

## Agreement in Discourse

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### 0. Introduction

It is well-known that the grammatical gender of a pronoun can be determined by the gender feature of its antecedent, even when that antecedent occurs in a previous sentence. Following are examples from Serbo-Croatian and French:

- (1)a. Ova            stara        knjiga        stalno        pada.  
      this.F.SG    old.F.SG    book(fem)   always       falls.3.SG
- Molim        vas        podignite    je.  
      please      you       pick.2pl    it.F.SG

‘This old book<sub>i</sub> keeps falling. Please pick it<sub>i</sub> up.’

- b. Pierre a une chaise(fem). Elle(fem) est belle(fem).  
‘Pierre has a chair<sub>i</sub>. It<sub>i</sub> is beautiful.’

But how exactly is pronoun gender determined in such cases where the antecedent lies outside the sentence? Via the morphosyntactic features of the antecedent word, or the denoted concept, or the referent? How does agreement relate to interpretation? These are the questions we consider in this paper, with reference to Serbo-Croatian. The answers turns out to be subtler than what is often assumed. Roughly speaking, we will conclude below that the agreement features are associated with the *concept* denoted by the antecedent noun— even in non-natural (‘grammatical’) agreement as in (1).

### 1. The limits of structural agreement

To contextualize this issue we must first outline the general theory of agreement assumed here (Kathol, to appear; Pollard and Sag, 1994; Wechsler and Zlatic, 1997). We begin by carefully distinguishing between two general classes of agreement phenomena, which we can call *structural agreement* and *pragmatic agreement*.

*Structural agreement* arises as a side-effect of syntactic constraints which force identity between certain morphosyntactic features. An example is English subject-verb agreement. Structural agreement can be further subdivided according to the particular syntactic mechanism

involved: *index agreement* is identity of the referential indices, while *concord* is identity of certain head features (Wechsler and Zlatic, 1997, inter alia).

In contrast, *pragmatic agreement* results from the general condition that coreferential elements must have compatible anchoring conditions. Consider the two-sentence discourse: *A man approached the bar. She ordered a drink.* While the discourse is grammatical, it normally cannot be interpreted such that *she* and *a man* are coreferential, because their anchoring conditions conflict with respect to the sex of the referent. Even such mismatches can sometimes be accommodated, typically for rhetorical effect (in this example perhaps implying the man was effeminate, etc.). By contrast, failure of structural agreement simply leads to ungrammaticality: *\*He are happy.*

Unlike pragmatic agreement, structural agreement is enforced within a syntactically defined domain. English generics *one* and *you* are semantically very similar, differing perhaps only in register, and one can switch between them in a discourse, as shown in (2)a,b. But a bound reflexive must match its antecedent, as shown in (2)c,d.

- (2) a. You really have to watch yourself around here. One can easily get in trouble.  
b. One really has to watch oneself around here. You can easily get in trouble.  
c. \*You really have/has to watch oneself around here.  
d. \*One really has/have to watch yourself around here.

To take another example, in some dialects collective nouns like *faculty* can trigger either singular or plural agreement on verbs and pronouns (3)a,b. Similarly, feminine pronouns are sometimes used for ships, as in (4)a. But it is not possible mix and match within a single clause, as shown in (3)c and (4)b ((3) and (4) are from Pollard and Sag 1994):

- (3) a. The faculty is voting itself a raise.  
b. The faculty are voting themselves a raise.  
c. \*The faculty is voting themselves a raise.
- (4) a. The ship lurched, and then she righted herself / it righted itself  
b. \*The ship lurched, and then she righted itself.

