CAMBRIDGE
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Closest conjunct agreement with attributive adjectives[1]

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Abstract

Contrary to most French grammars claiming that French only allows masculine agreement when mixed-gender nouns are conjoined, we show that closest conjunct agreement (CCA) does exist in contemporary French, as in other Romance languages, and is the preferred strategy for prenominal adjectives. Using data from a large corpus (FrWac) and an acceptability rating experiment, we show that (feminine) CCA is well accepted in contemporary French, and should be distinguished from attraction errors, despite the norm prescribing masculine agreement. We also show the role of the adjective position, i.e. prenominal or post-nominal, and humanness. CCA is the preferred strategy for prenominal adjectives, and non-human nouns favour CCA for post-nominal adjectives. Assuming a hierarchical structure for coordination, the closest noun is the highest in A-N order, whereas it is the lowest in N-A order. Thus CCA in prenominal position may be favoured by a shorter structural distance. One can also see CCA with a prenominal adjective as 'early' agreement. Regarding humanness, grammatical gender is interpreted as social gender with human nouns, and a masculine plural can refer to a mixed group. This 'gender neutral' plural may favour masculine agreement for human nouns, or the prescriptive norm is more influential for human nouns.

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Introduction

Agreement with coordination is a complex issue and different languages may use different strategies (cf. Sadler, 1999; Wechsler and Zlatić, 2000; Kuhn et al., 2007; Borsley, 2009; Dalrymple and Hristov, 2010). When the coordination includes conjuncts with conflicting features, languages may follow resolution rules (cf. Givón, 1970; Dalrymple and Kaplan, 2000) or use closest conjunct agreement (cf. Corbett, 1991; Wechsler and Zlatić, 2003). A single language, such as Latin, may use different strategies in case of coordination of nouns with different genders: masculine resolution (1-a) (for human nouns) or agreement with the closest conjunct (1-b).

1) a. *quam*   *pridem*   *pater*   *mihi*   *et*   *mater*
        how-long   ago   father.M.SG 1SG.DAT   and   mother.F.SG
        mortui   *essent.*
        dead.M.PL   be.PST.3.PL
        'How long ago my father and mother had died' (Corbett, 1991, p.193)
    b. ***eadem***   *alacritate*   *ac*   *studio*
        same.F.SG.ABL   ardor.F.SG.ABL   and   zeal.N.SG.ABL
        'with the same ardor and zeal' (Caesar BG. 4.24; cited in Johnson 2013, p.6)

Romance languages, such as Italian, Spanish and Portuguese, use the same masculine resolution strategy, but also allow for CCA. In example (2-a) (from Demonte and Perez-Jimenez, 2012), the determiner and prenominal adjective show CCA while the post-nominal adjective is not marked for gender. CCA is observed for the post-nominal adjective in example (2-b) (Villavicencio, Sadler and Arnold, 2005), and for the prenominal adjective in Italian (2-c) (Benincà, 1988).[2]

2) a. **Una**   **in oportuna**   llovizna   y   viento   pertinaz
        an.F.SG   untimely.F.SG   drizzle.F.SG   and   wind.M.SG   persistent.SG
        'Inopportune and persistent drizzle and wind' (Spanish)
    b. Esta   canção   anima   os   corações
        this.F.SG   song.F.SG   animates   the.M.PL   hearts.M.PL
        e   mentes   **brasileiras**.
        and   minds.F.PL   Brazilian.F.PL
        'This song cheers up Brazilian hearts and minds.' (Portuguese)
    c. **alcune**   città   e   villagi   del   Messico
        certain.F.PL city.F   and   village.M.PL of-the   Mexico
        'some cities and villages of Mexico' (Italian)

Feminine agreement with nouns of mixed genders is also attested in classical French (Viennot, 2014).

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[2]Villavicencio, Sadler and Arnold (2005) observe that in Portuguese only CCA is allowed for gender agreement of prenominal adjectives, while both resolution and CCA are possible with post-nominal adjectives, with 11.95% of CCA in Google queries.

3) a. | *Armez-vous* | *d'un* | *courage* | *et* | *d'une* | *foi* | ***nouvelle*** |
|---|---|---|---|---|---|---|
| arm-yourself | with a.M.SG | courage.M.SG | and | with a.F.SG | faith.F.SG | new.F.SG |

   'Arm yourself with new courage and faith' (Racine, Athalie, 1691)

   b. | ***Toutes*** | *les* | *citoyennes* | *et* | *citoyens* | *doivent* | *concourir* |
|---|---|---|---|---|---|---|
| all.F.PL | the.PL | citizen.F.PL | and | citizen.M.PL | must | contribute |

personnellement	*ou*	*par*	*leurs*	*représentants*	*à*	*sa*
personally	or	by	their	representatives	to	its

formation.
formation

   'All citizens must contribute personally or through their representatives to its forma-
   tion.' (de Gouges, Déclaration des droits de la femme, 1791)

In (3a), the postnominal adjective *nouvelle* has wide scope over the two nouns, since ?*Armez-vous d'un courage* ('arm yourself with a courage') is weird without an adjective: *un* ('a') refers to a subtype of courage and *de* would be used without an adjective: *Armez-vous de courage* ('arm yourself with courage').

The masculine resolution rule in contemporary French

According to some authors (cf. Viennot, 2014), contemporary French has lost the possibility of CCA due to the power of the (masculine) prescriptive norm. Other authors suggest a more nuanced view: Grevisse and Goosse (2016, p.338) write: "si les noms sont de genre différents, l'épithète se met au genre indifférencié, c'est-à-dire masculin".[3]

4) | *Et [...]* | *la* | *guêpe* | *fouisseuse [...]* | *leur* | *perce* | *avec* | *un* |
|---|---|---|---|---|---|---|---|
| and | the | wasp | burrowing | them | pierces | with | a.M.SG |

savoir	*et*	*une*	*adresse*	***merveilleux*** *[...]*
knowledge.M.SG	and	a.F.SG	skill.F.SG	marvellous.M.PL

   'and the burrowing wasp pierces with a marvellous knowledge and skill' (Proust, *A la Recherche du temps perdu, t.1, p.124*)

But they add: "La règle générale n'est pas toujours respectée [...]. La tradition grammaticale, qui correspond à un certain sentiment des usagers, estime choquant pour l'oreille que le nom féminin soit dans le voisinage immédiat de l'adjectif." (5) (Grevisse and Goosse, 2016, p. 339)[4] and conclude: "il est préférable chaque fois que cela est possible d'accorder avec l'ensemble des noms".[5]

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[3]'if the nouns are of different genders, the attribute must be with indistinct gender, i.e. masculine'

[4]'the general rule is not always observed. [...] The grammatical tradition, which corresponds to some speakers' feeling, finds it shocking for the ear if the feminine noun is immediately close to the adjective.'

[5]'it is preferable every time it is possible to agree with the set of nouns'. Notice that in (5) the prenominal adjective 'nombreuses' follows CCA while the predicate 'reportés' obeys the masculine resolution rule.

5) *De* **nombreuses**   *décisions*   *et*   *échanges*   *avaient*   *été*
   IND numerous.F.PL decision.F.PL and exchange.M.PL aux.PAST.3PL be.PTCP
   reportés.
   postponed.M.PL
   'Many decisions and discussions had been postponed.' (Le Monde, Nov. 4th
   1976)

According to Curat ([1999](#)), examples (6-a), (6-c) and (6-e) obey the resolution
rule but (6-a) is not acceptable. In (6-b), CCA is claimed to be dubious because it is
not compatible with the resolution rule. In post-nominal position, Curat ([1999](#))
claims that the feminine adjective only modifies N2 (6-d), whereas the
masculine adjective may modify the coordination as a whole (6-e).

