

## Does nonbinary *they* inherit the binary pronoun production system?

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The English pronoun system is undergoing a change in progress as singular *they* is used more frequently to refer to specific individuals, especially those who identify as nonbinary. How does this change affect the language production system? Research has shown that the production of *he/she* pronouns is supported by salient discourse status and inhibited in contexts where the pronoun would be ambiguous. In an analysis of naturally-occurring written texts, we test whether *they* production patterns with *he/she* production, controlling for discourse context. Results show that the overall rate of pronoun use is lower for references to nonbinary individuals than for references to binary individuals. This difference is not explained by the potential ambiguity of a referent in context. We speculate that relative unfamiliarity with nonbinary *they* and nonbinary gender may inhibit the activation of *they* during production, or may lead writers to avoid using a form that may not be familiar to their addressees.



## 1. Introduction

Pronouns are some of the most frequent words in language, and they create cohesion between utterances. But recently English pronouns have also been recruited for a social function, where identifying one's pronouns (e.g. "My pronouns are she/her") signals gender identity (Out and Equal, 2021). This practice is inter-related with a growing awareness that gender identity is not always identifiable based on appearance, names, or social role. An increasing number of individuals have identified their personal pronouns as *they/them*, signaling a nonbinary or gender-queer identity. While nontraditional gender identities have been around for a long time (Vincent & Manzano, 2017), the recent salience of this trend led the American Dialect Society to adopt "they" as the word of the decade in 2019.

What this means is that the pronominal system is changing. It is not novel that *they* is used in a singular sense; singular *they* has been used for centuries (Baron, 2020; Bjorkman, 2017; Conrod, 2020; Konnelly & Cowper, 2020; Nunberg, 2016), especially in cases where the referent is quantified or ungendered, e.g. *Everyone...they*, or *If you know a student who is absent please send them a recording of today's lecture*. Singular *they* can also refer to specific individuals, but is more common when the person's identity is not contextually critical, for example it is more acceptable when the referent is "socially distant" (*my dentist...they*) than someone the speaker knows personally (*my friend...they*; Camilliere et al., 2021). But the use that attracts the most attention is when it refers to a specific and salient individual (Ackerman, 2019; Bjorkman, 2017; Conrod, 2020; Konnelly & Cowper, 2020), e.g. "Sam Smith has opened up about how they feel since publicly coming out as non-binary," (Young, 2020). This form is socially appropriate (and for many, required) in contexts where the referent is a person who identifies as nonbinary and uses *they/them* as personal pronouns, so we will use the term "nonbinary they" to refer to this specific linguistic usage.

This change parallels a dramatic re-drawing of the conceptual representations of gender, and has thus drawn substantial attention. For transgender people and allies, using someone's appropriate pronouns is a critical signal of respect, leading many to advocate for the adoption of *they*. Yet others criticize the use of singular *they* as either ungrammatical or needlessly ambiguous, for example "The reader enters a minefield of confusion when any individual *or* any group might be referred to as *they* or *them*," (Flynn, 2020). Thus, use of this form is variable across individuals.

This change in progress raises questions about the psycholinguistic processes behind reference production. Every instance of referring requires speakers and writers to make a choice about how specific to be: Should I say *Kamala Harris? The Vice President? She?* Even though nonbinary *they* is a relatively new form, it is poised to inherit the same well-practiced decision-making system that allows speakers to choose between *he* or *she* and more explicit expressions.

