On the agreement between predicative complements and their target

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Abstract

Predicative complements canonically show number and/or gender agreement with their target. The most detailed proposal on how to model it in HPSG is in Kathol (1999). This proposal, though, mainly deals with the predicative adjectives of the Romance languages, and turns out to be rather inappropriate for dealing with predicate nominals. There is an obvious way to repair it, but it cannot be fitted in the canonical HPSG treatment of clauses with a predicative complement. It can be fitted, though, in a treatment of such clauses that was proposed in Van Eynde (2009). Adopting that treatment, the agreement will be modeled in terms of a constraint on the lexemes which select a predicative complement.

1 Introduction

The most conspicuous type of agreement in clauses with a predicative complement concerns the number and gender agreement between a predicative adjective and its target, as illustrated in the Italian (1).

(1) a. Il cane mi sembra contento/*contenti.
the dog-SG.MAS me seems happy-SG.MAS/*happy-PL.MAS
'The dog seems happy to me.'

b. I cani mi sembrano contenti/*contento.
the dog-PL.MAS me seem happy-PL.MAS/*happy-SG.MAS
'The dogs seem happy to me.'

c. La gatta mi sembra contenta/*contente.
the cat-SG.FEM me seems happy-SG.FEM/*happy-PL.FEM
'The cat seems happy to me.'

d. Le gatte mi sembrano contente/*contenta.
the cat-PL.FEM me seem happy-PL.FEM/*happy-SG.FEM
'The cats seem happy to me.'

While the data in (1) are straightforward, the phenomenon is more complex than these examples suggest, as demonstrated in (2–3).

(2) Su Majestad suprema está contento.
his majesty-FEM supreme-FEM is happy-MAS
'His Majesty is happy.'

[†]For their comments on the first version of this text I want to thank the three anonymous reviewers, my colleagues at the Centre for Computational Linguistics and the audience of an HPSG workshop in Frankfurt on May 11–12, 2012, where I gave a talk about a similar topic. Special thanks go to Gert Webelhuth for the invitation to the workshop in Frankfurt, to Byong-Rae Ryu for the offer to deliver the keynote speech at the conference in Daejeon, and to Stefan Müller for his comments on the prefinal version of this paper.

(3) a. Vous êtes/*es loyal.
you-2.PL be-2.PL/*be-2.SG loyal-SG
'You are loyal.'

b. On a/*ont été loyaux.
one-SG have-3.SG/*have-3.PL been loyal-PL
'We have been loyal.'

In the Spanish example, quoted from Corbett (1991, 225), the attributive adjective *suprema* shares the grammatical gender of the feminine *Majestad*, but the predicative adjective does not. Instead, it takes the masculine form if it denotes a male monarch, and the feminine form if it denotes a female monarch. Similarly, in the French examples, quoted from Wechsler and Zlatić (2003, 98, 102), the finite verbs shares the grammatical number of the subject, which is plural for *vous* and singular for *on*, but the predicative adjectives do not: They are singular if the subject denotes an individual and plural if it denotes an aggregate, irrespective of the pronouns' grammatical number.

The challenge for a treatment of this type of agreement is to model it in such a way that it blocks the starred combinations in (1), but allows the mismatches in (2) and (3). A useful starting point for that purpose is the distinction between morphosyntactic agreement (also known as concord) and index agreement, as introduced in Pollard and Sag (1994) and further developed in a.o. Kathol (1999) and Wechsler and Zlatić (2003).

2 Two kinds of agreement

What underlies the distinction between two kinds of agreement is the intuition that the morphosyntactic number and gender of a noun do not always correspond to its 'semantic' number and gender. The Spanish *Majestad*, for instance, is grammatically feminine, but is treated as masculine for the purpose of agreement with the predicative adjective if it denotes a male monarch, as in (2). Similarly, the French *vous* is grammatically plural, but is treated as singular for the purpose of agreement with the predicative adjective if it denotes a single entity, as in (3a). To make this more precise Wechsler and Zlatić (2003, 30) employs the scheme in (4).

