Exploring the Neurolinguistic Processing of Nonbinary Pronouns in First vs Second Languages

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This study investigates how people process nonbinary pronoun constructions (NBPCs, e.g., singular 'they') in their first (L1) versus second (L2) language using event-related brain potentials (ERPs). Previous work investigating NBPC processing with ERPs has primarily focused on L1 and has generally found that NBPCs elicit P600 effects compared to cisgender pronouns (Leventhal, Camilliere et al. 2020, Prasad and Morris 2020). The little research that has investigated NBPC processing in L2 has primarily focused on L2 English and has shown that self-paced reading times increase for NBPCs compared to cisgender pronouns, with more proficient participants showing a smaller reading time difference than less proficient participants (Speyer and Schleef 2019, Ma, Wu et al. 2022). Given the real-world import of NBPCs and the fact that many people assert that they have difficulty understanding them, it is important to further our understanding of L2 effects on NBPC processing.

To isolate L2 effects, the present work is a French L2 training study. Participants (target N=45) are right-handed, native English speakers with no prior French exposure. The study consists of three sessions with one day between each. In Sessions 1 and 2, a limited set of French vocabulary, grammar rules, and training sentences are introduced. Training and testing sentences describe simple actions performed by three characters, each with preferred pronouns. Training implicitly teaches the grammaticality of NBPCs. The experiment has a 2 (language: French or English) x 4 (character: Jennifer, George, Alex or plural) x 2 (acceptability: correct or incorrect pronoun) design. Table 1 provides an example item. After training in Session 2 and then at the beginning of Session 3, participants judge the acceptability of 120 French and 80 English sentences while undergoing EEG recording. Language is blocked, with French first in each testing session. During Sessions 1 and 3, participants complete behavioral tasks that probe their socioeconomic/political attitudes, implicit biases against transgender people (transgender implicit association test), working memory updating ability (spatial 3-back task), and L2 proficiency level.

Processing of the first n=10 participants ERP data has been completed. For analysis purposes, Jennifer and George conditions have been collapsed into one "cisgender" condition. Visual inspection of the grand averaged waveforms shows possible P600 effects elicited by use of NBPCs in L1 compared to cisgender pronouns (Fig 1A), similar to those previously reported. However, L2 shows more of an extended positive effect (Fig 1B), possibly similar to a late positivity complex from retrieving the correct pronoun from memory. Further interesting comparisons come when investigating how misgendering (using the wrong pronoun for) characters affects processing between languages. In L1, misgendering either a cisgender (Fig 1C) or nonbinary character (Fig 1E) appears to elicit P600 effects, though with an earlier P300-type effect for the acceptable condition forming as well. The P600 carries to L2 when a cisgender character is misgendered (Fig 1D). However, when a nonbinary character is misgendered in L2, we see a potential N400 emerge (Fig 1F), however, this would be surprising in such a newly learned L2 and may be better seen as an N2.

These results are preliminary so should be interpreted with caution, but if confirmed will suggest that in L2, participants were expecting the nonbinary character to be referred to with an NBPC. It seems that with just minimal training, participants are able to overcome L1 syntactic constraints on proper processing of NBPCs and develop new representations of NBPCs in L2 that account for the nonbinary identity.

(Please see poster for final results)

Table 1. Example stimulus item, with all conditions. * Denotes unacceptable version

Jennifer (she)	George (he)	Alex (they)	Plural (they)
Jennifer works then **she/he*** plays.	George works then **he/she*** plays.	Alex works then **they/he*/she*** play.	Alex and Jennifer work then **they/he*/she*** play.
Jennifer travaille puis **elle/il*** joue.	George travaille puis **il/elle*** joue.	Alex travaille puis **iel/il*/elle*** joue.	Alex et Jennifer travaillent puis **iel/il*/elle*** jouent.