The question we ask here is how people choose between singular third-person pronouns (*he, she, they*) and more explicit names or descriptions. Decades of research on *he* and *she* have

revealed two major factors that drive reference production. First, pronouns (and other reduced expressions) are used in discourse contexts where the referent is already available, e.g. when the referent is **given** (recently mentioned or evoked) vs. **new** (Ariel, 1990; Chafe, 1976; Givon, 1983; Gundel et al., 1993; Prince, 1981). Pronouns are also more frequent for referents that have a prominent or topical discourse status, for example referents that were mentioned recently (Givon, 1983), or occurred as subject or first-mentioned referent in the previous sentence (Arnold et al., 2000; Gernsbacher et al., 1989; Jarvikivi et al., 2005). The effect of discourse status is observed cross-linguistically, including in languages where pronouns do not mark gender (Gundel et al., 1993; Hwang, 2020), or in languages where the functional equivalent to English pronouns are null references (e.g., Spanish; Medina-Fetterman et al., 2022).

The second major consideration for pronoun production is whether the discourse context includes competitor referents (Ariel, 1990; Givon, 1983; Hwang, 2020). For example, when referring to Mickey, people are less likely to use a pronoun in a story about Mickey and Donald than in a matched story about Mickey and Daisy (Arnold & Griffin, 2007; Francik, 1985). This might reflect a desire to avoid ambiguity: the pronoun *he* is situationally ambiguous in the presence of two male referents, but not in a context with one male and one female (but for an alternate explanation see Arnold & Griffin, 2007; Fukumura et al., 2011; Fukumura, Hyona, & Scholfield, 2013). This idea is related to claims that speakers aim to be communicatively cooperative by producing referential expressions that are informative for the context (Davies & Katsos, 2010; Deutsch and Pechmann, 1982; Engelhardt, Bailey, & Ferreira, 2006; Olson, 1970; Pogue, Kurumada, & Tanenhaus, 2016), for example using modifiers like “blue cup” in contexts with more than one cup (for a review see Davies & Arnold, 2019).

In sum, research shows that both 1) discourse status and 2) the presence of competitor referents affect the production of pronouns. We strongly predict that discourse status should affect *they* use, given its widespread constraint on reference cross-linguistically. Yet relatively little is known about how speakers and writers use nonbinary *they* in English. Here we ask two questions:

First, is nonbinary *they* chosen as frequently as binary *he/she*, controlling for discourse context? Nonbinary *they* is relatively new to mainstream American English communities, and individuals vary highly in their acceptance and use of it (Ackerman, 2018; Bjorkman, 2017; Camilliere et al., 2021; Conrod, 2020; Konnelly & Cowper, 2020). The newness of this form raises the possibility that speakers and writers may shy away from using *they* in favor of more explicit names and descriptions.

Second, if we do find a difference between the rates of nonbinary *they* and binary *he/she*, what explains this difference? We focus on the hypothesis that *they* could match a wider range of referents in the context, including plural, socially-distant-singular, and nonbinary singular referents. If

ambiguity drives production choices, we may find that writers avoid all pronouns (*he*, *she*, and *they*) in contexts with other potential referents. If *they* is more likely to occur in potentially ambiguous contexts than *he/she*, and if ambiguity drives pronoun use in our dataset, we might observe a lower use of *they* than *he/she* that is entirely a function of ambiguity. On the other hand, referential forms – even *he* and *she* – are frequently ambiguous, and listeners generally resolve them rapidly (e.g., Arnold et al., 2000). Data on whether ambiguity avoidance drives *they* production provides an opportunity for psycholinguistic data to inform public discussion, given that many critics of singular *they* rely on the claim that it is problematic because it is ambiguous (e.g., Flynn, 2020).

Alternatively, a difference between *they* and *he/she* production could also be explained by two known effects in reference production. First, the unfamiliar form may be harder to retrieve and suffer competition from alternative forms (e.g., Jescheniak & Shriefers, 1998). Second, writers may be less certain that singular *they* will be interpretable to readers and avoid it through a process of audience design (Ferreira, 2019).

To investigate these questions, we assembled a naturally-occurring sample of published articles about individuals who identify as nonbinary and use the pronouns *they/them*, along with a comparison sample of references to binary individuals. This corpus analysis thus examines the production of reference form within a sample of authors, taking an average of pronoun use in each category across several tokens. We analyzed references to both nonbinary and binary individuals and calculated the rate of pronouns for each, controlling for discourse status and potential ambiguity. These articles represent a real-world sample; indeed, for individuals who do not already know people who use *they/them* pronouns, articles may be one of their first exposures to this usage.