(4) morphology $\Longleftrightarrow$ CONCORD $\Longleftrightarrow$ INDEX $\Longleftrightarrow$ semantics

"We recognize two distinct grammaticalization 'portals', one each via semantics and morphology. These two sources of grammaticalization lead to two distinct bundles of agreement features for a given noun. The morphology-related agreement bundle wil be called CONCORD (which includes case, number and gender) and the semantics-related agreement bundle which will be called INDEX (which includes person, number and gender)." (Wechsler and Zlatić, 2003, 28) For most nouns, the number and gender features in the two 'portals' match, but if there is a mismatch between morphology and semantics, as in the case of a grammatically

feminine noun with a male referent, the INDEX|GENDER value may reflect the latter and deviate from the former. This is made explicit in the lexical entry that Kathol (1999, 248) assigns to *Majestad*.[1]

(5)
$$\begin{bmatrix} \ldots \mid \text{AGR} \begin{bmatrix} \text{NUMBER} & \textit{sg} \\ \text{GENDER} & \textit{fem} \end{bmatrix} \\ \ldots \mid \text{INDEX} \begin{bmatrix} \text{PERSON} & \textit{3} \\ \text{NUMBER} & \textit{sg} \\ \text{GENDER} & \textit{gender} \end{bmatrix} \end{bmatrix}$$

The AGR|GENDER value is unambiguously *feminine*, but its counterpart in the index is left underspecified. This accounts for (2), if one assumes that the agreement between an attributive adjective and its nominal head is an instance of concord, whereas the agreement between a predicative adjective and the subject is an instance of index agreement, as spelled out in (6), quoted from Kathol (1999, 241).[2]

(6) a. morphosyntactic: AGR(selector) $\approx$ AGR(argument)
b. semantic: AGR(selector) $\approx$ INDEX(argument)

The selector is the adjective, and the argument is the head nominal in (6a) and the subject in (6b). "$\approx$" stands for something like "is structure-shared in its relevant parts with" (o.c.).

The number agreement in the French examples can be described along the same lines: If it is assumed that *on* 'one' and *vous* 'you' have a specific AGR|NUMBER value but an underspecified INDEX|NUMBER value, and if it is assumed that the agreement between subject and finite verb is an instance of concord (in French), while the agreement between a predicative adjective and its target is an instance of index agreement, one accounts for the data in (3).

From a more general perspective, the introduction of the distinction between morphosyntactic agreement and index agreement begs the question of which types of agreement belong to the former and which to the latter. Surveying the HPSG literature on the topic, there appears to be a large consensus that the agreement between a noun and an attributive adjective, as in *cane contento/*-i* and *Majestad suprema/*-o*, is an instance of morphosyntactic agreement. Likewise, there is a broad consensus to treat the agreement between an anaphoric pronoun and its antecedent, as in (7), as an instance of index agreement.

(7) a. Joan washed herself/*himself/*itself/*themselves.
b. The brothers/*brother killed each other.

[1] Kathol's AGR feature corresponds to Wechsler and Zlatic's CONCORD feature.
[2] Kathol's characterization of (6b) as 'semantic' is misleading, but it is part of the quote.

The reflexive pronoun in (7a) must be singular feminine if its antecedent denotes a female individual, and the inherently plural reciprocal pronoun in (7b) is only compatible with a plural antecedent.

For other types of agreement, though, one finds different proposals. This is partly due to differences between languages. Pollard and Sag (1994), for instance, argues that the agreement between subject and finite verb is an instance of index agreement, mainly on the basis of English examples, while Kathol (1999) argues that it is an instance of morphosyntactic agreement, mainly on the basis of German and French examples. These proposals are not incompatible: It is perfectly conceivable that English differs from German and French in this respect.

Precisely for this reason it is worth investigating the agreement between predicative complements and their target in other languages than the Romance ones.