6) a. *les   **nouveaux**   étudiantes   et   étudiants
        the.PL   new.M.PL   student.F.PL   and   student.M.PL
    b. ?les   **nouvelles**   étudiantes   et   étudiants
        the.PL   new.F.PL   student.F.PL   and   student.M.PL
    c. les   **nouveaux**   étudiants   et   étudiantes
        the.PL   new.M.PL   student.M.PL   and   student.F.PL
    d. les   étudiants   et   étudiantes   **nouvelles**
        the.PL   student.M.PL   and   student.F.PL new.F.PL
    e. les   étudiants   et   étudiantes   **nouveaux**
        the.PL   student.M.PL   and   student.F.PL new.M.PL

Thus, the status of the masculine resolution rule is unclear in French, especially
for prenominal attributive adjectives when the closest noun is feminine (5) (6-a).
Furthermore, most authors rely on their own intuition or a handful of attested
examples.

The aim of this article is to pursue a quantitative and empirical study of gender
agreement of French attributive adjectives in case of coordination of nouns with
different genders. We provide new contemporary data on gender agreement of
plural adjectives with plural nouns, which shed some light on the acceptability
of CCA, and on the factors that may favour it over resolution.

CCA and Corbett's agreement hierarchy

Putting French in a more general perspective, we take into account Corbett's
typological work. Looking at a wide variety of languages, Corbett considers that
agreement is an asymmetric relation between a controller and a target, involving
syntactic, semantic and pragmatic factors. In his view, CCA is not a 'repair'
mechanism yielding acceptable but otherwise ungrammatical output (Peterson,
[1986](#); Bhatt and Walkow, [2013](#)), but a strategy available in many language
families, such as Slavic or Bantu languages. He proposes that three factors may
favour CCA for languages with different agreement strategies (see Corbett, [1983](#),
[1991](#), [2006](#)):

- Controllers referring to inanimates
- Targets before Controllers (postverbal subject vs. preverbal subject)
- Agreement hierarchy

attributive < predicate < relative pronoun < personal pronoun
← non-resolution ——————————————resolution →

In his view, animate nouns may favour a more semantic agreement, for example plural agreement with two singular conjuncts, hence resolution. The interaction between CCA and directionality is compatible with a structural explanation (when the subject is postverbal, the closest noun is the highest noun, see below Section 4.2). It is compatible as well with an incremental processing account: only in backward agreement, when the target follows the controller, does the speaker know the features of all conjuncts before computing target agreement.

The agreement hierarchy may also be explained in terms of linear and structural distance. An attributive adjective (6-c) (6-b) is closer to the (controller) noun (and belongs to the same noun phrase) than a predicative one, which belongs to the verbal phrase and may be separated from the (controller) noun by a copula (5) (7), hence a penalty for CCA for predicative adjectives.

7) *Ces   étudiants   et   étudiantes   sont   **nouveaux.***
   this.PL   student.M.PL   and   student.F.PL   are   new.M.PL
   'These male and female students are new.'

If these factors apply to French gender agreement, CCA should be more frequent for prenominal adjectives than for post-nominal adjectives. We also expect differences between human and non-human nouns, if human nouns favour resolution in general.

The article is organized as follows: Section 1 briefly reviews previous literature about adjective agreement and positions in French. The new empirical data are presented in Section 2 (a corpus study) and Section 3 (an acceptability experiment). We analyse the results, discuss the factors that interact with CCA, and compare gender and number agreement in Section 4.

1. Gender agreement of French attributive adjectives

1.1 French nouns and gender

Like most other Romance languages, French has two grammatical genders, feminine (fem) and masculine (masc). For non-human nouns, grammatical gender is usually considered arbitrary. For example, the noun *chaise* 'chair' (*la chaise*) has feminine gender, while the noun *livre* 'book' (*le livre*), on the other hand, has masculine gender.

As in many languages, grammatical gender is usually associated with social gender for human nouns: masculine nouns tend to refer to males and feminine nouns to females. For example, *garçon* ('boy') is masculine and *fille* ('girl') is feminine, even if many personal nouns have a common gender, such as *journaliste*, 'journalist.M/F'.[6]

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[6] We leave aside some fixed gender nouns that can refer to both men and women (*un génie* 'a.M.SG genius', *une victime* 'a.F.SG victim'). See Bonami and Boyé (2019) for a discussion of the evolution.

Table 1. Inflection of French adjectives

	petit (small)		joli (beautiful)	
	masc	fem	masc	fem
SG	*petit*	*petite*	*joli*	*jolie*
PL	*petits*	*petites*	*jolis*	*jolies*

For human nouns presenting gender alternation (*chanteur/chanteuse* 'singer.M/ singer.F'), we leave open the debate whether they are formed by parallel suffixation, by derivation of one noun from the other, or by inflection from a common lexeme (Spencer, 2002; Bonami and Boyé, 2019).

1.2 French adjectives and gender

The paradigm of French adjectives has been discussed in morphology (cf. Morin, 1992; Bonami and Boyé, 2005).[7] In *Lexique* (New et al., 2001), 82% adjectives are marked for gender (masc/fem) in written French (as *petit* 'small', *joli* 'pretty' in Table 1), and others are syncretic (as *jeune* 'young'), while in spoken French, 66% adjectives have syncretic forms (masc/fem), as is the case for *joli*.

In what follows, we use a written corpus with various adjectives, but in our experiment we only use adjectives with an audible gender marking (*petit/e*) (Section 3).

1.3 Agreement strategies for French attributive adjectives

Attributive adjectives in French can be in pre- or post-nominal position, depending on their semantic class (cf. Wilmet, 1981; Bouchard, 1998; Miller, Pullum and Zwicky, 1997). For example, indefinites and cardinals are only found in prenominal position (8-a)-(8-b), while size, color or relational ones occur post-nominally (8-c)(8-d).[8]

8) a. ces   quelques   fleurs/   *ces   fleurs   quelques
        this.PL   some.PL   flower.F.PL   this.PL   flower.F.PL some.PL
   b.   mes   trois   amis/   *mes   amis   trois
        my.PL   three   friend.M.PL/   my.PL   friend.M.PL three
   c.   un   repas   italien/   ?un   italien   repas
        a.M.SG   meal.M.SG   italian.M.SG/ a.M.SG   italian.M.SG meal.M.SG
   d.   une   pièce   ronde/   ?une   ronde   pièce
        a.F.SG   room.F.SG   round.F.SG/   a.F.SG   round.F.SG   room.F.SG

Many evaluative adjectives like *agréable* 'pleasant' (9) can alternate between pre- and post-nominal positions with roughly the same meaning (Abeillé and Godard, 1999; Thuilier, Fox and Crabbé, 2012; Laenzlinger, 2005).

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[7]Bonami and Boyé (2005) argue that for singulars, on top of feminine and masculine, a third form is needed for prenominal masculine singular adjectives (*vieux, vieil, vieille*). We leave aside this issue here since we only consider plural forms.

[8]As in English, all adjectives must occur after the noun when they have a phrasal dependent: *un bon repas* 'a good meal'/*un repas bon pour moi*/*un bon pour moi repas* 'a meal good for me', hence the [WEIGHT light] constraint proposed by (Abeillé and Godard, 1999) or the [LEX +] constraint by (Sadler and Arnold, 1994) for prenominal adjectives.