## 2. Methods

### 2.1. Sample

We searched the internet for published articles that included references to a person who both identifies as nonbinary/genderqueer and uses *they/them* as their personal pronouns (termed “nonbinary” references for the analysis). For a comparison sample, we found references by the same author to individuals who go by *he/him* or *she/her* pronouns (termed “binary” references), either in the same or a different article. Our criteria for including an author in the analysis was that we could find at least 5 nonbinary references and at least 5 binary references in one or more articles. In some cases the references were to different people. We used all the articles we found that met our criteria.

To roughly equate the number of tokens contributed by each author, we only coded up to the first 20 references in each category for a particular author, distributed equally.<sup>1</sup> The articles and

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<sup>1</sup> If an article had references to more than one different nonbinary or binary individuals, we aimed for about equal tokens from each referent.

number of tokens per author are listed in Appendix A. The final analysis had 27 authors, with 723 datapoints (369 nonbinary, 354 binary).

## 2.2. Coding Scheme

Our key question was whether reference forms would relate to two features of the discourse context: 1) whether the referent was mentioned recently, and 2) whether potentially competing characters were mentioned recently. To assess this we identified the binary or nonbinary target character(s) in each narrative, and sampled the first reference to that character in each sentence as the token for analysis.

Our basic unit of analysis was the sentence, defined by orthographic conventions: the unit in writing that begins with a capital letter and ends with a period, exclamation mark or question mark. In most cases the sentence corresponded with one or more syntactic clauses, but in a few cases it was only a fragment (e.g., “Aren’t scientists, developers, and such an international community of mostly liberal-leaning people who eat this woke stuff up? Not so much.” (Greene, 2020)). The only exception was multiple sentences in a quote, which was condensed into a single line, along with any nonquoted material (e.g. “she said”). Quotes were excluded from our sample of tokens to analyze, but were included for the purpose of identifying the discourse status of referents.

We chose the sentence as the unit because it is a natural unit in writing, can be reliably identified, and provides a reasonable unit of analysis to approximate the effects of discourse status. Even though some scholars operationalize the effect of the prior context in terms of clauses (e.g., Grosz, Weinstein, & Joshi, 1995), discourse status effects emerge from all prior context, where the recent context has the strongest effects (e.g., Ariel, 1990; Arnold, 1998).

In each sentence, we identified the first mention of the target referent and marked the way it was referred to (pronoun vs. name/description), which served as the dependent measure. Our analysis only examined direct mentions of the target in the singular, either with names, descriptions, or pronouns. We excluded possessives, reflexive pronouns, and any plural mention that included the target; these expressions are driven by different constraints than singular non-possessive pronouns. We also excluded the first mention of each character in the article, which could not be pronominal.

We coded two critical predictors. First, was the referent mentioned in the previous sentence? “Given” referents were those that received any sort of mention, including mention with a possessive or reflexive pronoun, as a part of a plural expression, or within a quote. If it was not mentioned in the previous sentence or quote it was coded as “New”. Second, were there any other characters mentioned in the previous sentence? We identified the presence of any other characters, and also whether they would qualify as a potential referent for a pronoun in that condition. Each token was coded by at least two experimenters and any discrepancies were discussed.

