendered pronouns. For the main analysis, antecedents were categorized as either definite or generic, without distinguishing between types of definite names (male, female, or gender-neutral). In addition, 18 ungrammatical filler sentences were included, evenly distributed across pronoun types (e.g., “I saw they in the park yesterday afternoon”), to ensure attention to grammaticality and discourage strategy-based responding. Example stimuli are presented in Table 1.

Table 1: Example stimuli by condition

<i>Pronoun</i>	<i>Antecedent type</i>	<i>Sentence</i>
gendered	definite	If a child’s tooth hurts, make sure she is examined by a dentist
		When the student had a problem understanding the lecture, they called the teacher for help
	generic	When an athlete gets injured, they should go to the trainer
		When the student had a problem understanding the lecture, they called the teacher for help
they	definite	
	generic	

Procedure

Participants were seated at a desktop computer equipped with an EyeLink 1000 infrared eye tracker (Version 1.5.2; SR Research Ltd., Ottawa, Ontario, Canada), at an approximate

viewing distance of 55 cm. They were instructed to remain as still as possible throughout the experiment. After providing informed consent, participants read sentences presented individually in randomized order while their eye movements were recorded. Following each sentence, participants rated its grammatical acceptability in response to the prompt “How grammatically acceptable was the sentence?” using a 5-point Likert scale (1 = Not at all, 5 = Very). After completing the reading task, participants completed additional questionnaires. The entire experimental session lasted approximately 30 minutes. Eye movements were recorded only during the sentence-reading task.

Results

Ungrammatical control sentences were rated as significantly less acceptable than all other sentence types (all *ps* < .05), indicating that participants were attentive to the task. These sentences were therefore excluded from the main analyses, which focused exclusively on sentences containing gendered pronouns and singular they.

Scale Results

BSRI The internal consistency of the BSRI in the current study was good ($\alpha = .83$). Mean scores indicated that participants reported relatively high levels of femininity ($M = 4.93$, $SD = 0.59$, $range = 3.52\text{--}6.14$) and masculinity ($M = 4.63$, $SD = 0.66$, $range = 3.25\text{--}5.90$), as well as moderate endorsement of neutral traits ($M = 4.49$, $SD = 0.37$, $range = 3.75\text{--}5.45$).

PGAS The internal consistency of the PGAS in the current study was good ($\alpha = .83$). Participants’ average PGAS score was 3.17 ($SD = 0.57$, $range = 1.93\text{--}4.40$), indicating a moderate level of grammatical prescriptiveness.

ATTSPS The ATTSPS demonstrated excellent internal consistency in the present sample ($\alpha = .93$). The mean score was 4.16 ($SD = 0.72$, $range = 2.25\text{--}5$), reflecting generally positive attitudes toward the singular use of they.

GRAS The GRAS showed high reliability ($\alpha = .90$). The mean score was 1.85 ($SD = 0.61$, $range = 1.05\text{--}4.50$), indicating predominantly egalitarian gender role attitudes.

Correlation among the variables PGAS was not significantly correlated with any other variable (all *ps* > .05). ATTSPS showed a significant negative correlation with GRAS, $r(49) = -0.498$, $p < .001$, suggesting that participants higher in egalitarian attitudes had more positive attitudes towards the use of singular they compared to participants lower in egalitarian attitudes.

Sentence Ratings

Table 2 summarizes mean acceptability ratings (1–5 scale) varied as a function of pronoun and sentence type.

Acceptability ratings were analyzed using linear mixed-effects models with pronoun type (gendered vs. they), sentence type (definite vs. generic), and their interaction as fixed effects, and random intercepts for Participants and Sentences. There were no significant main effects of pronoun, $B = 0.23$, $SE = 0.14$, $t = 1.66$, $p = .106$, or sentence type, $B = -0.19$, $SE = 0.14$, $t = -1.35$, $p = .186$. However, the Pronoun $\times$ Type interaction was significant, $B = 1.00$, $SE = 0.28$, $t = 3.64$, $p < .001$. Bonferroni-corrected pairwise comparisons showed that for gendered pronouns, definite sentences received significantly higher acceptability ratings than generic sentences, $t(32) = 4.32$, $p < .001$. In contrast, for singular they, acceptability ratings did not differ significantly between definite and generic sentences, $p = 1.00$. Importantly, generic sentences containing singular they were rated as significantly more acceptable than generic sentences containing gendered pronouns, $t(32) = -3.25$, $p = .016$. For definite sentences, no differences between singular they and gendered pronouns were found $t(32) = 1.71$, $p = .580$. A separate model was conducted including antecedent name (i.e., stereotypically male, female, or invented gender-neutral names) and its interactions with pronoun and sentence type. No main effect of antecedent name was observed (all $ps > .25$).