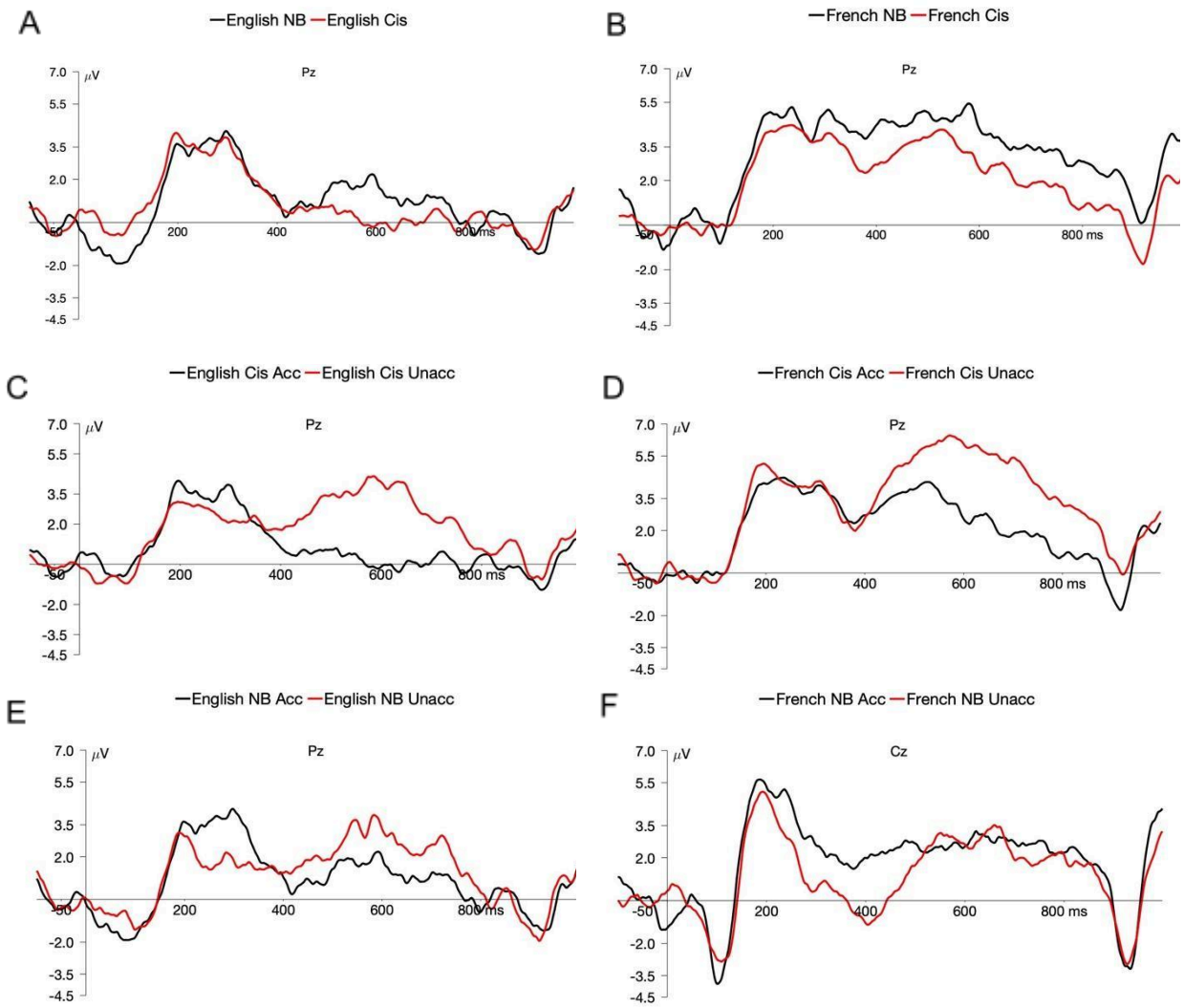

Figure 1. Grand averaged waveforms. A&B: Comparisons between correct usage of NBPCs vs cisgender pronouns in L1 (A) and L2 (B); C-F: Effects of misgendering cisgender and nonbinary characters in both L1 and L2

References

(Speyer and Schleef 2019, Leventhal, Camilliere et al. 2020, Prasad and Morris 2020, Ma, Wu et al. 2022)