Representations underlining grammatical gender ambiguity avoidance

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A controversy in language production research concerns whether speakers avoid ambiguous utterances. Here we examined if and how speakers avoid grammatical gender ambiguous pronouns in French. Grammatical gender is assumed to be represented at the *lemma* level (e.g., Levelt et al., 1999). We asked how grammatical ambiguity avoidance might interact with the referent's linguistic as well as non-linguistic representations. The *interactive competition* account predicts that different levels of representation jointly enhance the lexical representations at the grammatical level (Dell, 1986), strengthening the activation of the shared gender node (and its links with the antecedents) (Pickering & Branigan, 1998). In this view, the antecedents' semantic or phonological similarities should enhance the likelihood of successful grammatical ambiguity avoidance. By contrast, the *non-interactive competition account* argues that grammatical representations are affected by the referents' semantic similarity (assuming that semantic similarity affects competition at the lemma level, e.g., Schriefers et al., 1990) but not by their phonological similarity (cf. Cleland & Pickering, 2003). So the referents' semantic, but not phonological, similarity should interact with grammatical gender ambiguity avoidance.

Experiment 1 examined if the referents' grammatical gender congruence interacts with their semantic similarity, as predicted by both the interactive and non-interactive competition accounts. Participants saw a display of two objects on a monitor and read aloud a context sentence (1a-d). In the display, the target object then changed location. Participants described the change (1e) to their addressee. The referents were either *semantically-similar* (1a-b) or *dissimilar* (1c-d), and they either had the same gender (1a&c) or different grammatical genders (1b&d). Mixed-effects analyses revealed that participants used significantly fewer pronouns when the referents had the same, rather than different, grammatical gender, but this only occurred when the referents were semantically related. Experiment 2 manipulated the referents' gender congruence and phonological similarities, as in (2a-d). Contra Experiment 1, grammatical gender congruence did not result in fewer pronouns in any condition.

Experiment 3 examined if speakers were more likely to avoid gender ambiguous pronouns when the referents competed more strongly in the non-linguistic context. In the *situationally similar* condition, both referents were in a red box, signalling to both participants that either could move in the display. In the *situationally dissimilar* condition, only the target was in a red box, signalling that only the boxed target could be the referent. The main effect of situational congruence revealed fewer pronouns when both entities were in the box than when only the target was in the box. Yet, no significant main effect of grammatical gender congruence or interaction were observed. Finally, Experiment 4 pitched the effect of grammatical gender ambiguity avoidance against biological gender ambiguity avoidance (4), investigating if speakers would be more likely to avoid gender ambiguous pronouns when gender congruence increases the referents' conceptual similarity (biological gender condition) than when it does not (grammatical gender condition). The biological gender congruence, but not the grammatical gender congruence, led to fewer pronouns, indicating that the referents must be conceptually similar for speakers to avoid gender ambiguous pronouns.

These results support the non-interactive competition account, which claims that grammatical gender ambiguity avoidance is affected by the referents' semantic similarity, but not by their phonological or situational similarity. Moreover, the lack of the grammatical gender congruence effect in the absence of the referents' semantic (Exp 2) or conceptual (Exp 4) similarity or in the presence of a strong non-linguistic competition (Exp 3) suggests that speakers do not reliably avoid ambiguous pronouns on the basis of the referents' grammatical gender alone.

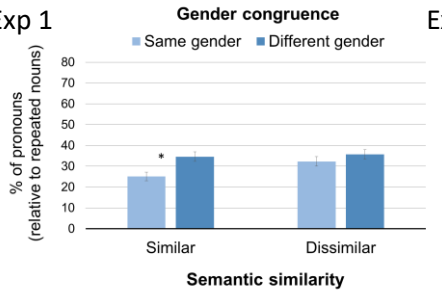
(1) Exp 1 a. La fraise à côté de la pastèque est sur le numéro 2.
The strawberry next to the watermelon is on Number 2.
b. La fraise à côté du melon est sur le numéro 2.
The strawberry next to the melon is on Number 2.
c. La fraise à côté de la guitare est sur le numéro 2.
The strawberry next to the guitar is on Number 2.
d. La fraise à côté du violon est sur le numéro 2.
The strawberry next to the violine is on Number 2.
e. Maintenant, **la fraise /elle** est au numéro 6. (Now the **strawberry/it** is on Number 6).

(2) Exp 2 a. La canette à côté de la cabane est sur le numéro 1.
The can next to the hut is on Number 1.
b. La canette à côté du camion est sur le numéro 1.
The can next to the truck is on Number 1.
c. La canette à côté de la bougie est sur le numéro 1.
The can next to the candle is on Number 1.
d. La canette à côté du bouton est sur le numéro 1.
The can next to the button is on Number 1.
e. Maintenant, **la canette /elle** est au numéro 6. (Now the **can/it** is on Number 6).

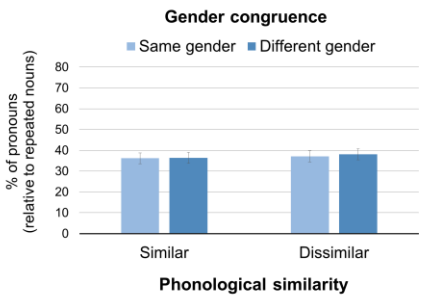
(3) Exp 3 a. La fraise à côté de la pastèque est sur le numéro 2. (2 boxes vs. 1 box)
The strawberry next to the watermelon is on Number 2.
b. La fraise à côté du melon est sur le numéro 2. (2 boxes vs. 1 box)
The strawberry next to the melon is on Number 2

(4) Exp 4 a. La reine en dessous de la fée est sur le numéro 6.
The queen below the fairy is on Number 6.
b. La reine en dessous du marin est sur le numéro 6.
The queen below the sailor is on Number 6.
c. La casette en dessous de la pizza est sur le numéro 6.
The casette below the pizza is on the number 6.
d. La casette en dessous du piment est sur le numéro 6.
The casette below the pepper is on the number 6.
e. Maintenant, **la reine /elle** est au numéro 6. (Now, the **queen/she** is on Number 6.)
Maintenant, **la casette /elle** est au numéro 6. (Now the **casette/it** is on Number 6.)

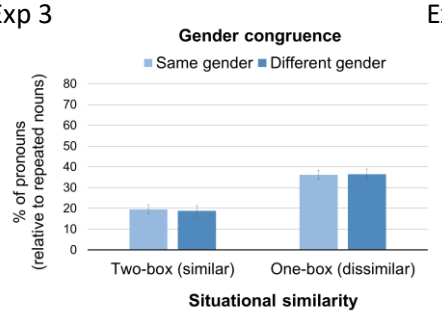
Exp 1



Exp 2



Exp 3



Exp 4