The fact that agreement is enforced only within a syntactically defined domain shows that syntactic mechanisms are responsible for enforcing agreement in such phenomena as subject-verb agreement and reflexive binding; beyond the domain of those mechanisms agreement is not enforced. Using the HPSG framework, Pollard and Sag (1994) analyze agreement in the English

examples above in terms of unification of referential indices. The semantics of a noun (and hence a noun phrase) or pronoun contains the feature INDEX whose value corresponds to a referential index (cp. situation semantics *restricted parameter*; also similar to DRT *discourse referent*). In the case of a common noun, the noun's semantics also include restrictions on the anchoring of this index: the index introduced by the noun *book* must be anchored to something with the 'book' property, and so on. Pollard and Sag (1994) posit that the index itself (that is, the value for the feature INDEX) contains person, number, and gender features. See (18) below for a sample of noun's semantic content.

Subject-verb agreement is a consequence of subcategorization: the lexical entry for a verb form such as *is* specifies that its subject has a third person singular index. In the case of anaphoric binding, the binding principles dictate that the INDEX values of the reflexive and its antecedent are unified. This sharing of a single INDEX value between pronoun and antecedent accounts for coreference (if the NP is referential) and also explains the matching condition on agreement features.

A look at other languages indicates that not all agreement can be handled through the INDEX feature. Languages with richer morphology often have, in addition, a morphosyntactic head feature on nouns which includes number and gender (as well as case) features. This second feature complex, which we call CONCORD following Wechsler and Zlatić (1997; 1998) (Kathol, to appear calls it AGR), is illustrated directly by Serbo-Croatian.

## 2. Serbo-Croatian agreement.

Serbo-Croatian has the following types of agreement: within a nominal, determiners and adjectives agree in gender, number and case with the head noun; a nominative subject NP triggers person and number agreement on finite auxiliaries and verbs, and triggers number and gender agreement on participles; and pronouns agree in person, number, and gender with their antecedents. Each of these types is illustrated in (1)a above. Recall that we distinguish two subtypes of structural agreement, namely index and concord agreement. Wechsler and Zlatić (1997) argue for the following analysis of Serbo-Croatian: NP-internal modifiers (determiners and adjectives) show concord with the head noun; finite verbal elements (auxiliaries and verbs) show index agreement with the subject; pronouns show index agreement with their antecedents. Among our evidence for this split is the mixed agreement with certain collective nouns such as *deca* 'children', *braća* 'brothers', *gospoda* 'gentlemen', *vlastela* 'landowners'. Modifiers of such nouns are feminine singular while finite verbs and pronouns show neuter plural agreement.

(5) Posmatrali smo ovu dobru decuj.  
 watched.1.PL AUX this.F.SG good.F.SG children

Onaj su spavala.  
 they-N.PL AUX.3.PL slept-NT.PL

‘We watched those good children<sub>i</sub>. They<sub>i</sub> slept.’

(6) ...deca<sub>i</sub>... Mi smo ih<sub>i</sub> videli.  
 ...children... we Aux-PL them-ACC.PL saw  
 ‘...children<sub>i</sub>... We saw them<sub>i</sub>.’

(7) Ta dobra deca su došla.  
 that.F.SG good.F.SG children(F.SG) Aux-PL came-PPRT.F.SG  
 ‘Those good children came.’

(8) Ta dobra deca dolaze.  
 that.F.SG good.F.SG children(F.SG) come.3.PL  
 ‘Those good children came.’

Accordingly for nouns of this type we posit a CONCORD value of feminine singular (and nominative) and INDEX value of neuter plural (and third person):

(9) *deca* ‘children’:  $\left[ \begin{array}{l} \text{CONCORD } fem.sg \\ \text{INDEX } nt.pl \end{array} \right]$

For most nouns, however, these values are identical (although there is more than one exceptional type where they diverge). In addition to the empirical evidence for the CONCORD/INDEX split from mixed agreement, there are important theoretical differences between them. The two features involve different feature sets: *person*, number and gender for INDEX, but *case*, number, and gender for CONCORD. They have different syntactic domains: INDEX is involved in pronouns (since it is a side-effect of the coindexation which is responsible for coreference) and certain finite verbs (with agreement inflections historically derived from pronouns); while CONCORD tends to be NP-internal (though sometimes also applies to predicates such as adjectives which alternatively function as NP-internal modifiers). Most importantly for what follows, INDEX is more closely associated with the semantics; indeed, it is technically part of the semantic CONTENT value of a nominal. CONCORD, in contrast, is a morphosyntactic head feature. See Wechsler and Zlati<sup>~</sup> (1997) for further discussion of the CONCORD/INDEX distinction.

