Interpreting the gender of French human nouns: an experimental approach

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1 Introduction

Corbett 1991 considers grammatical gender an enigmatic feature: it does not carry meaning as do tense and number, but it is not fully formal in its marking of syntactic dependencies as is case. Generally considered as inflectional for adjectives and non-interpreted for inanimate nouns, grammatical gender encodes different meanings and connotations for human nouns (Corbett 1991, Richy & Burnett 2021, Michel 2017). For human nouns, grammatical gender and social gender tend to correspond—this is the case for congruent nouns, where [masculine]⇒man and [feminine]⇒woman (Corbett 1991). This generalisation (Semantic Core Generalisation) is robust cross-linguistically for languages with grammatical gender, and French follows such a pattern (instituteur.M 'male school.teacher', institutrice.F 'female school.teacher'), with half of its human nouns being common gender (le juge 'male judge', la juge 'female judge'), and some epicenes (nouns with fixed gender for both sexes: individu.M, personne.F) (Bonami & Boyé 2019).

Merchant 2014 suggested that ellipsis may shed light on our understanding of gender features: if we consider (uninterpreted) agreement features (contextual inflection, per Booij 1995) to be ignored for ellipsis interpretation, the acceptability of gender mismatches under ellipsis is a central question, for both syntactic (Merchant 2001) and semantic (Ginzburg & Sag 2000) reconstruction approaches. Looking at stripping constructions, Merchant 2014 proposed 3 classes for human nouns. Class I encompasses kinship (e.g. *father/mother*) and nobility or title (e.g. *king/queen*) nouns, and disallow gender mismatch: **John is a prince/father and Mary too. *Mary is a princess/mother and John too*. For these, gender is lexically specified and asserted with the noun's meaning for each member of the pair: [masculine] = male social gender and [feminine] = female social gender. They also have in common to often come in suppletive pairs, even in languages without grammatical gender; they refer to life-long roles, where social gender plays a crucial role: a mother gives birth, a father does not; in several countries, as in France, a *queen* may refer to the king's wife (as opposed to a female monarch), and a *prince* may inherit the kingdom, unlike a *princess*. For both types of nouns, the masculine plural may not refer to mixed groups (a), unlike with other role nouns (b).

(1) a. *les rois* ('the kings') ≠ *les rois* ('the kings') & *les reines* ('the queens')
les pères ('the fathers') ≠ *les pères* ('the fathers') & *les mères* ('the mothers')
b. *les acteurs* ('the actors') = *les acteurs* ('the actors') & *les actrices* ('the actresses')

Alternating role nouns (e.g. *actor/actress*) fall into Class II, and allow for gender mismatch in the Masc-Fem order: *John is an actor and Mary too. / *Mary is an actress and John too*. For Merchant 2014, gender is lexically specified for [feminine] only (asserted or presupposed with the noun meaning), and it is not interpreted for [masculine] (unmarked or underspecified), unlike Class I. For Sudo & Spathas 2020 gender inferences for [feminine] are both asserted and presupposed given that gender is a lexical entailment, and restricts the domain of quantification to female individuals only. For [masculine], there are no gender inferences, nouns are semantically unmarked.

A Class III, then, groups common gender (role) nouns with no gender marking (e.g. *student*), or where gender is marked via inflection (e.g. Portuguese *medico/a* 'doctor' M/F), and allow gender mismatch in both ordering. For these, Sudo & Spathas 2020 posit that gender is an inflectional feature, and is not interpreted for either value.

These 3 human noun classes have been discussed for Modern Greek Sudo & Spathas 2020 and Brazilian Portuguese (Nunes & Zocca 2009, Bobaljik & Zocca 2011), and built-upon for Spanish (Donatelli 2019). For English, Sprouse et al. 2022 tested 16 nouns of Class I and II and found a symmetric mismatch penalty for 7 of them, and a fem-masc penalty for the others. In a follow-up experiment (58 nouns), they found an asymmetric mismatch for 35 of them.

Our goal is to test gender interpretation with French human nouns, using ellipsis as a diagnostic tool. We first test whether gender is ignored under ellipsis with adjectives, then test the 3 classes for nouns. If French has Class III nouns (especially those derived from adjectives), gender is a contextual inflectional feature and can be ignored under ellipsis, while for others it is part of the noun meaning and cannot be ignored. If French has Class II nouns, gender is only interpreted for the feminine form, hence an asymmetric mismatch under ellipsis.

