

Recall and production of singular *they/them* pronouns

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The use of singular *they/them* pronouns is becoming increasingly common as nonbinary identities gain more visibility, with a third of Gen Z and a quarter of Millennials knowing someone who uses *they/them*¹. An exciting opportunity surrounding this cultural and linguistic change is to examine how people learn to associate pronouns with a person. The learning process may require a change from automatically accessing pronoun gender based on semantic/conceptual features of a person², or based on syntactic gender associated with a person's name³, and instead recalling episodic information about a person's stated pronouns. People can learn to interpret *they/them* as singular instead of plural, especially when given explicit instructions to do so⁴. However, speakers often fail to consistently use the correct pronouns when referring to individuals who use *they/them*⁵. Here we ask: When a person is introduced with their pronouns, how accurately are their pronouns remembered and produced, and what is the relationship between memory and production?

Methods: Participants (Ps) [N=102] were introduced to 12 characters, each associated with 4 facts: name (6 masculine, 6 feminine), pronouns (he/him [H], she/her [S], singular *they/them* [T]), job (one of 12), and pet (one of 3). Four characters were associated with masculine names and H, 4 with feminine names and S, and 4 with T (2 masculine, 2 feminine names), such that the use of T could not be predicted from the name. Characters were introduced one-by-one in the frame “[Name] uses [pronouns]. Name works as a [job] and has a [pet].” After a brief delay, we tested memory and production accuracy: For each name, Ps completed a multiple-choice memory test for that character's pronouns, job, and pet. Next, Ps saw each character referenced in the prompt “After [Name] got home from [job]...” and were asked to finish the sentence. Prompts were designed to easily continue using subject pronouns.

Predictions: As T forms are lower frequency than H/S, we expect more accurate memory and production for H/S over T. If learning to produce singular *they/them* requires a shift to a new type of thinking-for-speaking based on episodic memory for a person's stated pronouns, Ps may correctly recall T but fail to accurately use T in production. If episodic retrieval is a necessary first step in production, memory accuracy should predict production accuracy, but more so for T, which is less frequently produced and not always fully incorporated into participants' dialects.

Results: Analysis using mixed-effects models revealed that Memory for pronouns (Fig1) was significantly more accurate for H/S vs. T ($z=11.36$), with no H vs. S difference ($z=0.43$). For characters whose pronouns are T, Ps correctly remembered their pronouns above 33% chance ($t(101)=3.42$, $p<.001$) and at a similar rate as the control item (pet) ($t(101)=0.70$, $p=0.49$). When incorrect, Ps responded with H and S at similar rates (Fig2). Production (Fig3) was more accurate for H/S vs. T ($z=8.80$), with no H/S difference ($z=-0.33$). When referencing characters whose pronouns are T, accuracy was *not* significantly different than 33% chance ($t(101)=-1.11$, $p=.27$), with Ps producing H/S/T at roughly equal rates (Fig4). As predicted, memory accuracy predicted production accuracy ($z=7.40$). Further, this relationship was modulated by pronoun type ($z=-2.44$): When Ps correctly recalled a character's pronouns, the relative difficulty in producing T was somewhat alleviated (Fig5), and further, they produced T at above chance levels ($t(80)=2.69$, $p<.01$).

Conclusion: While memory and use of H/S was more accurate than T, memory for T was above chance, suggesting speakers can learn a person's pronouns when pronouns cannot be automatically inferred. While successful retrieval of T facilitated accurate production of T, speakers were not always successful even when they correctly identified a person's pronouns when explicitly asked. Our findings demonstrate that learning to use *they/them* pronouns may require targeting multiple aspects of learning: remembering that a person uses *they/them*, but also updating the processes by which personal pronouns are produced.

- [1] Parker, K., Graf, N., & Igielnik, R. (2019). Generation Z looks a lot like millennials on key social and political issues. Pew Research Center.
- [2] Antón-Méndez, I. (2010). Gender bender: Gender errors in L2 pronoun production. *Journal of Psycholinguistic Research*, 39(2), 119-139.
- [3] Schmitt, B. M. (1997). Lexical access in the production of ellipsis and pronouns. *MPI Series in Psycholinguistics*, Nijmegen.
- [4] Arnold, J., Mayo, H., & Dong, L. (2020). Personal pronouns matter: Singular they understood better after explicit introduction. 33rd CUNY Human Sentence Processing Conference.
- [5] The Trevor Project. (2019). National survey on LGBTQ youth mental health.