9) une   agréable   soirée/   une   soirée   agréable
    a.F.SG   nice.SG   evening.F.SG/ a.F.SG   evening.F.SG nice.SG
    'a nice evening'

Following many French grammar books (cf. Riegel, Pellat and Rioul, 2018), French would be unique among Romance languages in only allowing resolution in case of conflicting genders: the coordination of a masculine and a feminine noun is supposed to be resolved to masculine, regardless of whether the nouns are animate (10) or not (4).

10) *Un*   *père*   *et*   *une*   *mère*   ***excellents***
     a.M.SG   father   and   a.F.SG   mother.F.SG excellent.M.PL
     'an excellent father and mother' (Corbett 1991, p.279)

Masculine agreement is sometimes considered as default agreement (Grevisse and Goosse, 2016), since it is used for expressions without grammatical gender: it is the gender used with sentential or verbal subjects (11-a) and with the expletive pronoun (11-b).

11) a.   *Bien*   *dormir*   *est*   *important.*
             well   sleep   is   important.M.SG
             'It's important to sleep well.'
     b.   *Il*   *pleut.*
             3.M.SG   rain.SG
             'It's raining.'

The difference between default agreement and resolution rules has been debated (cf. Nevins and Weisser, 2019), since in languages with three genders, default agreement is usually neuter while resolution is usually masculine. We use the term resolution rule in this article referring to masculine agreement when there is a conflict of features.[9]

In Section 2 and Section 3, we use coordination with one determiner shared by two plural nouns *D A N1 et N2* or *D N1 et N2 A*. We choose plural nouns so that there is no interaction with number agreement (see An and Abeillé (2017, 2019) for a discussion of CCA for number agreement with French determiners and adjectives). It is assumed that with a shared determiner, the two conjuncts are semantically related and form a conceptual unit (Wälchli, 2005; Le Bruyn and de Swart, 2014). The adjective thus tends to be interpreted as having scope over the coordinated nouns. We do not discuss adjectival scope much further, but only include examples where the adjective makes sense with scope over the whole coordination in the following sections. Our empirical data come from a corpus study on the one hand, and an acceptability rating experiment on the other hand.

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[9]We also leave aside semantic agreement with social gender, as in *Vous êtes beau/belle.* ('You are beautiful.M.SG/F.SG'), depending on the social gender of the addressee (see Wechsler and Zlatić, 2003).

2. New corpus data

2.1 Attributive Adjective agreement in FrWac

We chose FrWac (French Web as a Corpus, Baroni et al., 2009) because it is a large (1.6 billion word) corpus of contemporary French, including informal uses, annotated for parts of speech. In this corpus, we found 32,769 tokens for *D A N1 et N2* and 59,818 tokens for *D N1 et N2 A*. We randomly took 2,500 items for each structure and annotated automatically the gender information of nouns and adjectives with the *Lexique* database (New et al., 2001). We only selected plural nouns (among the two sets of 2500, it turns out that 1081 were plural for prenominal A and 1,000 were plural for post-nominal A). Restricting our data to nouns with different genders, we checked each item manually and removed the examples where the A N combination is a compound (12-a)[10] and when the A has scope on only one conjunct or has a syncretic form (12-b).

12) a. *les*   *grandes*   *écoles*   *et*   *laboratoires*
         the.PL   big.F.PL   school.F.PL   and   laboratory.M.PL
     b. *les*   *outils*   *et*   *procédures*   **nécessaires**
         the   tool.M.PL   and   procedure.F.PL   necessary.PL

We thus obtained 290 *D A N1 et N2* and 370 *D N1 et N2 A* sequences. Table 2 reports the occurrences of masc/fem adjectives with the two plural nouns of different genders.

In both prenominal and post-nominal positions, when the closest noun is masculine, masculine agreement may be triggered by resolution or by CCA. The adjectives are always masculine in these cases (13-a), (13-b).

13) a. *les*   **différents**   *pays*   *et*   *organisations*[11]
         the.PL   different.M.PL   country.M.PL and   organization.F.PL
         'different countries and organizations'
     b. *les*   *régions*   *et*   *pays*   **voisins**
         the.PL   region.F.PL   and   country.M.PL neighboring.M.PL
         'neighboring regions and countries'

In combinations like *D A N1$_f$ etN2$_m$* and *D N1$_m$ et N2$_f$ A*, we found two possibilities for A agreement: the resolution rule (14-a), (14-b) or CCA (14-c), (14-d). However, with a closest feminine noun, resolution is very rare for prenominal A (5%), while it is at 55% for postnominal A.

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[10]*Grandes Ecoles* is a collocation which refers to selective French higher education establishments which are different from the universities.

[11]A reviewer suggested an alternative analysis with two adjectives and ellipsis: *les **différentes** ressources et* ~~différents~~ *services* (the.PL different.F.PL resource.F.PL and different.m.PL service.m.PL); *les ressources* ~~différentes~~ *et services **différents*** (the.PL resource.F.PL different.F.PL and service.m.PL different.m.PL). But unlike number mismatch, ellipsis with gender mismatch between present and deleted form is an open issue (Merchant, 2014; Aparicio, Franich and Xiang, 2015). Furthermore, such an analysis would not capture the difference we find between prenominal and post-nominal adjectives. See section 3.3.1

Table 2. Adjective agreement with mixed-gender coordinate plural nouns in FrWac

	Am	*Af*	Total	% CCA	% Resolution
A N1$_f$ et N2$_m$	5	88	93	94.62	4.38
A N1$_m$ et N2$_f$	197	0	197	100	100
N1$_m$ et N2$_f$ A	79	65	144	55.86	44.14
N1$_f$ et N2$_m$ A	226	0	226	100	100

14) a. *Les*   **différents**   *ressources*   *et*   *services*
      the.PL   different.M.PL   resource.F.PL and   service.M.PL
      (FrWac, ac-orleans-tours.fr)
   b. *Leurs*   *droits*   *et*   **respectifs**
      their.PL   right.M.PL   and   respective.M.PL
      obligations
      obligation.F.PL
      (FrWaC, rhonealpes.fr)
   c. *les*   **différentes**   *villes*   *et*   *pays*
      the.PL   different.F.PL   city.F.PL   and   country.M.PL
      (FrWaC, leava.fr)
   d. *les*   *objectifs*   *et*   *caractéristiques*   **essentielles**
      the.PL   objective.M.PL   and   characteristic.F.PL essential.F.PL
      (FrWaC, gouv.fr)

2.2 Is masculine resolution the only agreement rule?

Table 2 shows that CCA exists in French and is not necessarily the same as resolution. It also shows a strong preference for CCA in prenominal position compared to post-nominal position ($p < .001$, Fisher's Exact Test). This may be explained by structural proximity: in cases of D A$_f$ N1$_f$ et N2$_m$, the feminine closest conjunct is also the highest one (see Section 4.2 below).

Following previous literature (see Willer-Gold et al., 2017), we consider three possible strategies: closest conjunct agreement (CCA), (masculine) resolution, and first conjunct agreement (FCA). For example in Slovenian, on top of masculine resolution agreement, agreement is possible with the closest noun (neuter here) or with the first noun (feminine here):

15) *Knjige*   *in*   *peresa*   *so*   *se*   **podražila/e**
    book.F.PL   and   pen.N.PL   AUX.PL   REFL   become-more-expensive.N/F.PL
    'Books and pens have become more expensive' (Slovenian, Willer-Gold et al., 2016, p.188)

In a two gender system like French, FCA may predict the same agreement strategy as CCA, with a prenominal **A$_f$** N1$_f$ et N2$_m$, but not with a postnominal N1$_f$ et N2$_m$ **A$_f$**, where CCA predicts A$_m$.