### 3. Pronoun agreement.

While the aforementioned mechanisms responsible for structural agreement processes are relatively well understood, those involved in (non-reflexive) pronoun agreement are less so. As for the agreement features involved, for the reasons given just above, pronoun agreement is expected to involve the INDEX rather than CONCORD feature. But how exactly are the INDEX features of pronoun and antecedent to be related? Note first of all that technically in HPSG no syntactic rule dictates that the INDEX feature of an ordinary (i.e. non-reflexive) pronoun is shared with anything else, not even with a coreferential item in the same sentence. Principle A of the binding theory guarantees that a reflexive pronoun shares its INDEX value with its antecedent, but Principle B gives only the obviation domain for ordinary pronouns. For example, in *John thinks that he is smart*, nothing requires coindexation (in the technical sense of sharing the INDEX values) between *John* and *he*, even on the coreferential interpretation. ‘The connection between coindexing and coreference is simply that if two expressions are coindexed and one of them refers, then the other expression refers to the same thing.’ (Pollard and Sag, 1994, p. 75) The same problem arises for a pronoun taking its antecedent outside its sentence. Sex-based semantic agreement as in English might be explained in terms of compatibility of anchoring conditions (see Section 1 above), but what about grammatical gender?

As a first pass at this problem, consider the proposal briefly floated as part of a textbook illustration in Kamp and Reyle (1993, p. 71), for how full NP’s and pronouns are translated in the construction of a DRS. When a full NP is translated, a discourse referent is introduced into the DRS along with the appropriate conditions corresponding to the semantics of the NP and of its syntactic environment. In addition, a condition of the form  $\text{Gen}(\alpha) = \beta$  is added, where  $\alpha$  is the new discourse referent and  $\beta$  is the gender indicated by the NP. For example, to translate the NP [knjiga] (‘book’, fem.), we introduce a discourse referent  $x$  and the equation  $\text{Gen}(x) = \text{fem}$  into the DRS. Now, to translate a pronoun one introduces a discourse referent along with a condition of the form  $\alpha = \beta$ , where  $\alpha$  is the new discourse referent (for the pronoun) and  $\beta$  is a discourse referent already in the DRS (for the antecedent). Coreference is modelled by equating discourse referents in this manner: the equation  $\alpha = \beta$  means that discourse referents  $\alpha$  and  $\beta$  must be anchored to the same thing in the interpretation of the discourse. To account for gender agreement between pronoun and antecedent, Kamp and Reyle constrain the equation  $\alpha = \beta$  with the further condition that  $\beta$  must be selected such that  $\text{Gen}(\alpha) = \text{Gen}(\beta)$ . For convenience we will call this the *Same Gender Rule* below.

While we adopt such a rule later, this rule alone is not adequate to account for the range of agreement phenomena we will consider. In the next section we explain some of these phenomena and point the way to a more adequate account.

#### 4. Concept agreement.

The problem with the Same Gender Rule is that languages sometimes allow alternative forms for a pronoun with a given antecedent. To take a well-known example, pronouns anteceded by German *Mädchen* ‘maiden’ can be neuter (reflecting the diminutive morphology *-chen*) or feminine (reflecting the female sex of the referent). The Serbo-Croatian diminutive *devoj e* ‘girl’ has exactly the same properties. We will return to such cases briefly later, but first consider a similar but slightly different type of pronoun alternation. As noted above, collective nouns like *deca* ‘children’ trigger neuter plural agreement on pronouns. But masculine plural is the default form for pronouns referring to collections of mixed or unknown sex or gender. Hence when the antecedent is *deca*, we find variation between neuter plural and masculine plural:

(10) Posmatrali smo ovu dobru decu<sub>i</sub>.  
watched.1.PL AUX this.F.SG good.F.SG children.ACC

(i) Ona<sub>i</sub> su se lepo igrala.  
they.N.PL AUX.3.PL REFL nicely played.NT.PL

(ii) Oni<sub>i</sub> su se lepo igrali.  
they-M.PL AUX.3.PL REFL nicely played-M.PL

‘We watched these good children<sub>i</sub>. They<sub>i</sub> played well.’