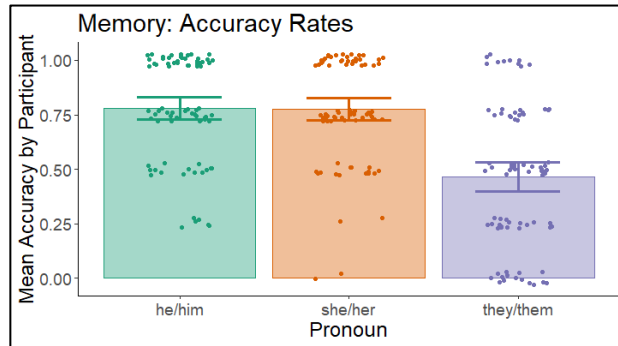


Figure 1. Multiple choice accuracy rates by pronoun condition, with participant means and by-participant standard errors.

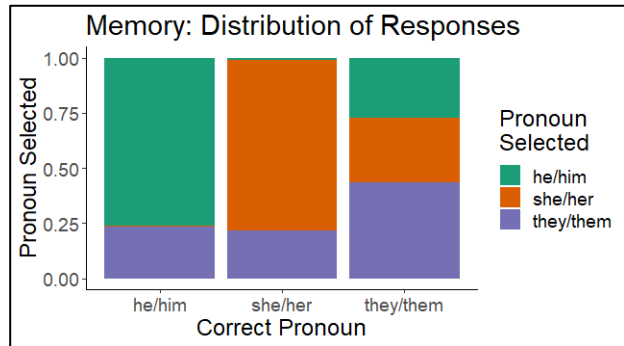


Figure 2. Distribution of multiple choice responses, with the correct pronoun on the x axis and the selected pronoun as the color.

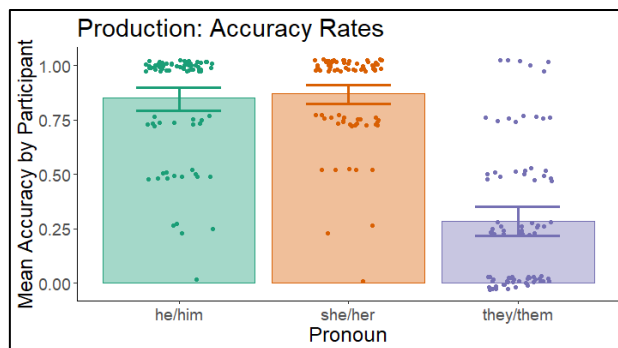


Figure 3. Sentence completion accuracy rates by pronoun condition, with participant means and by-participant standard errors.

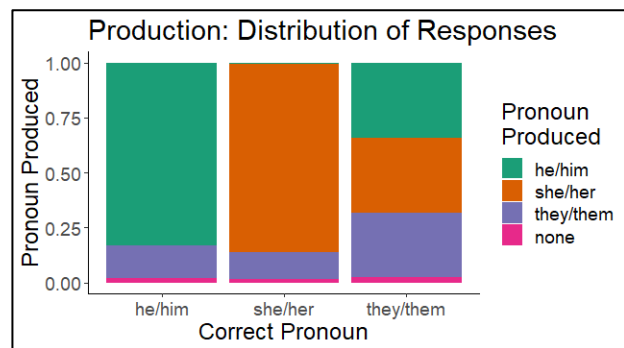


Figure 4. Distribution of sentence completion responses, with the correct pronoun on the x axis and the recalled pronoun as the color.

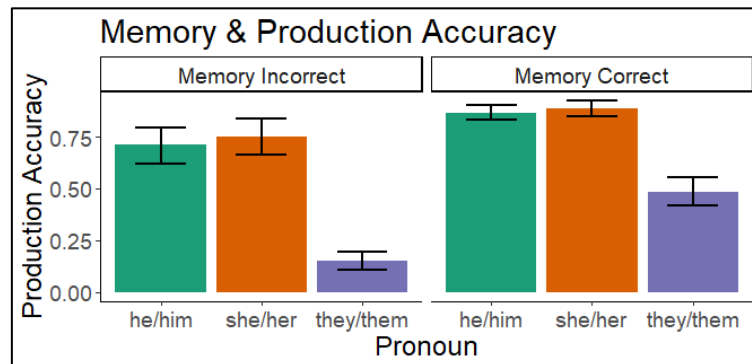


Figure 5. Accuracy on the production task, split (on a trial-by-trial basis) based on whether the P correctly remembered the pronoun in the memory test.