Table 2: The mean acceptability ratings

Pronoun	Antecedent type	Mean	SD
gendered	definite	4.30	0.97
	generic	3.61	1.14
they	definite	4.03	1.12
	generic	4.34	0.94

To examine whether individual difference measures modulated the acceptability of singular they, separate models added prescriptive grammar attitudes, attitudes toward they as a singular pronoun, Bem Sex Role Inventory subscales (masculinity, femininity, neutrality), and GRAS as covariates. Across all models, the Pronoun $\times$ Type interaction remained robust and statistically significant (all $ps < .001$). None of the covariates showed a significant main effect on ratings (all $ps \geq .17$), nor did they reliably interact with pronoun and type in three-way interactions (all $ps \geq .20$).

Eye-tracking Results

Our primary analyses focused on the pronoun region, utilizing two key indices: first-pass fixation duration (i.e., the duration of the first fixation on the region) to index early, automatic processing, and dwell time (i.e., the sum of all fixations within the region) to capture late, integrative processing. Secondary exploratory analyses were conducted for the antecedent, spillover, and entire sentence regions, as well as for additional global measures including trial fixation count, regression path duration, and last fixation duration.

These measures provided complementary indices of re-reading and integration difficulty.

For each dependent variable, separate linear mixed-effects models were performed with pronoun type (gendered vs. they) and sentence type (definite vs. generic) as fixed effects. Participants and Sentences were included as random intercepts. Individual-difference measures and their interactions with pronoun and sentence type were subsequently added to separate models to examine how personal characteristics modulate processing. Secondary analyses of the antecedent and spillover regions, as well as global measures (regression path duration and trial fixation count), did not yield any significant effects (all $ps > .15$).

Early Processing In the pronoun region, a significant main effect of pronoun type emerged, $B = -36.51$, $SE = 13.00$, $t(31.7) = -2.81$, $p = .032$. First fixations were significantly shorter for they than for gendered pronouns. No main effect of sentence type or interaction between pronoun and sentence type was observed (all $ps > .30$). An interaction between attitudes toward singular they and sentence type was observed, $p = .048$, suggesting a pattern that more positive attitudes were associated with longer first fixations in generic sentences.

Late Processing For the pronoun region, no main effects of pronoun or sentence type reached significance (all $ps > .32$). A three-way interaction emerged between Pronoun Type, Sentence Type, and Prescriptive Grammar Attitude, $B = 363.10$, $SE = 183.10$, $t(1698) = 1.98$, $p = .048$ (Figures 1 & 2). Specifically, participants with higher prescriptive grammar attitudes tended to spend more time reading generic they compared to those with lower prescriptive attitudes.

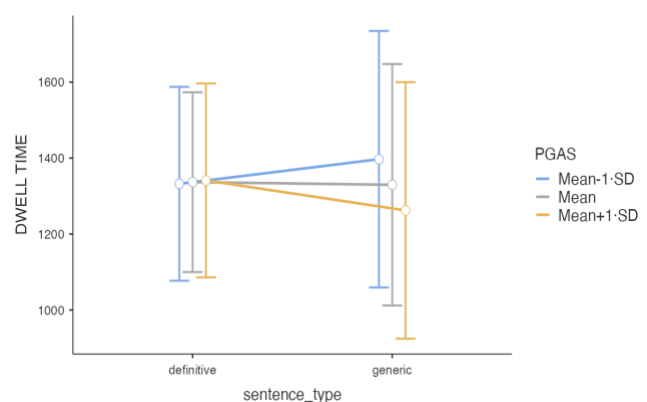


Figure 1: Dwell time for gendered pronouns as a function of PGAS scores. Error bars represent 95% confidence intervals.