Table 3. Adjective gender agreement in FrWac and the three agreement strategies

	Total	CCA	FCA	Resolution
A_f N$_f$ et N$_m$	88	+	+	–
A_m N$_f$ et N$_m$	5	–	–	+
A_m N$_m$ et N$_f$	197	+	+	+
A_f N$_m$ et N$_f$	0	–	–	–
Total	290	285	285	202
N$_f$ et N$_m$ A_m	226	+	–	+
N$_f$ et N$_m$ A_f	0	–	+	–
N$_m$ et N$_f$ A_m	79	–	+	+
N$_m$ et N$_f$ A_f	65	+	–	–
Total	370	291	79	305
Grand Total	660	576	364	507

Table 3 lists all potential cases of mismatch, with the three corresponding strategies.[12] In cases like A_m $N1_m$ et $N2_f$, FCA, CCA and resolution converge: masculine agreement is preferred over feminine. In the two cases A_f $N1_f$ et $N2_m$ and $N1_m$ et $N2_f$ A_f, CCA and resolution diverge. In the first case, CCA is preferred and also coincides with FCA since the trigger is the first conjunct. In the second case, (feminine) CCA does not coincide with FCA and it seems as acceptable as (masculine) resolution.

We can see that FCA is not an independent strategy in French, since N_f et N_m A_f is not allowed (16). FCA is never observed outside CCA (A_f N_f et N_m) or resolution (N_m et N_f A_m).

16)   *des   ressources   et   services   **différentes**
      a.PL   resource.F.PL   and   service.M.PL   different.F.PL
      'some different resources and services'

On the other hand, CCA is an independent strategy since it is observed outside resolution (A_f N_f et N_m) or FCA (N_m et N_f A_f) : in cases of $N1_m$ et $N2_f$ A_f, CCA is the only factor that plays a role, as the feminine closest noun is the lowest one. We also discover that CCA has more weight than resolution since the preference for feminine in A N_f et N_m is greater than the preference for masculine in N_m et N_f A.

Overall, we have more examples compatible with CCA (576: 87%) than examples compatible with resolution (507: 76%). Looking at prenominal adjectives, we have 285 examples compatible with CCA (98%), and 202 compatible with resolution (69%). Leaving aside FCA, we have 88 examples of 'CCA only' (30%) and only 5 of 'resolution only' (1,7%). Looking now at postnominal adjectives, we found 291 examples compatible with CCA (78%) and 305 compatible with resolution

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[12]'-' means that the agreement strategy is violated and '+' means that it is obeyed.

(82%). Leaving aside FCA, we have 65 examples of 'CCA only' (17%), and 79 examples of 'resolution only' (21%). Given the overwhelming weight of CCA for prenominal A, we conclude that $A_m N_m$ *et* N_f may be considered as a case of (masculine) CCA.

In order to test the acceptability of such corpus data, we ran an acceptability rating experiment to see whether the corpus frequencies correspond to speaker's preferences. We also want to compare CCA and attraction errors (Bock and Miller, 1991), and to test the differences between human and non-human nouns, since grammatical gender has a social meaning for human nouns (Corbett, 1991).[13]

3. Experimental data

Since formally collected judgements are more reliable than speakers' intuitions (cf. Wasow and Arnold, 2005; Gibson and Fedorenko, 2010; Sprouse, Schütze and Almeida, 2013), and more formal methods may reveal previously unobserved patterns in the data (cf. Keller, 2000; Abeillé and Winckel, 2020), we ran an acceptability judgement task. Most experimental studies deal with (number) subject-verb agreement (cf. Keung and Staub, 2018; Foppolo and Staub, 2020), while some deal with gender subject predicate agreement (Willer-Gold et al., 2017). As far as we know, this is the first experimental study of CCA in the nominal domain. We use a factorial design which treats adjective gender, humanness, and adjective position as three factors, each with two values (Am/Af, human/non-human and pre/post).[14]

As in our corpus study, we only use plural nouns, in order to avoid an interaction with number agreement. We also chose a gender neutral plural form for the determiner (*de/des* 'IND.PL'). We use 12 control items with attraction errors to compare their acceptability with that of CCA.

3.1 Materials

We built 24 experimental items, 12 with human (17) plural binomials and 12 with non-human (18).[15] The adjectives can appear in both pre- and post-nominal positions and they can have scope over the coordination in both positions. We chose human nouns with distinct masculine and feminine forms, in order to avoid interference from implicit expectations about social gender bias.

For each item, there are four conditions: masculine (Am) and feminine (Af) adjectives in prenominal (pre) position (17-a), (18-a), as well as in post-nominal (post) position (17-b), (18-b). We changed the order of binomials in (17-a) and

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[13]Our corpus data do not provide enough examples with human nouns for a statistical analysis since most of the examples involve inanimates.

[14]In our experiment, we distinguish between humans and non-humans instead of using a more complex animacy hierarchy (cf. Corbett, 2000; Haspelmath, 2013; Zaenen et al., 2004), since because grammatical gender is related to social gender for human nouns, the relation between sex and grammatical gender tends to be looser in the case of animals. In French, for instance, a panda is always *un panda* (masculine) and a whale is always *une baleine* (feminine), regardless of their biological sex.

[15]All items are in Appendix A. One non-human item was removed because of a manipulation error. This leaves us with 11 items with non-human nouns.

(17-b) so that the closest conjunct is always feminine in order to distinguish CCA from resolution. Thus, Am corresponds to resolution agreement and Af to CCA.

17)   Am/Af; pre; human:

a. *De* **nouvelles/nouveaux** *étudiantes* *et* *étudiants* *sont*
   IND   new.F.PL/new.M.PL   student.F.PL   and   student.M.PL   are
   déjà *en* *stage*
   already in   internship.

   Am/Af; post; human:

b. *Des* *étudiants* *et* *étudiantes* **nouvelles/nouveaux**
   IND.PL   student.M.PL   and   student.F.PL   new.F.PL/new.M.PL
   sont *déjà* *en* *stage.*
   are   already   in   internship.

18)   Am/Af; pre; non-human:

a. *De* **nombreux/nombreuses** *nuits* *et* *jours*
   IND   numerous.M.PL/numerous.F.PL   night.F.PL and   day.M.PL
   seront *nécessaires* *pour* *finir* *ce* *travail.*
   be.FUT.3.SG   necessary   to   finish   this   work

   Am/Af; post; non-human:

b. *Des* *jours* *et* *nuits* **nombreux/nombreuses**
   IND.PL   day.M.PL and   night.F.PL   numerous.M.PL/numerous.F.PL
   seront *nécessaires pour finir* *ce* *travail.*
   be.FUT.3.SG   necessary   to   finish   this   work

With prenominal adjectives, the determiner is *de* (and not *des*) in order to force the adjective to have wide scope over the coordination - plural *de* is a variant of indefinite *des* only with a prenominal adjective (*des/*de garçons* vs *des/de grands garçons*) (Milner, 1978). With postnominal adjectives, the more natural reading is wide scope too since the determiner is shared between the two nouns.

We also included 12 control items, in two versions, one grammatical (19-a) and one with an agreement error (19-b), in order to test the differences between CCA and attraction errors (cf. Fayol, Largy and Lemaire, 1994; Keung and Staub, 2018). The ungrammatical version included a closest feminine noun complement.