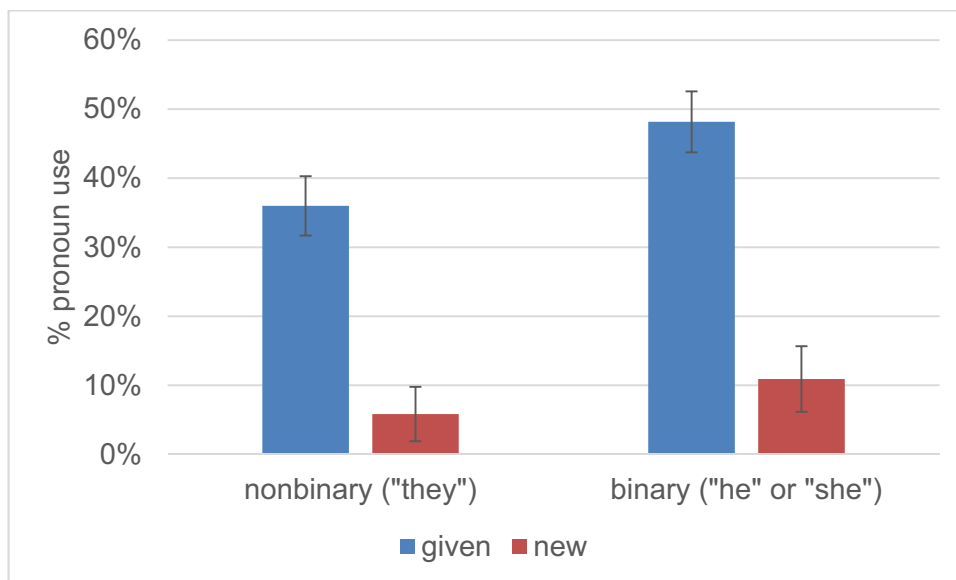
### 2.3. Analysis

We analyzed the rate of pronoun use as a binary dependent measure, calculated as the number of pronouns (*they*, *she*, *he*) in each category out of the total number of references, including also names and descriptions (e.g., *the man*, *Argueta*). Thus our dependent measure was pronoun (coded 1) vs. other form of reference (coded 0). We used SAS proc glimmix to perform a mixed effects logistic regression, with author as the random effect. The predictor variables were grand-mean centered. Analysis 1 tested predictor gender condition (nonbinary vs. binary), discourse condition (given vs. new) and the gender  $\times$  discourse interaction.

Analysis 2 tested whether the effect of gender occurs even when ambiguity is controlled for. We operationalized potential ambiguity as whether there was a competitor referent that would make a pronoun ambiguous: for the binary condition this was a same-gender competitor; for the nonbinary condition we counted any potential referent for *they*, including plural 3<sup>rd</sup>-person referents, individuals who use *they/them* pronouns, or any two people who might be combined in a plural reference. For examples of potential ambiguity, see Appendix B.

### 2.4. Results and Discussion

Results (see **Figure 1**) demonstrated that writers used pronouns more for given referents than new, and more for binary than nonbinary referents. Our statistical analysis (see **Table 1**) revealed that both givenness and gender effects were significant.



**Figure 1:** Average rate of pronoun use by discourse condition and pronoun type (binary vs. nonbinary), calculated as the average of the author means. Error bars are the standard error of the author means.

Effect	Estimate (standard error)	t value	p value
Intercept	-0.81 (0.14)	-5.59	< .0001
Given vs. New	2.22 (0.41)	5.38	< .0001
Nonbinary vs. Binary	-0.64 (0.28)	-2.27	0.03
Given × Nonbinary	0.23 (0.72)	0.32	0.75

**Table 1:** Inferential statistics for analysis 1 (effects of discourse status and nonbinary/binary condition).

Potentially Ambiguous?	Gender condition	Discourse condition	N (# tokens in category)	% pronoun
no competitor	nonbinary	given	195	37%
	nonbinary	new	50	6%
	binary	given	249	53%
	binary	new	70	14%
competitor	nonbinary	given	99	34%
	nonbinary	new	25	4%
	binary	given	26	27%
	binary	new	9	0%

**Table 2:** Rate of pronoun use according to the gender of the target (binary vs. nonbinary), discourse condition (given vs. new), and whether there were any potential competitors for the pronoun. A potential competitor was defined as a same-gender character in the binary condition, and as a potential referent for “they” in the nonbinary condition.