Now, one might suppose that one could adopt the Same Gender Rule as an optional rule, with masculine plural representing another option (perhaps the default). But this is not the whole story: crucially, neuter and masculine pronouns are not always in free variation. In conditions of sloppy identity, only neuter plural is possible, as shown in these examples:

(11) Marija dopušta svojoj deci da galame. A u Milanovoj kući, on insistira da ...  
Mary lets self’s children that be-noisy but in Milan’s house, he insists that

(i) ...**ona** budu tiha. (strict or sloppy reading: *ona* = Mary’s or Milan’s kids)  
they-NT.PL be quiet-NT.PL

(ii) ...**oni** budu tihi. (ONLY strict reading: *oni* = Mary’s kids)  
they-M.PL be quiet-M.PL

‘Mary lets her children be noisy. But in Milan’s house, he insists that **they** be quiet.’

- (12) Kad je Marija išla na posao ona je ostavljala decu kod svoje majke.  
When Aux Mary went to work she Aux left children at self's mother

A kad je Suzana išla na posao ...  
But when Aux Susan went to work

- (i) ...**ona** su ostajala kod kuće.(strict or sloppy reading: M's or S's kids)  
they-NT Aux stay-NT.PL at home
- (ii) ...**oni** su ostajali kod kuće. (ONLY strict reading: Mary's kids)  
they-M Aux stay-M.PL at home

'When Mary went to work she left the children with her mother. But when Susan went to work **they** stayed home.'

- (13) Otac koji je insistirao da mu deca idu na studije je bio pametniji od onog  
father who Aux insisted that his children go to college Aux was smarter from that

oca koji je insistirao da se **ona/oni** odmah zaposle.  
father who Aux insisted that se they.NT.PL/they.M.PL immediately employed

'The father who insisted that his children go to college was smarter than the father who insisted that **they** immediately get a job.'

*ona* (they.NT.PL) => strict or sloppy reading  
*oni* (they.M.PL) => ONLY strict reading

The coreferential ('strict') reading is possible with either the neuter or masculine pronoun. But the sloppy reading requires the neuter pronoun — the form which is lexically associated with the noun *deca* 'children'. The default masculine pronoun cannot be used to express this meaning, and instead forces the coreferential interpretation, despite its implausibility in these examples.

This observation provides a clue to the process of grammatical gender agreement. Consider what is involved in strict versus sloppy interpretations. To calculate the sloppy interpretation it is necessary to access the antecedent concept ('sense', 'relation')— in these examples the concept of 'children'. For example, in the sloppy reading of (12), the 'children' concept is imported into the second sentence and applied to Suzana (instead of Marija), yielding Suzana's children as the new referent.

Coreference, in contrast, does not require access to the antecedent concept. Once a discourse referent is established, it is unnecessary to re-evoked the semantic property which was employed in an earlier referential expression. We conclude that grammatical gender features on a pronoun serve (or can serve) to evoke the *concept* associated with the antecedent noun. This supports Bosch's (1989) claim, made on independent grounds, that 'the gender of anaphoric pronouns is determined by the conceptual representation of the (expectable) referent and not by the grammatical gender of an antecedent.' (Bosch, 1989), p. 225.

Independent evidence for this view comes from pronoun gender in instances of exophora, that is, cases where a pronoun lacks any textual antecedent at all (Cornish, to appear; Dowty and Jacobson, 1988, *inter alia*). Suppose a Serbo-Croatian speaker comes home to find her bookcase mysteriously empty. She could utter (14)a, while (14)b would not convey the desired meaning.