19)   gram:

a. *Le* *fils* *de* *la* *voisine* *est*
   the.M.SG   son.M.SG   of   the.F.SG   neighbor.F.SG   is
   content *d'* *aller* *à* *l'* *école.*
   happy.M.SG   of   go   to   the   school

   un-gram:

a. **Le* *fils* *de* *la* *voisine* *est*
   the.M.SG   son.M.SG   of   the.F.SG   neighbor.F.SG   is
   contente *d'* *aller* *à* *l'* *école.*
   happy.F.SG   of   go   to   the   school

3.2 Procedures

These materials were included in an acceptability judgement paradigm on the Ibex on-line platform (Drummond, 2013). After providing informed consent, participants read each sentence on a computer screen and judged its acceptability on a range from 0 (not at all acceptable) to 10 (completely acceptable), which is the usual scale in the French school system.[16] After rating each sentence, participants had to answer a simple comprehension question, to ensure that they were attentive.

Participants could only see one version for each item, the distribution of which was counterbalanced across participants. The order of experimental items was also randomized in each trial. In addition there were 20 filler items with four conditions for each item from an unrelated experiment. Experimental items, controls and fillers were distributed across three lists using a Latin square design so that each list contained 24 experimental sentences, 12 controls, 20 fillers (from an unrelated experiment) and 3 practice items.

The duration of the experiment was estimated at 10 minutes on average. 43 native speakers of French (21 to 82 years old, median = 34, 26 female, 10 male, 3 did not report their gender), recruited on the RISC website (http://www.risc.cnrs.fr/) volunteered to participate in the experiment. Three participants were removed because their accuracy for comprehension questions was less than 75% and one was removed because they rated the ungrammatical controls higher than the grammatical controls.

3.3 Results

The results are shown in Figure 1 and Appendix B. Error bars in all figures in this article correspond to 95% confidence intervals. In general, the experimental items were rated higher than the ungrammatical controls (with attraction errors) (mean = 2.73), but lower than the (very simple) grammatical controls (mean = 9.52). Feminine adjectives (mean = 6.73 in prenominal position, mean = 6.37 in post-nominal position) were also preferred over masculine adjectives (mean = 5.03 in prenominal position, mean = 5.89 in post-nominal position), and this preference was stronger in prenominal position. We did not find effects of gender or age of participants.

3.3.1 Effects of Directionality

We analysed the data with a mixed-effects ordinal regression model using the *clmm()* function in the ordinal package (Christensen, 2018). This is an appropriate statistical model for ratings that cannot be assumed to represent an interval scale, i.e., the values may not represent equally spaced points in subjects' subjective acceptability space. Fixed effects in this model were position (pre vs. post) and gender (Am/Af). We also included maximal random effects (random

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[16]This scale is more familiar to French speakers from France than a 1-7 Likert scale, and has been used successfully in previous linguistic experiments (Abeillé, An and Shiraïshi, 2018, Abeillé et al., 2020; Abeillé and Winckel, 2020; An and Abeillé, 2017, 2019).
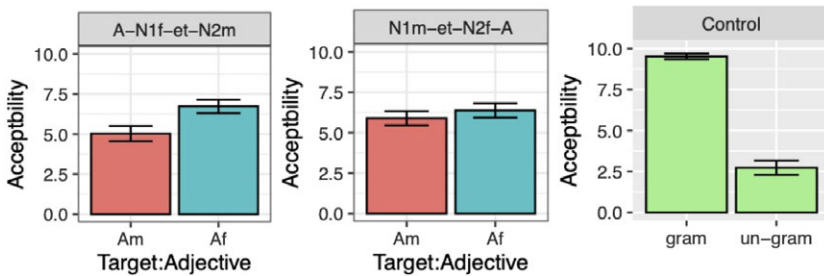
Figure 1. Results of the adjective gender agreement rating experiment.

intercepts and random slopes) for items and subjects. The coefficient of random and fixed effects is presented in Appendix C1 (Table 4).

There were no significant main effects of gender and position. But the interaction between gender and position was significant ($p = 0.006$). CCA was particularly preferred in prenominal position, which is consistent with our corpus data (Section 2) and with Corbett (1991)'s typological observation that CCA is more acceptable when the target precedes the controller (cf. Introduction).

3.3.2 Effects of Humanness

In the A-N1f-et-N2m condition, we ran a similar mixed-effect ordinal regression model as in the previous section, with gender, humanness and their interaction as fixed effects and random slopes for subjects and gender as random slopes for items. The results (see Appendix C2 Table 5 for more details) showed a significant effect of A gender ($p = 0.01$). As shown in Figure 2, in prenominal position, feminine adjectives were preferred with both human nouns and non-human nouns. The difference between Am/Af with non-human nouns was bigger than with human nouns, but the interaction between humanness and A gender was not significant ($p = 0.24$).

However, in post-nominal position, masculine adjectives were preferred with human nouns, while feminine adjectives were preferred with non-human nouns. This interaction was significant ($p = 0.004$) in the mixed-effect ordinal regression model. We did not find significant main effects for A gender ($p = 0.59$). Across humanness conditions, masculine and feminine adjectives were equally acceptable. The main effect of Humanness is marginal ($p = 0.07$).

To sum up, (feminine) CCA was preferred with prenominal adjectives compared to post-nominal adjectives. This is consistent with our corpus data, but quite striking given the weight of the masculine resolution rule which is taught as the prescriptive norm in France. If we zoom in on the data, the interaction between gender agreement and humanness was significant only in post-nominal position. Masculine (resolution) agreement was more acceptable with human nouns, while feminine agreement (CCA) with non-human nouns (compared with human nouns).
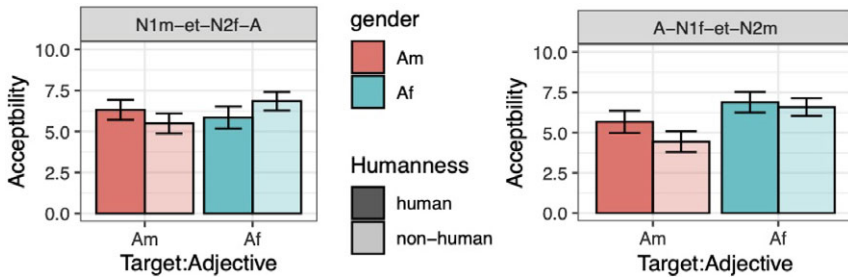
Figure 2. Humanness and adjective gender agreement in the rating experiment.

4. Discussion

4.1 Closest conjunct agreement is not an attraction error

Our experiment has shown quite sharp differences between closest conjunct agreement in conjoined NPs and attraction errors. CCA is in fact preferred over resolution for gender adjective-noun agreement, except for human nouns with post-nominal adjectives. On the other hand, sentences with attraction errors are judged almost three times lower than closest conjunct agreement.

Proximity plays a role in language processing in general (Bock and Miller, 1991; Deevy, 1999), but its effects in CCA are different from attraction errors (Keung and Staub, 2018), so these two phenomena should be distinguished. In examples with attraction errors, N1 is the syntactic head (see Figure 4 next section) and it contributes its gender and number features to the NP subject, whereas coordination is a specific syntactic structure with specific properties, which we will discuss in the following section.

4.2 CCA and the syntactic Structure of Coordination

From the theoretical point of view, CCA is puzzling since agreement usually obeys locality constraints (between a head and its subject, specifier or local modifier, or between a trigger and the highest c-commanded probe cf. Chomsky, 2001). Some authors have tried to reduce CCA to standard agreement with clausal coordination and ellipsis (Aoun, Benmamoun and Sportiche, 1994, but see Munn, 1999). Most authors consider that it is related to the exceptional syntax of coordination, which does not have the syntactic features of a standard controller. Either the conjunction is a syntactic head (Kayne, 1994), but without gender features, or the coordination is unheaded (Ross, 1967; Borsley, 2005).