We then asked whether the potential ambiguity of the pronoun accounts for this pattern. A potential concern is that the nonbinary pronouns may be more likely to be ambiguous than binary pronouns, and indeed this pattern obtains in our dataset (34% potentially ambiguous tokens in the nonbinary condition and 10% in the binary condition). If pronoun use is driven by ambiguity, this imbalance could explain our contrast between binary and nonbinary conditions. If it isn’t, we should see the same gender effect even when we control for potential ambiguity.

To test this, we added potential ambiguity to the model in **Table 1**, coded as presence of competitor in previous sentence vs. not (see **Table 2**). Yet even accounting for ambiguity, we still observed an overall lower rate of *they* use than *he/she* use, and a significant effect of gender (see **Table 3**). Potential ambiguity had no effect. Further evidence that ambiguity is not driving the contrast between binary and nonbinary conditions comes from an analysis of only the unambiguous tokens (where we have the most data), which reveals significant effects of Givenness ( $b = 2.19 (.46)$ ,  $t = 4.73$ ,  $p < .001$ ) and Nonbinary condition ( $b = -0.66 (.30)$ ,  $t = -2.23$ ,  $p = .03$ ), but no interaction ( $t = 0.46$ ,  $p = 0.64$ ).

Effect	Estimate (standard error)	t value	p value
Intercept	-0.81 (0.15)	-5.56	< .0001
Given vs. New	2.25 (0.41)	5.41	< .0001
Nonbinary vs. Binary	-0.58 (0.28)	-2.05	0.048
Ambiguity vs. not	-0.31 (0.29)	-1.07	0.3
Given × Nonbinary	0.32 (0.72)	0.44	0.66

**Table 3:** Inferential statistics for analysis 2.

## 4. General Discussion

Our primary finding was that nonbinary singular *they* was produced at a significantly lower rate than the binary singular pronouns *he* and *she*. Even though nonbinary *they* has not been adopted by all users of English (Graf & Geiger, 2019), this sample represents a set of writers who are willing to use *they* in this context. Even so, the relative rate of names or descriptions was higher for reference to nonbinary than binary individuals.

Our second finding was that the difference between binary and nonbinary pronoun use cannot be explained by a context-dependent ambiguity-avoidance strategy. Writers used *they* around 34–37% of the time for given referents, regardless of whether the context included another potential referent for *they*. Thus, writers are not selectively avoiding *they* in contexts where it would be ambiguous.

We speculate that nonbinary *they* may be suppressed for one or more of the following three reasons. First, we consider and dismiss the idea that ambiguity avoidance may operate as a general strategy: writers may be aware that *they* often has multiple possible referents, and so may generally suppress it (and not just specifically as a function of contextual ambiguity). However, a purely ambiguity-driven strategy would predict a resistance to *they* for both plural and nonbinary uses, which is inconsistent with the fact that *they* is one of the most frequent words in English (Davies, 2008). This suggests that *they*-avoidance is specific to the relatively new nonbinary case, consistent with the intuition that this new usage is hard for some people (Joyner, 2019).

A second possibility is that the newness of nonbinary *they* may inhibit the activation of this form during reference production. Word choice is a competitive process (e.g. Dell, 1986; Britt, Ferrara & Mirman, 2016; Griffin & Bock, 1998; Jescheniak & Levelt, 1994), and word production leads to co-activation of near synonyms (e.g., *sofa* and *couch*; Jescheniak & Levelt, 1998; Peterson & Savoy, 1998). On these models, the most activated form is selected. Theoretically this process may also account for the choice between pronouns and alternate forms (e.g., *Kamala* vs. *she*). On this view, referring to the singer Sam Smith might involve the simultaneous activation of the expressions *Sam* and *they* (and perhaps other expressions if they are contextually supported, e.g. *the singer*).



