Implicit gender bias in linguistic descriptions for expected events: The case of the 2024 United States presidential election

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Background: What is the relationship between expectations regarding events in the world and language production and comprehension? von der Malsburg et al. [2] presented evidence for a *biased* mapping between event expectations and linguistic preferences, using the natural experiment of the 2016 US presidential campaign, when a woman might have been elected president for the first time in the nation's history. Throughout the pre-election campaign, participants rated the female candidate as more likely to win, but in experiments, participants produced *he* pronouns more than *she* pronouns in co-reference to the next president, and exhibited a substantial RT penalty on *she* versus *he* pronouns co-referring to the next president during comprehension.

Here we took the opportunity afforded by the 2024 US presidential campaign to revisit these questions. Unlike in 2016, the country had already had a female vice president at this point, who was the female candidate in the race; this might reduce the bias against *she* pronouns relative to 2016. On the other hand, unlike 2016, during the 2024 campaign the female candidate was never reliably favored to win; this might increase the bias against *she* pronouns. Demographic change and public discourse regarding pronoun use in the intervening 8 years might also be influencing factors. As in 2016, we measured event expectations, pronoun production preferences, and comprehension RTs both before & immediately after the Nov. 5 election.

Methods: We based our materials on von der Malsburg et al. [2]. We recruited 2552 English-speaking US citizens living in the US on Prolific to provide their expectations regarding who would be the next US president and to do 1 trial of one linguistic task (with order counterbalanced across participants). Participants performed either a Cloze task, completing a sentence about the next US president, or a task reading a short vignette about the next US president, containing co-referring pronouns, using a self-paced reading (SPR) paradigm or an A-maze paradigm [1] (table 1). Data was collected in 2 waves (pre-election: Oct. 31, post-election: Nov. 9).

Results: Before the election, participants on average assigned roughly equal probability to Harris and Trump (fig. 1). On the Cloze task, participants who used pronouns in their responses were more likely to use *they* (64%) than gendered pronouns *he* (22%), and *she* (14%) (fig. 2). Despite the equal average expectations for Trump and Harris, in the Maze task, participants took longer to read *she* than either *he* or *they*, and *they* was read fastest (all pairwise comparisons significant at 0.05 level, fig. 3). On the second pronoun in a passage, when it was the same gender as the first pronoun, there was no significant difference in RT in pairwise comparisons between genders, yet there was a significant interaction with mismatching (meaning: RT slowdown for *she* versus *he* was larger when the previous pronoun had mismatched gender; $p<0.001$, fig. 4). RT patterns from SPR showed a similar pattern of results (figs. 5 and 6).

After the election was called for the male candidate, participants in the Cloze task strongly favored *he* (79%), although some *they* completions were also used (21%). In the Maze task, the RT advantage for *he* compared to *she* increased post-election, and *she* took even longer to read, as either the first or second pronoun. Post-election, RTs for the neutral pronoun *they* were not significantly different from *he* ($p=0.546$). Results from SPR were again generally consistent with the patterns seen in the Maze task.

Discussion: Our results show similar patterns to those reported in [2], including a numerical preference against *she* pronoun productions relative to event expectations, and a strong RT penalty against *she* pronouns. One marked change from the 2016 results is that singular *they* was produced more, even for known-gender referents, while gender-hedged forms (*e.g.*, "he/she") were less common. *They* was also the pronoun read fastest as a first pronoun pre-election, rather than *he* that was the fastest in 2016. Our results suggest language production and processing do track shifting expectations from real-world events, however, production and comprehension were still biased against female pronouns referring to the presidential candidate.

Sample experimental item: *Set-up:* The next US president will be sworn into office in January 2025. *Sentence #1:* During the inauguration speech, the president will emphasize **[her|his|their]** commitment to resolve outstanding issues quickly. *Sentence #2:* After moving into the Oval Office, one of the first things that **[she|he|they]** will do is hold a staff briefing.

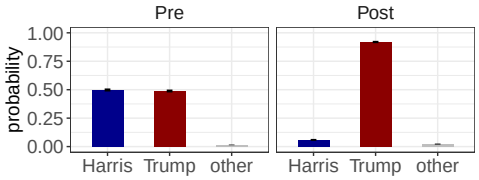
In Cloze, participants saw *set-up* and then the start of a sentence (out of 10) until just before the pronoun and were asked to compete the sentence. In SPR and Maze, participants saw *set-up* and 2 other sentences (of 10) with matching pronouns (*she-she*, *he-he*, or *they-they*) or mismatching (*she-he*, *he-she*).