Looking more closely at the syntax, two asymmetric syntactic structures have been proposed for coordination in the literature (Figure 3). Even though they differ from each other as to whether the conjunction is the head (Structure (a)) or the structure is non headed (Structure (b)), they both consider that the first conjunct is in a structurally higher position than the second conjunct.

As shown in Figure 3a, in minimalist approaches, the conjunction is the head, the first conjunct occupies the specifier position and the second the complement
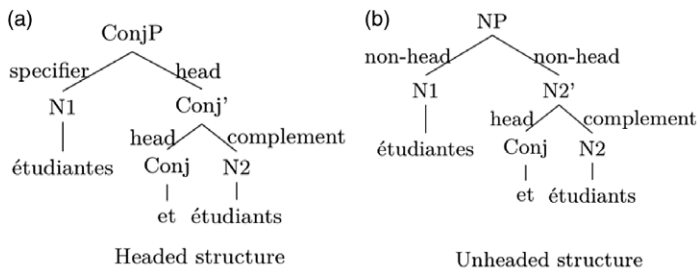
Figure 3. Two syntactic structures for a coordination phrase.

position. If the conjunction (*and*) is the head, it may have its own number value (plural) but it does not have a gender value (Bhatt and Walkow, 2013). Assuming agreement can be triggered by the specifier, only the gender of the first conjunct is accessible for agreement.[17] This predicts first conjunct agreement but not CCA with the second conjunct.

In unification-based grammars, there is no Agree operation but feature matching through unification. Certain features, in particular person and gender, are not distributive (Dalrymple and Kaplan, 2000; Sag, 2005): they are not necessarily shared by the conjuncts and their value for the coordination as a whole is computed by special feature resolution rules and not by unification.[18] In HPSG, a hierarchical structure is assumed for coordination (Borsley, 2005, see Figure 3b), but it is non headed, and the conjunction is only the head of the conjunct it combines with. Since there is no head to assign morphosyntactic features, such as gender, number, person, several options are available for the coordination as a whole.[19] Villavicencio, Sadler and Arnold (2005) analyse gender and number agreement of attributive adjectives in Portuguese. In their analysis, agreement is always with the whole coordination phrase, which has three agreement features: CONCORD (for resolution), LEFT-AGR (with concord features from the left-most conjunct) and RIGHT-AGR (with concord features from the right-most conjunct). This analysis may well account for our French data, although not taking preferences into account.

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[17]See Johannessen (1998) for similar cases of asymmetric coordination for case assignment. As shown by Borsley (2005), Structure (a) is problematic for labeling, since the coordination should have the (nominal, adjectival etc.) category of the conjuncts, and also for ternary coordination (apples, pears and oranges) since it needs multiple specifiers.

[18]In LFG, Dalrymple and Kaplan (2000) assume a flat constituent-structure for coordination and a set value in functional-structure. Dalrymple and Hristov (2010) account for CCA in Serbo-Croatian with precedence rules in f -structure. Since the f -structure of the coordination is a set, the agreement rules may trigger their first or last member. They do not expect differences between backward and forward agreement.

[19]Unlike structure (a), structure (b) is not defined as a binary phrase, it is well suited for ternary coordinations (*étudiants, professeurs et étudiantes*) with N1, N2 and N3' at the same level, as well as for coordinations with several conjunctions (*et Paul et Marie* 'both Paul and Marie') with N1' and N2' at the same level Mouret (2005). However, it needs specific feature percolation principles and does not obey X-bar theory.

4.3 Linear Distance vs Structural Distance

Comparing prenominal and post-nominal adjectives, if CCA is superficial and only sensitive to linear proximity (number of intervening words), the preference for CCA should be the same in the two positions. On the other hand, if we look at structural distance (number of intervening nodes), prenominal and post-nominal adjective agreement should be different. In case of CCA, the prenominal adjective agrees with the highest conjunct (highest conjunct agreement or HCA, cf. Aoun, Benmamoun and Sportiche, 1994; Munn, 1999), while the post-nominal adjective agrees with the lowest conjunct. Thus, CCA should be preferred in prenominal position since the structural distance (the number of syntactic nodes between the adjective and the controller noun) is shorter with the first conjunct (see discussion of Willer-Gold et al., 2017 for South Slavic languages), while linear distance (the number of words between the adjective and the closest noun) does not change between prenominal and post-nominal positions.

Both our experimental and corpus data show an effect of the syntactic position when the adjective agrees in gender with a coordinated NP. The preference for CCA is stronger in prenominal position than in post-nominal position for both human nouns and non-human nouns. This result can be explained by taking structural proximity into account: assuming a hierarchical structure for coordination (Figure 3), the closest conjunct is the highest one (and is structurally closest to the target counting the number of intervening nodes) with prenominal adjectives. Both linear and structure distance may also explain the difference between attributive and predicative agreement, since predicative agreement favours Resolution: the attributive adjective is closer to the (closest) noun than the predicative one which is separated from the subject by the copular verb (5) (7). In terms of structural distance, the attributive adjective belongs to the same noun phrase as the (controller) noun, while the predicative adjective belongs to the verbal phrase and is thus separated from the (controller) noun by an extra phrasal boundary.

This asymmetry is also consistent with the agreement hierarchy proposed by Corbett (1991) — that is to say that CCA is preferred when the target precedes the controller (Introduction). This effect of directionality can also be explained in terms of processing difficulties (see Haskell and MacDonald, 2005 and Hemforth and Konieczny, 2004 for psycholinguistic evidence). Human language processing is incremental in nature (cf. Tanenhaus et al., 1995; Kaiser and Trueswell, 2004; Levy, 2008): we do not wait until we have heard an entire sentence to start disambiguating and understanding. In N-A order, the speaker can anticipate agreement with the whole coordination phrase. However, in A-N order, the speaker cannot anticipate the coordination and could agree with the first noun in a strategy that we may call 'early' agreement.

But neither linear nor structural proximity is the only factor. One must take into account the syntactic function of the items. In CCA, the second noun is the lowest one but can nevertheless trigger agreement. In attraction errors, the complement is in the same structural position but it does not trigger agreement (Figure 4). The key difference is that with coordination, neither of the two nouns is the head (Figure 3), while in attraction errors, N1 is the head and N2 is a complement. Gender is thus assigned directly by the head noun to the NP in the latter case, but not in coordination.
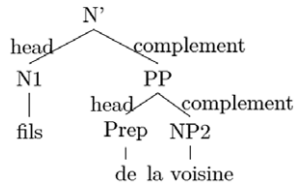
Figure 4. Syntactic structure for an NP with a complement.

4.4 The role of humanness

Our acceptability rating experiment shows that the preference for CCA is sensitive not only to directionality (or structural distance), but also to humanness. However, the effect of humanness is only significant in post-nominal position when adjective agreement takes place after the whole coordination phrase has been seen. This effect can be explained by the role of interpretation for human-based gender. While it is arbitrary for non-human nouns, grammatical gender is usually non-arbitrary for human nouns, and associated with social gender (Section 1.2). Note that for human nouns, especially 'professional nouns', their interpretation involves a social meaning. Plural masculine is ambiguous between a gender-neutral reading (i.e., referring to persons of both sexes) and a gender specific reading (i.e. referring to men only) (Gygax et al., 2009). *les habitants* (the inhabitant.M.PL) can be used to refer to a group of men and women ; however, a noun phrase with feminine grammatical gender, such as *les habitantes* (the inhabitant.F.PL), exclusively picks out women.