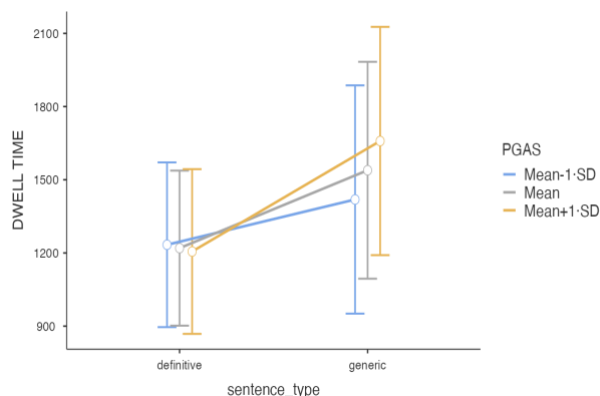


Figure 2: Dwell time for they as a function of PGAS scores. Error bars represent 95% confidence intervals.

Discussion

The present study examined the acceptability and real-time processing of singular they during reading, as well as the influence of individual differences in grammatical knowledge and social attitudes among university students in Canada. Overall, the findings indicate that native English speakers found singular they highly acceptable both in generic and definite context. Moreover, the processing of singular they was not found to be significantly more difficult than that of gendered pronouns, suggesting that singular they is processed at least as efficiently. These findings support the view that singular they is well integrated into English grammar (Jäggi et al., 2025).

Acceptability judgments showed that singular they was rated as highly acceptable in both generic and definite contexts. This pattern aligns with historical and contemporary evidence that singular they has long been used as a natural solution to gender indeterminacy in English (Balhorn, 2004; Bjorkman, 2017; Curzan, 2003). Importantly, consistent with previous studies (e.g., Bradley et al., 2019) generic sentences containing singular they were judged more acceptable than generic sentences with gendered pronouns, suggesting that readers increasingly perceive they as the pragmatically optimal choice when gender is unspecified. Moreover, the high acceptability of they in definite contexts indicates that English speakers do not restrict its use to cases of unknown gender, but also readily accept it as a marker of gender neutrality for specific, identifiable referents. Individual-difference measures did not influence explicit ratings, indicating that even speakers with stronger grammatical prescriptive or traditional gender views did not explicitly reject the use of singular they.

Further, eye-tracking results revealed that first-pass fixation durations were shorter for they than for gendered pronouns in the pronoun region. This pattern aligns with the findings of Sanford and Filik (2006), who observed shorter first-pass reading durations for they compared to he and she. Sanford and Filik proposed that singular pronouns such as he and she trigger an immediate, resource-demanding search for a uniquely identifiable antecedent, whereas plural pronouns

allow for a broader and more flexible set of potential antecedents, resulting in delayed verification of referential fit. Our results support this account: the shorter first-pass fixations on singular they suggest that readers initially treat it as referentially underspecified, postponing detailed antecedent evaluation. This evidence reinforces the idea that plural pronouns are not mentally represented as hybrid singular-plural forms; rather, singular they benefits from the processing flexibility typically associated with plural pronouns, even when referring to a singular entity.

No main effects of pronoun type or sentence type were observed in late processing for the pronoun region, indicating that, for most readers, singular they was processed as efficiently as gendered pronouns in later stages, with no statistically significant evidence of increased reading difficulty or integration failure. In other words, encountering singular they did not result in a measurable increase in processing cost compared to gendered pronouns in this sample. However, later processing showed a trend toward modulation by prescriptive grammar attitudes. Participants with stronger prescriptive orientations tended to spend more time rereading generic they, suggesting a potential for heightened evaluative or monitoring behavior rather than a complete comprehension failure. This pattern can be explained with Sanford and Filik's (2006) account, in which the comprehension system initially detects a potential number mismatch and subsequently accommodates the singular interpretation of they. For prescriptively oriented readers, this accommodation process may be more effortful or consciously scrutinized. Overall, this pattern may suggest that linguistic prescriptivism may impose subtle processing costs, even when readers explicitly accept singular they. However, this cost is brief and does not result in overall processing difficulty.

No statistically significant effects were observed on whole-sentence measures, suggesting that any processing costs associated with singular they are rapidly resolved and do not result in a measurable disruption of overall sentence comprehension. This pattern is consistent with findings from studies of the Swedish gender-neutral pronoun *hen*, where increased processing was limited to the pronoun spillover region and did not influence later sentence-level measures (Vergoossen et al., 2020). Together, these results provide evidence against models that treat gender-neutral pronouns as inherently more cognitively demanding than gendered pronouns. Instead, the findings support accounts in which initial processing may involve a brief, localized adjustment for some readers, after which comprehension proceeds as efficiently as for gendered pronouns. Overall, these data suggest that readers can flexibly integrate gender-neutral pronouns into language without additional cognitive cost. Both explicit ratings and the current eye-tracking data indicate that the use of singular they as a gender-neutral pronoun is relatively well-standardized in Canadian English (see also Jäggi et al., 2025).