2 Experiment 1: inflectional gender on adjectives

We ran a first acceptability judgment task, conducted online via IbexFarm (Drummond 2013), using a 1-10 Likert scale. 89 participants, all self-declared French native speakers, were recruited on the RISC website and on social media. The experiment had 16 target items, following a 2x2 Latin square design with ±MISMATCH and ±ELLIPSIS as factors, as well as 16 filler items on wh-extractions and 12 control items testing participant sensitivity to gender agreement. All critical items featured human nouns and alternating adjectives. Order was encoded as an intra-item variable (Masc-First/Fem-First).

(2) a. *Paul/Pauline est grand/grande et Marie/Michel aussi.*
Paul/Pauline is tall.M/F and Marie/Michel too
'Paul/Pauline is tall and Marie/Michel too.'

b. *Paul/Pauline est grand/grande et Marie/Michel l'est aussi.*
Paul/Pauline is tall.M/F and Marie/Michel it.is too
'Paul is tall and Marie/Michel is too.'

We found a weak penalty of mismatch in ellipsis condition ($\bar{x} = 8.24$) compared to match ($\bar{x} = 9.01$), and no robust effect of order (P($\beta > 0$)=0.06). These results show that inflectional features (agreement gender features on adjectives) are largely ignored for ellipsis resolution.

3 Experiment 2: lexically specified gender (nobility and kinship nouns)

For our second experiment, we recruited 37 participants from Prolific, with the same procedure.

We had 24 target items, with a 2x2 design with ±MISMATCH and X-FIRST:Fem-First/Masc-First as factors. We also had 24 fillers, and 12 (gender agreement) control items. We tested 10 nobility nouns (a,b) and 14 kinship nouns (c,d).

(3) a. *Édouard est un roi juste, Philippe/Philippine aussi.*
Édouard is a.M king.M fair.M Philippe/Philippine too
'Édouard is a fair king, Philippe/Philippine too.'

b. *Eugénie est une reine juste, Philippe/Philippine aussi.*
Eugénie is a.F queen.F fair.F Philippe/Philippine too
'Eugénie is a fair queen and Philippe/Philippine too.'

c. *Thomas est un frère sage, Ambroise/Ambre aussi.*
Thomas is a.M brother.M behaved.M Ambroise/Ambre too
'Thomas is a behaved brother, Ambroise/Ambre too.'

d. *Inès est une sœur sage, Ambroise/Ambre aussi.*
Alice is a.F sister.F behaved.F Ambroise/Ambre too
'Alice is behaved sister, Ambroise/Ambre too.'

We found a strong mismatch penalty overall ($\bar{x} = 4.71$), but mismatches were still rated higher than ungrammatical controls ($\bar{x} = 2.71$). With a high variation per item, we found no order preference for nobility nouns, and a non-robust preference for the Masculine-First order for mismatched kinship nouns.

This shows that gender mismatches under ellipsis for Class I nouns are penalized, though not impossible.

4 Experiments 3-5: asymmetric gender (alternating role nouns)

Experiments 3 to 5, all online acceptability judgment tasks (IbexFarm, 1-10 Likert scale) looked at alternating role nouns. Noun endings was controlled for, with œʁ∼øz (*chanteur∼chanteuse* 'singer.M/F'), œʁ∼ʁis (*coordinateur∼coordinatrice* 'coordinator.M/F') and .∼C (*infirmier∼infirmière* 'nurse.M/F') as possible alternations.

We took into account stereotypical gender information (gender biases) using normed scores from Misersky et al. 2014. Experiment 3 looked at non-biased nouns (normed scores between 0.45 to 0.55, nouns like *voisin∼voisine* 'neighbour.M/F'), and experiment 4 looked at biased nouns (female biased nouns with scores above 0.65 such as *esthéticien∼esthéticienne* 'beautician.M/F', and masculine biased nouns with normed scores below 0.45 such as *plombier∼plombière* 'plumber.M/F'). Using Prolific, we recruited 64 participants for Experiment 3 and 35 for experiment 4, all self-declared L1 speakers of French who were asked to rate the acceptability of sentences on a scale of 1-10.

Experiment 3 and 4 had 48 target items each following a 2x2 design: ±MISMATCH, ±FEM-FIRST, for a total of 24 alternating non-biased (a) and biased (b) nouns. For each noun, we tested both orders (Masc-First/Fem-First) with the hypothesis that symmetric judgments of mismatches would indicate that these nouns pattern closer to adjectives.

(4) a. *Jacqueline est une joueuse de bingo, Claudine/Bernard aussi.*
Jacqueline is a.F player.F of bingo Claudine/Bernard too
'Jacqueline is a bingo player, Claudine/Bernard too.'

