People adapt to Nonbinary Singular *They* through exposure

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While the pronoun *they* is traditionally considered to be plural (e.g., “Liz and Will went to the library. They borrowed a textbook”), recently it has gained usage as a singular pronoun for referents who use *they/them* pronouns, such as our cartoon character Alex (“Alex went to the store. They bought a sandwich”). We call this form “nonbinary they”. However, studies show reduced acceptability (Bjorkman, 2017; Bradley et al., 2019) and increased processing difficulty (Leventhal et al., 2020) for this form compared to plural *they* or binary pronouns (*he/she*). Nevertheless, the use of nonbinary *they* is increasing (Conrod, 2020), and singular interpretations of *they* can be encouraged by explicitly introducing pronouns (“Alex uses *they/them* pronouns”; Arnold et al.; 2021). However, an open question is whether people succeed in understanding this form primarily through explicit social signals like pronoun introduction. Do people also adapt to singular they through recent or frequent exposure?

In support of the role of adaptation, recent studies have shown that exposure shifts discourse biases for pronoun comprehension. For example, people are often biased to assign pronouns to the subject of the prior sentence (e.g., in “***Ana*** was cleaning with Liz. ***She*** used the broom”, people favor Ana as the referent), but this bias can be weakened by frequent exposure to stories with unambiguous pronouns referring to the second-mentioned person (e.g., “Will went hiking with ***Liz***. ***She*** brought snacks”; Johnson & Arnold, 2022). This suggests that even throughout adulthood, people shift their processing biases toward the most frequent usage in local context. This predicts that hearing *they* used to refer to nonbinary individual may encourage people to consider the singular interpretation in ambiguous contexts.

Methods: We tested adaptation to the local frequency of singular or plural *they*, both in an online mouse-tracking experiment (Exp. 1) and an offline interpretation task (Exp. 2). Participants met three characters and learned their pronouns: Alex (*they*), Liz (*she*) and Will (*he*). Then they listened to 24 exposure stories that all used *they* in either the singular- or plural-exposure condition, plus 20 fillers. The exposure stories unambiguously used *they* to refer to Alex or in a plural sense. The critical test stories tested interpretation of *they* in an ambiguous context (e.g. “Liz handed the menu to Alex. Then they ordered some wine”); Fig. 1. We predicted more singular interpretations and less competition with the plural in the singular-exposure than plural-exposure conditions. In both experiments, participants listened to stories about two characters and viewed three pictures, e.g., Alex, Will, and a plural Alex-and-Will picture. Two objects were underneath each picture, and participants were told that those objects were the ones each character interacts with (Fig. 1). Their job was to click on the object mentioned, e.g. “wine”, where wine under Alex signals the singular, while wine under Alex-and-Will signals the plural. In **Exp. 1** (mousetracking on Mturk; 124 participants), for exposure and critical stories the object only appeared under either Alex (singular) or the joint picture (plural). Mouse-tracking measured competition, where maximum absolute deviation (MAD) and x-axis flips signal competition. In **Exp. 2** (undergrads; 80 participants; pre-registered) the exposure and critical stories had an ambiguous visual display, with the critical object under both Alex and the plural picture. For exposure stories the story made only one interpretation possible; the critical stories were ambiguous, and our question was which object they would pick.

Results and Discussion: In **Exp. 1** (Fig. 3), MAD revealed greater competition for the plural interpretation than singular following singular exposure (and no difference for plural exposure); while the x-flips measure revealed greater competition for the singular interpretation than the plural following plural exposure (and no difference for singular exposure). In **Exp. 2**, participants selected the singular interpretation more in the singular than plural exposure condition. In sum, exposure to nonbinary singular *they* increases the availability of the singular interpretation and reduces on-line competition from the plural, while exposure to plural *they* increases competition from the plural. Thus, adaptation to local frequencies of singular vs. plural guides assumptions about whether “they” is being used in the singular or plural.

Figure 1. Sample singular exposure story (left) and plural exposure story (right) for Exp. 1 (Note: Exp. 2 had the same stimuli except that one non-target picture was repeated in two locations.

Figure 2. Sample singular critical story (left) and plural critical story (right) for Exp. 1 (Note: Exp. 2 had only one visual display with the critical object repeated under Alex and Liz-and-Alex).

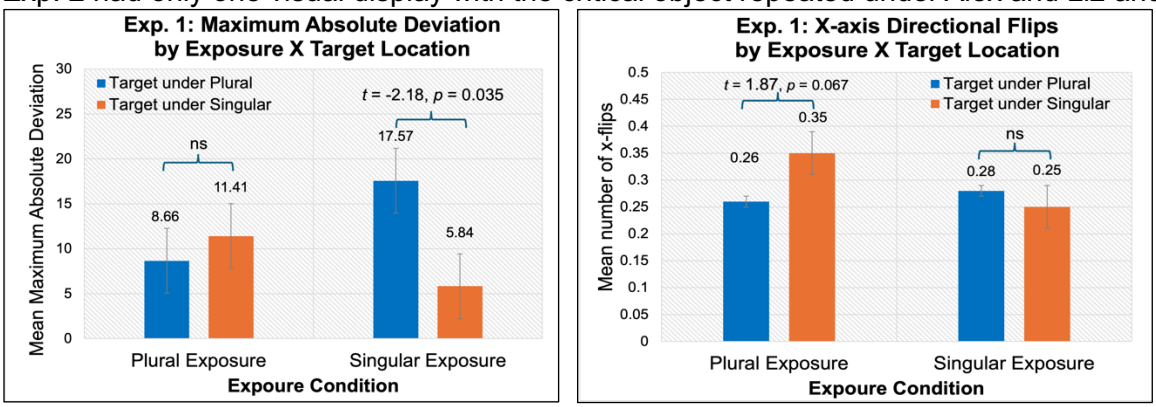
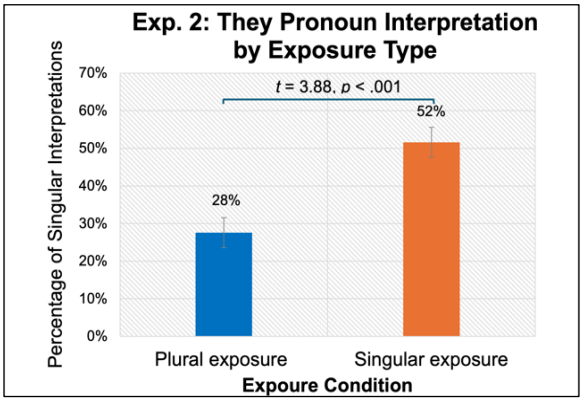


Fig. 3. Results for Exp. 1. MAD and X-flips are mouse-trajectory measures for competition between targets and the preferred alternatives. Lower values indicated lower competition.



References: Arnold et al. (2021). My pronouns are *they/them*…PBR. ♦ Bjorkman, (2017). Singular they…. Glossa. ♦Bradley et al. (2019). Personality, Prescriptivism…ET. ♦ Conrod, K. (2020). Pronouns and Gender… The Oxford Handbook of Language and Sexuality. ♦ Johnson & Arnold (2022). The Frequency of Referential Patterns...JEP:LMC.

Fig. 4. Results for Exp. 2. Proportions of singular they interpretations.