(14) Context: Speaker comes home to find her bookcase mysteriously empty.

- a. Gde su (one) nestale?  
Where did (they.F.PL) disappear.F.PL      (*knjiga*, ‘book’, fem.)  
‘Where did they (i.e. the books) go?’
- b. #Gde su (oni) nestali?  
Where did (they.M.PL) disappear.M.PL

The pronoun (if it appears; it may be pro-dropped) and agreeing participle must be feminine because *knjiga* ‘book’ is feminine, although the word *knjiga* need not have been uttered in the discourse. We may conclude that the concept of ‘book’ (or perhaps more accurately the concept of ‘knjiga’) is available in the background to this discourse and that it is conventionally associated with feminine gender. The speaker accesses this information— without necessarily uttering or hearing the word— in both exophora and in the sloppy identity examples above. This idea is formalized in the Section 5 below.

As another example of concept agreement, consider one-anaphora:

(15) John bought a blue sweater<sub>i</sub>. Mary bought a red one<sub>i</sub>.

The pronoun (or pro-N’) *one* is not used for coreference; instead, its antecedent is a concept. Thus in (15), *one* evokes the ‘sweater’ concept, while Mary is clearly not buying the same sweater (token) that John bought. Turning to grammatical gender languages, we predict that one-anaphors should require grammatical agreement rather than a default form (instead of allowing either one, as in the masculine/neuter alternation in Serbo-Croatian (10)).

For one-anaphora, Serbo-Croatian uses nominal ellipsis. The head noun is omitted, stranding modifiers and determiners, as in B’s answer:



(16)

A: Gde su tvoja deca?  
where Aux-PL your-F.SG children  
'And where are your children?'

B: Moja/\*moji su u školi.                      A tvoja/\*tvoji?  
my-F.SG/\*my-M.PL Aux-PL in school      and yours-F.SG/\*yours-M.PL  
'Mine are in school. And yours?'

A': Otišla/otišli su na more sa svojom bakom.  
went-NT.PL /went-M.PL Aux-PL on sea with self's grandmother  
'They went to the seacoast with their grandmother'.

As shown in this example, the stranded possessive adjective cannot take the default masculine plural form. Instead it requires the feminine singular *moja*. As noted in Section 2 above, *deca* 'children' takes neuter plural pronouns, but triggers feminine singular concord on modifiers (see (9)). In short, the stranded modifiers take the agreement form which they would have if the elided noun appeared. But an overt or null pronoun may take the default masculine plural (or the neuter plural induced by *deca*). Thus in (16)A', which has a null pronominal subject, the verb can take neuter or masculine.

A similar contrast is found with short answers consisting of a predicate. The plural form *sudije* 'judges' is grammatically feminine (regardless of the sex of the judges), as shown for example by the feminine modifiers *te nove* 'these(f) new(f)' in (17)A. The short answer given in B(i) must have feminine form for its predicate. Masculine plural, used for groups of males, or groups of mixed or unknown sex, is impossible, regardless of the sex of the judges in question. But when a pronoun is used it may appear in either feminine or masculine, as in the alternative answer B(ii)/(ii').

(17)

A: Kakve su te nove sudije?  
how are these-F.PL new-F.PL judges  
'How are these new judges?'

B(i): Dobre i pravi ne                      /\*Dobri i pravi ni.  
good-F.PL and just-F.PL      /\*good-M.PL and just-M.PL  
'good and just'

B(ii): Oni                      su dobri                      i pravici  
They-M.PL are good.M.PL and just.M.PL  
'They are good and just.'

B(ii)': One                      su dobre                      i pravicne.  
They-F.PL are good.F.PL and just.F.PL  
'They are good and just.'

We summarize and interpret our findings as follows. When the *concept* associated with a common noun is evoked, whether through sloppy readings of pronouns, exophora, or ellipsis, then the noun’s lexical agreement features come along with that concept. The concept and the agreement features form a package deal, so to speak. But in instances of simple non-concept-evoking coreference, the coreferential pronoun can alternatively appear in a default form which has no special relation to the lexical features of the antecedent noun.