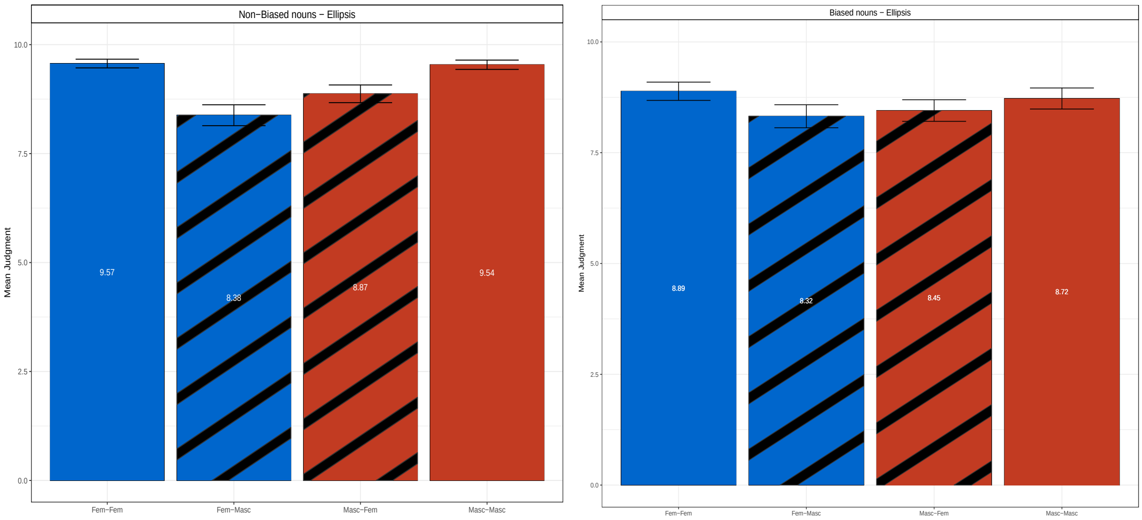
b. *Jacques est un instituteur, Paul/Pauline aussi.*
Jacques is a.M schoolteacher.M Paul/Pauline too
'Jacques is a schoolteacher, Paul/Pauline too.'

For non-biased nouns (Exp.3, Fig.1), we found a robust preference for the Masc-Fem order ($\bar{x}$=8.9, P($\beta < 0$)=1), with the Fem-Masc order ($\bar{x}$=8.4) still largely above ungrammatical controls ($\bar{x}$=5). For biased nouns (Exp.4, Fig.1), we also found a robust preference for Masc-Fem ($\bar{x}$=8.45, P($\beta < 0$)=1), with Fem-Masc ($\bar{x}$=8.32) once more above ungrammatical controls ($\bar{x}$=5.68). We found no robust effect of bias, and no interaction with ±Fem-bias. If ratings are lower for mismatches with biased nouns, and while order preferences are robust, we were not able to confirm an acceptability asymmetry for the 48 tested nouns in Experiments 3 and 4, with and without gender biases.

Experiments 3 and 4 show that these 48 role nouns allow for gender mismatch under ellipsis, in both ordering, and that a possible penalty may come from gender stereotype. This suggest that their gender may be a phi-feature, like adjectives. To investigate this further, we ran Experiment 5.

Experiment 5 had 48 target items in non-elliptical contexts, with a 2x2 design (±MISMATCH, ±FEM-FIRST), for which we recruited 53 participants (recruitment was run on the RISC website, all participants were self-declared native French speakers).

Figure 1: We plot the average acceptability per condition for Ellipsis in Exp.3 and 4, with blue for Fem-First and red for Masc-First. Patterned bars represent +MISMATCH.



(5) a. *Marie est une coiffeuse / un coiffeur.*
Marie is a.F hairdresserF / a.M hairdresser.M
'Marie is a hairdresser.'

b. *Marc est une coiffeuse / un coiffeur.*
Marc is a.F hairdresser.F / a.M hairdresser.M
'Marc is a hairdresser.'

Results show that [feminine] with a masculine subject is not acceptable ($\bar{x} = 2.68$), much like [masculine] with a feminine subject ($\bar{x} = 3.17$), indicating that [masculine] is not unmarked, as previously claimed. Our results show a clear gender agreement constraint is at work for alternating role nouns, and that results from experiments 3 and 4 are not a by-product of a parallelism constraint on coordinate structures. Mismatches were also more costly for feminine-biased nouns, showing that stereotypical gender (biases) play a role in the acceptability of gender mismatches and ordering.

In this experiment, they agree with the subject noun, just like adjectives. We conclude that they belong to class III, and doubt that class II is relevant for French.