We suppose that the preference for masculine (resolution) for humans can be explained by this interaction with social meaning. For human nouns, the interpretation of a coordination involving masculine and feminine can be a mixed gender reading, leading to a preference for a (neutral) masculine adjective.

4.5 Comparison with determiner agreement

As in other Romance languages, CCA is also attested for determiner agreement in French. Abeillé, An and Shiraïshi (2018) tested gender agreement. Most French plural determiners are not specified for gender (*les, des*), so we chose *certains/ certaines* ('certain') (Schnedecker, 2005). In Frantext (after year 1950: 31 millions words), we found as many tokens for *certains Nmpl et Nfpl* (20-a) as for *certaines N1fpl et N2mpl* (20-b), but no *certains N1fpl et N2mpl*.

20) a. ***Certains***   *instituteurs*   *et*   *institutrices font*   *très bien,*
some.M.PL   teacher.M.PL   and   teacher.F.PL   do   very well,
   surtout   *à*   *la*   *campagne,*   *le*   *relais avec les parents*
especially   in   the   countryside,   the   relay   with the parents
'Some teachers do very well, especially in the countryside, the relay with parents' (Dolto, La cause des enfants, 1985)

b. | *le* | *préfet [...] est* | *pratiquement* | *sans moyen* | *à* | | *l'égard* |
|---|---|---|---|---|---|---|
| The | prefect is | practically | | without | means with regard |

des	*salaires privés*	*et*	*des*	*budgets*	*de*
to	salaries private	and	the	budgets	of

certaines	*collectivités*	*et*	*organismes*	*publics*
certain.F.PL	community.F.PL	and	body.M.PL	public.M.PL

'the prefect [...] is practically without means with regard to private salaries and the budgets of certain communities and public bodies' (Belorgey, Gouvern et Administr. France, 1967)

In an acceptability judgement task, we tested gender agreement with the coordination of plural nouns of different genders (*certains/certaines N1fpl et N2mpl*), for human and non-human nouns, such as the following:

21) non-human:

a. | ***Certains/Certaines*** | *interactions* | *et* | *comportements* | *des* |
|---|---|---|---|---|
| some.M.PL/F.PL | interaction.F.PL | and | behavior.M.PL | of |

molécules	*ont*	*surpris*	*les*	*chercheurs.*
molecules	AUX	surprised.PTCP	the	researchers

human:

b. | ***Certains/Certaines*** | *étudiantes* | *et* | *étudiants* | *sont* | *déjà* |
|---|---|---|---|---|---|
| some.M.PL/F.PL | student.F.PL | and | student.M.PL | are | already |

en stage.
in internship

When the feminine N is the first conjunct (the closest to the determiner), we found that the feminine *certaines* is preferred, and that *certains* is rated as low as ungrammatical controls. We conclude that feminine agreement is a case of CCA and that it is the only strategy for gender agreement when the closest noun is feminine. Thus masculine agreement (when the closest noun is masculine) can also be analysed as a case of CCA. This is consistent with what we have found for prenominal adjectives.

4.6 Comparison with number agreement

As for number agreement in the nominal domain, An and Abeillé (2017, 2019) tested determiner (D) agreement with two coordinated singular nouns. In a corpus study (FrWac), we found that Ds (22a,22b) is more frequent (90% of occurrences) than Dp (22c,22d), even with non coreferent nouns (Ds in 71 % of occurrences with non coreferent nouns):

22) a. | **votre** | nom | et | prénom |
|---|---|---|---|
| your.M.SG | name.M.SG | and | first name.M.SG |

b. | **la** | date | et | heure | du | spectacle |
|---|---|---|---|---|---|
| the.F.SG | date.F.SG | and | time.F.SG | of | the show |

c. **les**   mari   et   femme
    the.PL   husband.M.SG and   wife.F.SG
d. **les**   frère   et   sœur
    the.PL   brother.M.SG and   sister.F.SG

We also found that syntactic position plays a role: Dp is more frequent in subject position (with a plural verb) than in object position. We also ran several acceptability studies, and found an effect of humanness: Ds is slightly more acceptable than Dp with non-human nouns (*votre/vos nom et prénom* 'your name and first name'), but Dp is more acceptable with human nouns (*mes père et mère* 'my father and mother'). We consider singular agreement as a case of CCA, and plural agreement as a case of resolution. So humanness favours resolution, as for gender agreement. This is different from other Romance languages, which seem to prefer singular agreement for determiners with two singular coordinated nouns (Le Bruyn and de Swart, 2014; Heycock and Zamparelli, 2005).

An (2020) also studied number agreement of postnominal attributive adjectives after two singular coordinated nouns (with the same gender):

23) a. *la   langue   et   la   littérature   **russe***
         the   language.F.SG and the   literature.F.SG russian.F.SG
         'Russian language and literature'

     b. *Le   directeur   et   le   sous-directeur*
         the.M.SG director.M.SG and the.M.SG   assistant director.M.SG
         administratifs
         administrative.M.PL
         'the administrative director and deputy director'

In an acceptability judgement task, she found that As is as acceptable as Ap, and there was no effect of humanness. This suggests that in the nominal domain, CCA is stronger for gender than for number in French, since for number both singular (CCA) and plural (resolution) are acceptable in prenominal position.[20]

5. Conclusions

A number of conclusions can be drawn from this work. We were able to show that CCA plays an important role in attributive adjective agreement, using a large corpus of contemporary French and an acceptability experiment. Contrary to the prescriptive norm, feminine agreement may be acceptable for attributive adjectives with conflicting coordinated nouns. In this respect, French is not different from other Romance languages, such as Spanish (Demonte and

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[20]An (2020) also tested number agreement of predicative adjectives and showed that they favour (plural) Resolution more than attributive adjectives, which is similar to the difference observed between attributive and predicative adjectives for gender agreement, see ex. 5 and 7.

Perez-Jimenez, 2012), Italian (Benincà, 1988) and Portuguese (Villavicencio, Sadler and Arnold, 2005).

Our corpus data strongly suggest that contrary to most French grammar books, closest conjunct agreement is quite frequent for noun-adjective gender agreement in French, and even the most frequent option for prenominal adjectives. Assuming a hierarchical structure for coordination (Kayne, 1994; Borsley, 2005), we suggest that the preference for CCA with prenominal adjectives may be explained by structural distance, as well as by incremental processing.

We use an acceptability rating task which shows that (feminine) CCA should be distinguished from attraction errors (Bock and Miller, 1991; Franck, Vigliocco, and Nicol, 2002), which do occur in spontaneous production but which are not well accepted (Fayol, Largy and Lemaire, 1994). Our experimental data also show that the preference for CCA is sensitive not only to the adjective position but also to the semantic features of nouns. Human nouns may favour resolution (masculine) agreement, especially for post-nominal adjectives. This difference may be explained by the interpretability of gender with human nouns and the availability of a masculine gender neutral plural for human nouns (*les habitants* may include men and women, while *les habitantes* do not) (Gygax et al., 2009). It may also be explained by the role of the prescriptive norm, which tends to take examples with human nouns (and to teach French children about *boys and girls* more than about *tables and books*).

We conclude that CCA is an independent strategy sensitive to the target-trigger ordering and to humanness as well, which confirms the typological tendencies proposed by Corbett (1983, 1991, 2006), and the corpus study in other Romance languages (Villavicencio, Sadler and Arnold, 2005). We suggest it is the only acceptable option in prenominal position. We conclude that closest conjunct agreement may be part of the grammar of contemporary French and suggest that it should be taught as such. Further work should test predicative adjectives.