### 5. Towards formalization.

We will make this idea more precise by adopting the theory of index agreement in (Pollard and Sag, 1994). In Head-Driven Phrase Structure Grammar, a word (‘lexical sign’) is represented as a feature matrix with attributes PHONOLOGY, CATEGORY (syntactic features), and (semantic) CONTENT. Omitting CATEGORY and various other features which are not relevant here, the sign for *knjiga* ‘book’ is roughly the following:

$$(18) \quad \left[ \begin{array}{l} \text{PHON } /knjiga/ \\ \\ \text{CONTENT} \left[ \begin{array}{l} \text{INDEX } \boxed{1} \left[ \begin{array}{l} \text{PERSON } 3rd \\ \text{NUMBER } sing \\ \text{GENDER } fem \end{array} \right] \\ \text{RESTR } \left\{ \left[ \begin{array}{l} book-rel \\ \text{INSTANCE } \boxed{1} \end{array} \right] \right\} \end{array} \right] \end{array} \right]$$

As explained above, according to Pollard and Sag’s (1994) theory of index agreement, person, number, and gender are features of the referential index itself. This index is modelled on the ‘restricted parameter’ of situation semantics (Barwise and Perry, 1983; Devlin, 1991). The feature RESTR(ictions) places conditions on the anchoring of the index to things in the model; here, the index must be anchored to something which is an instance of the *book-rel* relation. What about our cases where a word-denoted concept and the associated agreement features are accessed without the word being uttered? We can think of these as ignoring or stripping away the phonology and consulting the CONTENT value only, as shown in (19)a, and, in abbreviated form, in (19)b:

$$(19) \quad \text{a.} \quad \left[ \begin{array}{l} \text{INDEX } \boxed{1} \left[ \begin{array}{l} \text{PERSON } 3rd \\ \text{NUMBER } sing \\ \text{GENDER } fem \end{array} \right] \\ \text{RESTR } \left\{ \left[ \begin{array}{l} book-rel \\ \text{INSTANCE } \boxed{1} \end{array} \right] \right\} \end{array} \right]$$

b. abbreviation:  $\text{book}(x_{\langle \text{fem.sg} \rangle})$

When the predicate  $\text{book}(x_{\langle \text{fem.sg} \rangle})$  appears in a discourse representation structure, the fem.sg. features are written onto the discourse referent  $x$ . In the exophora example (14) this predicate expression appears in the background information for the discourse.

$x_{\langle \text{fem.sg} \rangle}$
$\text{book}(x_{\langle \text{fem.sg} \rangle})$
... ..

To translate a pronoun, we introduce discourse referent  $y_{\langle \alpha \rangle}$ , where  $\alpha$  are the pronoun's agreement features. Hence when the feminine singular pronoun in (14)a appears, a new discourse referent  $y_{\langle \text{fem.sg} \rangle}$  is introduced. When the coreference equation  $x=y$  is added, then the Same Gender Rule applies: if  $x_{\langle \alpha \rangle} = y_{\langle \beta \rangle}$ , then  $\alpha = \beta$ . Any clash between the value for  $y$  given by this rule, and the value given by the features of the pronoun, leads to unacceptability (on the relevant interpretation of the discourse).

$x_{\langle \text{fem.sg} \rangle} \quad y_{\langle \text{fem.sg} \rangle}$
$\text{book}(x_{\langle \text{fem.sg} \rangle})$
$x_{\langle \text{fem.sg} \rangle} = y_{\langle \text{fem.sg} \rangle}$
... ..

Essentially the same account applies to the sloppy identity cases. Take (11) for example. The first sentence introduces discourse referents and predicates for Mary and her children (among many others which are omitted for clarity; irrelevant agreement features are also omitted):

$x_{\langle \text{n.pl} \rangle} \quad w$
$\text{children}(x_{\langle \text{n.pl} \rangle})$
$\text{parent-of}(w, x_{\langle \text{n.pl} \rangle})$
$\text{Mary}(w)$
... ..