This process of word production depends on a connection between the word and the concept. For newly-learned concepts, this link may be weak, for example word production is slower for bilinguals and for low frequency words (Gollan et al., 2005). Binary genders are highly practiced and familiar categories to most people, and *he/she* pronouns are frequently used as singular pronouns. Thus, both *she* and *Kamala* are likely to be activated as potential expressions for referring to the Vice President, and the production system selects the best match for the discourse context. By contrast, familiarity with nonbinary pronouns is variable; only 22% of American adults report having heard a lot about the use of gender-neutral pronouns, 38% say they have heard a little, and 39% say they haven't heard anything at all (Geiger & Graf, 2019). Thus, nonbinary *they* may have reduced activation for producers who are less familiar with either the usage or the nonbinary concept. In essence, speakers may act like second language learners for this one concept, but their native name-producing ability is still intact. If so, the name may be the most highly activated word and be selected for production. This on-line production process may also influence the writer's intuition about which forms are most appropriate, and additionally influence the editing stage.

Third, speakers and writers may also take into account the likelihood that their audience is familiar with nonbinary *they*. If writers are not sure that all readers will be comfortable with nonbinary *they*, they may use names even in contexts where pronouns are more appropriate. Such an effect would be an example of audience design, that is, the process of designing one's utterances for the addressee. However, research shows that audience design effects can be variable. On the one hand, speakers and writers do take their audience into account in multiple ways, and in particular in the production of contextually-interpretable referential forms (e.g., Brown-Schmidt & Tanenhaus, 2006; Clark & Krych, 2004; Clark & Wilkes-Gibbs, 1986; Ferreira et al., 2005). Thus, it is plausible that writers avoid low-frequency usages such as nonbinary *they*. On the other hand, there are limits on speakers' consideration of the addressee's needs (e.g., Engelhardt et al., 2006; Ferreira & Dell, 2000; Kraljic & Brennan, 2005). Moreover, ambiguity avoidance is not the primary determinant of reference form. Even though some studies have reported a tendency for English speakers to avoid binary pronouns in same-gender context, this finding does not always emerge in empirical studies (e.g. Rosa & Arnold, 2017, Exp. 1). In our sample here, we did not observe any effect potential ambiguity, likely because our sample had very few tokens occurring in potentially ambiguous contexts. Yet we still observed substantial variation across discourse contexts, demonstrating that reference form choice is not driven purely by ambiguity considerations.

Our study examined written and published articles, in contrast with many studies that focus on spontaneous spoken language. This means that the wording may result from editing, and may be more influenced by metalinguistic judgments about ideal phrasing than by the momentary activation of information during online processing. Moreover, many of our articles

were specifically about the topic of nonbinary gender and the use of *they*, and not about people who just happened to be nonbinary. Thus, writers were likely thinking about nonbinary *they*, and perhaps more likely to use it than usual. Yet we still observed a relative suppression of nonbinary vs. binary pronouns.

This analysis also provides a benchmark for the unfolding change in the English pronominal system. The articles we analyzed appeared from 2015 to 2020, when singular *they* was relatively new. We predict that as the rate of nonbinary references increases over time, so will facility with this form, supporting the future production of *they* at a similar rate as *he* and *she*.

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## Data Accessibility Statement

Data and models are available at <https://osf.io/aep94/>. Supporting materials are available at <https://arnoldlab.web.unc.edu/publications/supporting-materials/arnold-marquez-li-franck/>.

## Additional File

The additional file for this article can be found as follows:

- **Supplementary Material.** Appendix A and B. DOI: <https://doi.org/10.5070/G601183.s1>

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## Competing Interests

The authors have no competing interests to declare.

## Author Contributions

JA: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Software, Supervision, Validation, Visualization, Writing – review & editing

AM & GF: Data curation, Funding acquisition, Investigation, Methodology, Project administration, Writing – original draft

JL: Data curation, Investigation, Methodology, Project administration, Writing – original draft

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