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Appendices

A Experimental materials

1. **N1m-et-N2f-A:** Des agissements et interactions surprenants/surprenantes risquent d'étonner les chercheurs.
   A-N1f-et-N2m: De surprenants/surprenantes interactions et agissements risquent d'étonner les chercheurs.
   Q: Les scientifiques vont-ils sans doute être surpris ? A: Oui

2. Des procédés et solutions astucieuses permettront de résoudre ce problème.
   Q: Le problème est-il résolu ? A: Non

3. Des départements et régions anciennes vont recevoir de nouveaux noms.
   Q: Les régions vont-elles être renommées ? A: Oui

4. Des comportements et propriétés fabuleuses sont caractéristiques des êtres vivants.
   Q: Les êtres vivants ont-ils des spécificités ? A: Oui

5. Des événements et activités intéressantes ont lieu dans cette enceinte.
   Q: Y a-t-il une femme enceinte ? A: Non

6. Des ananas et cerises délicieuses sont disponibles au marché.
   Q: Y a-t-il des fruits sur le marché ? A: Oui

7. Des appareils et technologies étonnantes verront le jour dans les années à venir.
   Q: La phrase parle-t-elle de littérature ? A: Non

8. Des jours et nuits nombreuses seront nécessaires pour finir ce travail.
   Q: Ce travail est-il facile ? A: Non

9. Des mensonges et vérités criantes sortent de la bouche de ces gens.
   Q: Ces gens sont-ils toujours honnêtes ? A: Non

10. Des immeubles et maisons nouvelles vont déjà faire l'objet de rénovations.
    Q: La phrase parle-t-elle de mode ? A: Non

11. Des tissus et matières délicates composent ces robes.
    Q: Ces robes sont-t-elles délicates ? A: Oui

12. Des usages et règles importantes doivent s'enseigner très tôt.
    Q: La phrase parle-t-elle de livre ? A: Non

13. Des donateurs et donatrices généreuses ont fait cadeau de leurs vêtements.
    Q: Ces gens sont-ils radins ? A: Non

14. Des étudiants et étudiantes nouvelles sont déjà en stage.
    Q: Les étudiants travaillent-ils en ce moment ? A: Oui

15. Des citoyens et citoyennes nombreuses attendent le dernier moment pour voter.
    Q: Les électeurs sont-ils indécis ? A: Oui

16. Des animateurs et célébrités anciennes se retrouvent au gala de fin d'année.
    Q: Le gala se passe-t-il en janvier ? A: Non

17. Des infirmiers et chirurgiennes courageuses effectuent des nuits de garde.
    Q: Le personnel hospitalier travaille-t-il parfois la nuit ? A: Oui

18. Des copains et copines gentilles me donneront leurs cadeaux.
    Q: Vais-je recevoir des cadeaux ? A: Oui

19. Des comédiens et comédiennes surprenantes rendent cette pièce incroyable.
    Q: Les acteurs sont-ils doués ? A: Oui

20. Des adolescents et adolescentes joyeuses révisaient sur les pelouses.
    Q: La scène se passait-elle dans une crèche ? A: Non

21. Des spectateurs et spectatrices ravissantes se pressaient à la fin de la pièce.
    Q: La phrase parle-t-elle de spectacle ? A: Oui

22. Des acteurs et actrices élégantes ont fait leur entrée au festival de Cannes.
    Q: Le festival de Cannes a-t-il commencé ? A: Oui

23. Des chefs d'Etat et personnalités importantes ont commencé les négociations.
    Q: Les négociations sont-elles terminées ? A: Non

24. Des bijoutiers et créatrices fameuses présenteront leurs œuvres.
    Q: La phrase parle-t-elle de cuisine ? A: Non

Control items

1. gram: Le fils de la voisine est content d'aller à l'école.
   ungram: Le fils de la voisine est contente d'aller à l'école.
   Q: Le fils est-il scolarisé ? A: Oui

2. Le four de la cuisine est trop crasseux pour faire à manger.
   Q: Le four est-il propre ? A: Non

3. Le mari de ma sœur est acteur à Hollywood.
   Q: Le mari travaille-t-il en France ? A: Non

4. L'amant de ma femme a été pris la main dans le sac.
   Q: Ma femme est-elle fidèle ? A: Non

5. Le fourgon de la police sera vert dorénavant.
   Q: Les agents ont-ils un véhicule ? A: Oui

6. Le rire de ma mère devient de plus en plus agaçant.
   Q: Ma mère rit-elle ? A: Oui

7. L'entrée du palais est vraiment somptueuse.
   Q: La phrase parle-t-elle d'architecture ? A: Oui

8. La venue du roi paraît assez effrayante.
   Q: Est-ce une monarchie ? A: Oui

9. La cousine de mon père est dessinatrice pour enfants.
   Q: Est-ce qu'un de mes parents a une cousine ? A: Oui

10. La vitrine du magasin semble ancienne et délabrée.
    Q: La vitrine est-elle neuve ? A: Non

11. La place du village est déserte depuis des années.
    Q: La place est-elle inhabitée ? A: Oui

12. La lumière du soleil devient plus chaude après 14h.
    Q: Fait-il plus chaud le matin ? A: Non

B Results:

Table 4. Mean of acceptability ratings in the final analysis, after removing participants whose results don't correspond to the criteria defined in section 3.2

	sequence	A	Humanness	mean	standard deviation	standard error
1	N1m-et-N2f-A	Af	human	5.85	3.46	0.35
2	N1m-et-N2f-A	Af	non-human	6.85	3.01	0.29
3	N1m-et-N2f-A	Am	human	6.32	3.12	0.31
4	N1m-et-N2f-A	Am	non-human	5.49	3.23	0.31
5	A-N1f-et-N2m	Af	human	6.89	3.27	0.33
6	A-N1f-et-N2m	Af	non-human	6.59	2.97	0.28
7	A-N1f-et-N2m	Am	human	5.67	3.48	0.35
8	A-N1f-et-N2m	Am	non-human	4.44	3.33	0.33

C Model analysis

C.1 Effects of position

Table 5. Coefficients of the mixed-effects ordinal regression model testing effects of adjective's position. This regression test the effects of adjectives' position on gender agreement, with fixed effects A (Am/Af), position (pre/postnominal) and their interactions. There were also random intercepts, as well as A, position and their interactions as random slopes for subjects and items

	Estimate	Std. Error	Z value	Pr($>$|z|)
A Am	−0.6372	0.4729	−1.348	0.17781
position pre	0.3892	0.3378	1.152	0.24916
A Am:position pre	−0.9420	0.3437	−2.740	0.00614**

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

C.2 Effects of humanness

Table 6. Coefficients of the mixed-effects ordinal regression model testing effects of humanness in the A-N1f-et-N2m position, with fixed effects Humanness (human/non-human), A (Asg/Apl) and their interactions, random intercept and Humanness, A and their interactions as random slopes for subjects and A for items

	Estimate	Std. Error	z value	Pr($>$|z|)
Humanness non-human	0.6158	0.3723	1.654	0.0981.
A Am	1.4114	0.5813	2.428	0.0152 *
Humanness non-human: A Am	0.5022	0.4276	1.174	0.2403

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 7. Coefficients of the mixed-effects ordinal regression model testing effects of humanness in the N1m-et-N2f-A position, with fixed effects Humanness (human/non-human), A (Asg/Apl) and their interactions, random intercept and Humanness, A and their interactions as random slopes for subjects and A for items

	Estimate	Std. Error	z value	Pr(>|z|)
Humanness non-human	0.7222	0.3982	1.814	0.06968
A Am	0.3019	0.5578	0.541	0.58830
Humanness non-human: A Am	-1.6174	0.5743	-2.816	0.00486**

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1