Interestingly, unlike some previous studies (e.g. Bradley, 2020; Conrod, 2019; Hernandez, 2020), the context singular

they is used (i.e., definite vs generic) or individual differences in gender role attitudes, prescriptive grammar orientations, or attitudes toward singular they did not influence explicit acceptability ratings in the present study. One factor that may contribute to the high acceptability of singular they in our sample is increasing integration and official recognition of singular they in Canadian English. Government initiatives such as Bill C-16, which added gender identity and expression to the Canadian Human Rights Act and Criminal Code, alongside official language guidelines promoting gender-neutral usage, have likely facilitated more widespread exposure and acceptance of singular they in both formal and informal contexts (Government of Canada, 2017; Canadian Centre for Diversity and Inclusion, 2023). This societal and institutional support may make singular they particularly familiar to Canadian readers, not only for referring to individuals of unspecified gender but also for referring to non-binary people. Such exposure may contribute to its strong acceptability ratings, potentially more so than in the U.S., where acceptance is more variable, although major U.S. dictionaries have begun recognizing singular they as standard (Merriam-Webster, 2019; American Heritage Dictionary, 2019). This broader societal and linguistic integration likely reduces the influence of individual differences in prescriptive attitudes or gender role beliefs on explicit judgments in our sample. Further, our sample overall exhibited predominantly egalitarian gender role attitudes, generally positive attitudes toward the use of singular they, and only moderate levels of prescriptive grammar orientation. Such a distribution likely reduced variability in judgments, making it less likely to detect systematic differences in acceptability ratings. Furthermore, explicit judgments reflect conscious, reflective evaluations rather than the immediate, automatic processes captured in eye-tracking measures. This distinction helps explain why prescriptive grammar attitudes modulated dwell times during pronoun processing, indicating subtle monitoring or evaluative behaviour, without producing corresponding effects in conscious acceptability ratings. In other words, while linguistic prescriptivism can affect the cognitive effort involved in processing singular they, it may not necessarily alter explicit evaluations in a sample already predisposed to accept singular they as grammatical and socially appropriate.

The relatively homogeneous sample may limit the generalizability of the findings, and future research would benefit from including more diverse populations, such as older adults, multilingual speakers, and individuals from a broader range of socio-political backgrounds. In addition, this study focused exclusively on singular they, so it remains an open question whether similar processing patterns would extend to other emerging gender-neutral pronouns. A further consideration relates to the interpretation of null effects. The absence of significant processing costs may reflect either genuine ease of processing or limited statistical power, particularly given the number of dependent measures and predictors examined. Future studies could address this by using larger samples, more sensitive within-item designs, and

complementary statistical approaches that can better evaluate evidence for the absence of effects, such as Bayesian or equivalence testing. Although individual-difference measures were included in separate models, the sample size may have limited variability across participants, which could have reduced sensitivity to detect smaller effects. Finally, while shorter first-pass fixation durations for singular they are consistent with accounts suggesting referential under specification and processing flexibility, this interpretation should be made cautiously, as the current stimuli differ from those used in previous work and do not directly manipulate number or plurality, which limits stronger theoretical conclusions.

Acknowledgments

E. Tutku Tunalı: Conceptualization, Data Collection and Analysis, Writing - Original Draft. Elena Nicoladis: Writing - Review & Editing, Supervision. Grammarly (<https://www.grammarly.com/>) was used in this paper to review grammar, spelling, and language use.

Conclusion

In conclusion, the present study demonstrates that singular they is both highly acceptable and efficiently processed in English. Readers endorsed its use in both generic and definite contexts, reflecting its growing integration as a grammatically and socially recognized gender-neutral pronoun in Canadian English. Eye-tracking results indicated that early processing treats singular they as referentially flexible, with any later-stage reanalysis being brief and minimally modulated by prescriptive grammar attitudes, suggesting subtle evaluative monitoring rather than comprehension difficulty. Overall, these findings support the view that singular they is well integrated into English grammar, allowing readers to flexibly and efficiently process gender-neutral references without incurring lasting cognitive costs relative to gendered pronouns.

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