5 Discussion

Our experimental results suggest that the human noun classes proposed by the literature (Nunes & Zocca 2009, Bobaljik & Zocca 2011, Merchant 2014, Sudo & Spathas 2020, Sprouse et al. 2022, Donatelli 2019) must be revised for French. From our investigations, a Class I (nobility/kinship nouns) clearly emerges, where mismatches are difficult but remain acceptable. We explain this penalty in having gender part of the noun's meaning. Other role nouns, seem to fall into Class III, with inflectional gender features (compulsory for predicate agreement, and ignored under ellipsis), like adjectives. Within this Class, preferences seem to be linked to gender biases (stereotypes), rather than to an 'unmarked' masculine.

Merchant 2014 postulates that gender inferences are always presuppositions (6): if gender features are located above NP (and under nP), there should always be a combination with a gender feature at a high level in the derivation. As a consequence, when presuppositions are triggered, and when there is a gender mismatch, that mismatch is disallowed due to a semantic clash in the combination. This approach proposes that for Class III nouns, there is no presupposition as [masculine] is semantically empty (and inflectional features only carry ϕ-presuppositions), which is why there is no clash blocking the mismatch. For Class I nouns, the lexical specification of gender is added onto the existing inference, and mismatches are disallowed regardless of the order. Asymmetries would therefore arise for Class I nouns, assuming again that [masculine] is semantically vacuous, it may freely combine with a [feminine] determiner or adjective in the DP.

(6) $[\![\ \text{[masculine]}\ ]\!] = \lambda P_{et}.\lambda x_e\text{: man(x).P(x)}$ $\quad [\![\ \text{[feminine]}\ ]\!] = \lambda P_{et}.\lambda x_e\text{: woman(x).P(x)}$

Sudo & Spathas 2020 propose that unless gender is lexically specified for a noun (in which case gender information is presupposed), it is semantically unmarked. Their theory predicts that Class I nouns (7a) have symmetric gender inferences (both [masculine] and [feminine] are lexically specified on the noun) yielding ungrammatical mismatches, just like Class III (7c) nouns symmetrically license mismatches with ϕ-features being uninterpreted and unmarked. For Class II nouns (7b), they propose that the predicted asymmetry comes from an entailment asymmetry ([feminine] entails [masculine], but the opposite is not true), and from the fact that an elided [masculine] noun means that no feature is interpreted that could yield a clash.

We adopt the following analysis, see also Sauerland 2003, 2008 (a.o.), where gender features outside of the DP are interpreted through syntactic agreement. For adjectives (7c), then, the interpretation of gender features follows the same principle as the ϕ-presuppositions of Class III nouns (7d).

(7)
a. $[\![\ \text{fils}\ ]\!] = \lambda x_e : \text{man(x).man(x)}\wedge\text{child(x)}$
$[\![\ \text{fille}\ ]\!] = \lambda x_e : \text{woman(x).woman(x)}\wedge\text{child(x)}$
b. $[\![\ \text{étudiant}\ ]\!] = \lambda x_e : \text{student(x)}$
$[\![\ \text{étudiante}]\!] = \lambda x_e : \text{woman(x)}\wedge\text{student(x)}$
c. $[\![\ \text{grand}\ ]\!] = [\![\ \text{grande}\ ]\!] = \lambda x_e\text{: tall(x)}$
d. $[\![\ \text{étudiant}\ ]\!] = [\![\ \text{étudiante}\ ]\!] = \lambda x_e\text{: student(x)}$

We adopt a direct interpretation approach to ellipsis, in line with Abeillé & Kim 2022, where the polarity fragment (8), a non-sentential utterance, is semantically interpreted viz. the antecedent (QUD), with no syntactic reconstruction. Mismatches are licensed, since the same Predicate is used (without inflectional features) for ellipsis resolution (adjectives and Class III nouns) or only part of it (for Class I nouns, such as CTXT QUD man(i) & child(i), CONT woman(j) & child(j), as with partial anaphors).

(8) Max$_i$ est grand/étudiant, Alice$_j$ aussi. (‘Max$_i$ is tall/a student, Alice$_j$ too.’)

$$\begin{bmatrix} \textit{stripping-cx} & \\ \text{CONT} & \textit{student}(j) \\ \text{CTXT QUD} & \textit{student}(i) \end{bmatrix}$$

NP$_j$ Adv
Alice aussi

Accounting for the different behavior of human nouns under nominal ellipsis, for French, thus requires inputs from semantics, but also from morphology (in distinguishing inflectional features, where gender can be uninterpreted, from derived pairs and lexically encoded gender), and sociolinguistics (with super-additive social gender information being automatically activated).

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