When the second sentence is added, the 'children' predicate is evoked again, this time applied to the new discourse referent  $y$  corresponding to Milan's children.

$x_{\langle n,pl \rangle}$ w $y_{\langle n,pl \rangle}$ z
children( $x_{\langle n,pl \rangle}$ )
parent-of (w, $x_{\langle n,pl \rangle}$ )
Mary(w)
... ..
children( $y_{\langle n,pl \rangle}$ )
parent-of (z, $y_{\langle n,pl \rangle}$ )
Milan(z)

We omit all of the details of how the sloppy reading is calculated. The crucial point is that the calculation necessarily involves predicating ‘children’ of the pronoun’s discourse referent  $y$ . This explains why grammatical agreement (here, neuter plural) is required for sloppy readings.

However, we have seen that the Same Gender Rule does not always give the right result. There are two types of exception: (i) the use of default masculine plural, despite the coreferential NP appearing in, e.g., neuter plural (as in (10) and the masculine plural versions of (11)-(13)). (ii) Sex-based gender which disagrees with the grammatical gender of the antecedent NP, as with neuter diminutives in German (*Mädchen*) and Serbo-Croatian (*devoj e*, ‘girl’). We cover all these cases with this disjunctive rule for pronoun interpretation.

(20) Serbo-Croatian pronoun translation rule

To translate a pronoun, do any one of the following whose conditions are met:

- (i) Any pronominal form: Introduce discourse referent  $y_{\langle \alpha \rangle}$ , where  $\alpha$  is the pronouns agreement feature matrix . Add coreference equation  $x_{\langle \alpha \rangle} = y_{\langle \beta \rangle}$  (where  $x$  was already present in the DRS). Let  $\alpha = \beta$ . (Same Gender Rule)
- (ii) Masculine plural pronoun: Introduce discourse referent  $y_{\langle m,pl \rangle}$ . Introduce coreference equation  $x=y$  (where  $x$  was already present in the DRS), with the condition that  $x$  is restricted to (i) an aggregate of humans of mixed or unknown sex; or (ii) an aggregate of nonhumans of mixed or unknown gender. (default)
- (iii)
  - a. Masculine pronoun: Introduce discourse referent ( $y_{\langle m \rangle}$ ) and predicate  $\text{male}(y)$ . Introduce coreference equation  $x=y$  (where  $x$  was already present in the DRS).
  - b. Feminine pronoun: Introduce discourse referent ( $y_{\langle f \rangle}$ ) and predicate  $\text{female}(y)$ . Introduce coreference equation  $x=y$  (where  $x$  was already present in the DRS). (sex-based agreement)

(Regarding the proviso ‘where x was already present in the DRS’ in (i) and (ii), keep in mind that we assume discourse referents can be introduced non-linguistically, as in the exophora cases. Hence any of these rules can be applied in the absence of a textual antecedent.) The Same Gender Rule is only one of three options. When rule (20)ii applies to translate a masculine plural pronoun or when (20)iii applies to translate a masculine or feminine pronoun, there is no requirement that the agreement features match the antecedent.

## 6. Conclusion.

Based on the Serbo-Croatian data, we have seen that when the interpretation of a pronoun involves retrieving the antecedent concept, then the gender feature of the antecedent noun must be retrieved as well. Coreference, when it does not involve retrieval of the antecedent concept, does not necessarily involve retrieval of the gender feature. In a sense this close bond between meaning and agreement features should not surprise us: what holds them together is the *noun* associated with both of them. In contrast, cases of simple coreference do not necessitate any recourse to a previously uttered noun at all; the discourse referent alone will do. This shows clearly that gender features, even non-natural or ‘grammatical’ gender features, are not merely formal morphosyntactic features, subject only to structural rules of syntax, but are intimately involved in processes of semantic interpretation.

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