Table 1: Participant counts

Type	Pre	Post
Cloze	494	509
Maze	291	280
SPR	494	484

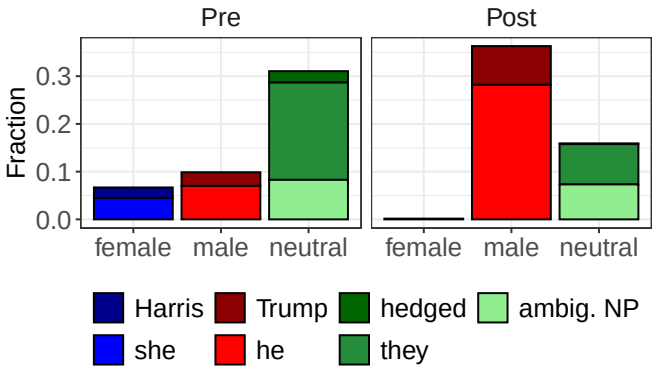
Numbers of participants in the different experimental conditions, pre- and post-election. 1/3 were asked for event expectations first, 2/3 saw a linguistic task first.

Figure 1: Event expectations



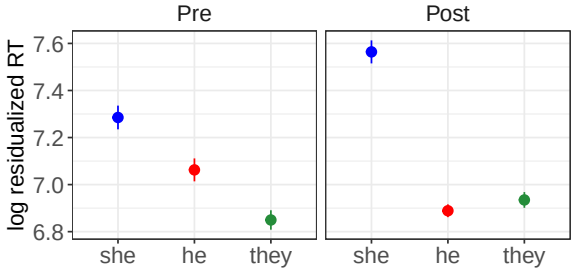
Participants used sliders to say the probability of each of Harris, Trump, and other being president in February 2025.

Figure 2: Cloze



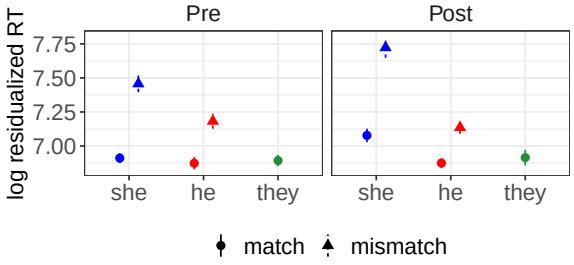
Cloze completions that contained pronouns or noun phrases that co-referred to “the next US president”. Hedged completions include ”he/she”, ”he or she”, etc.

Figure 3: Maze on first Pronoun



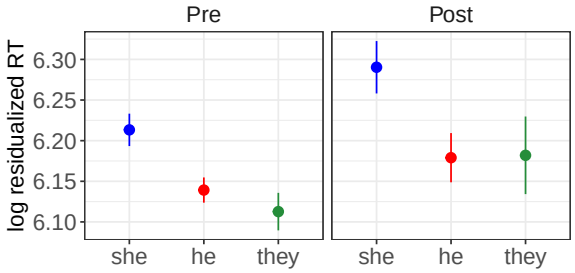
Maze log residual RTs on the first pronoun.

Figure 4: Maze on second pronoun



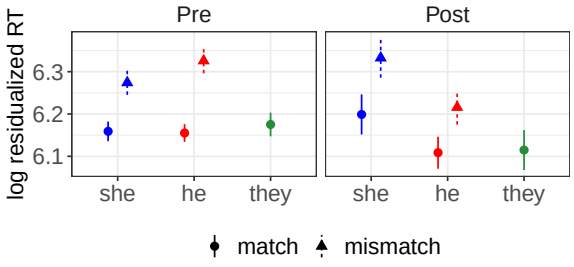
Maze log residual RTs on the second pronoun.

Figure 5: SPR on first Pronoun



SPR log residual RTs on the first pronoun and next three words (spillover region).

Figure 6: SPR on second pronoun



SPR log residual RTs on the second pronoun and next three words (spillover region).

References

[1] Boyce, V., Futrell, R., and Levy, R. (2020). Maze made easy: Better and easier measurement of incremental processing difficulty. *Journal of Memory & Language*, 111:104082.

[2] von der Malsburg, T., Poppels, T., and Levy, R. P. (2020). Implicit gender bias in linguistic descriptions for expected events: The cases of the 2016 US and 2017 UK elections. *Psych. Sci.*, 31(2).