3 The agreement between predicate nominals and their target

In English, Dutch and German, there is no overtly marked agreement between predicative adjectives and their target, since the predicative adjectives of these languages do not show any inflectional variation for number or gender. Their predicate nominals, however, are inflected for number and canonically show agreement with the target, as illustrated in (8).

(8) a. His brother is an engineer/*engineers.
b. His brothers are both engineers/*an engineer.

At the same time, there is ample room for mismatches, as shown by the following German example, quoted from Müller (1999, 273).

(9) Die Hooligans sind eine Schande.
the hooligan-PL are a shame-SG
'The hooligans are a shame.'

Similar examples from Dutch are given in (10–11), quoted from LASSY-small, a treebank for written Dutch, described in Van Noord et al. (2012).[3]

(10) Hiervan zijn tevens zes Belgische Europarlementariërs lid.
here-of are also six Belgian Europarlementarian-PL member-SG
'Six Belgian Europarlementarians are members of this.'

(11) Politieke tegenstellingen zijn een wezenskenmerk van elke democratie.
political contrast-PL are a characteristic-SG of every democracy
'Political contrasts are a characteristic of every democracy.'

[3]The identifiers of the sentences are respectively wiki-154.p.25.s.3 and dpc-kok-001320-nl-sen.p.6.s.2.

This clearly shows that the agreement between predicate nominals and their target is not an instance of morphosyntactic agreement in these languages. At the same time, the treatment which Kathol (1999) proposes for the predicative adjectives of the Romance languages, as spelled out in (6b), is not appropriate either: Given that the predicate nominal in (10), for instance, is grammatically singular, (6b) requires the subject to have a singular index, which implies that it is individuated as a single entity, yielding the implausible interpretation that (10) is about one member that consists of six people. The problem is worse in (12).

(12) Die politici zijn niet bepaald elkaars beste vriend.
those politician-PL are not exactly each-other-GEN best friend-SG
'Those politicians are not exactly each other's best friends.'

Also here the grammatical number of the predicate nominal is singular, which given (6b) implies that the index of the subject must be singular. However, since the agreement between an anaphoric pronoun and its antecedent is an instance of index agreement, the subject must have a plural index, just like the inherently plural reciprocal pronoun. In spite of these conflicting constraints on the INDEX|NUMBER value of the subject the sentence is wellformed. As an alternative I propose the scheme in (13).

(13) INDEX(selector) $\approx$ INDEX(argument)

What differentiates it from (6b) is that the predicate nominal is required to share its INDEX|NUMBER value, rather than its AGR|NUMBER value, with the INDEX|NUMBER value of its target.

In the following I first present a treatment of the agreement between predicative complements and their target along the lines of (13) (section 4). Then I demonstrate that this treatment is not compatible with the basic assumptions of the canonical HPSG treatment of predicative complements and argue that that treatment needs to be revised anyway (section 5). Finally, I present an alternative treatment of predicative complements, based on Van Eynde (2008) and Van Eynde (2009), and show how (13) can be integrated in this treatment (section 6).

4 Modeling the agreement

Remember that the mismatches in (2-3), repeated in (14-15), were accounted for by assuming that the morphosyntactic number and gender values of the subject are not necessarily identical to the number and gender values in its index.

(14) Su Majestad suprema está contento.
his majesty-FEM supreme-FEM is happy-MAS
'His Majesty is happy.'

(15) a. Vous êtes/*es loyal.
you-PL be-PL/*be-SG loyal-SG
'You are loyal.'

b. On a/*ont été loyaux.
one-SG have-SG/have-PL been loyal-PL
'We have been loyal.'

More specifically, while the subjects have specific values for morphosyntactic gender and/or number, the corresponding values in their index are underspecified and are resolved contextually.

Since predicate nominals are nouns or projections of nouns, just like subjects, it follows that their morphosyntactic number and gender values are not necessarily identical to the number and gender values in their index either. In fact, this is what accounts for the fact that the bare singular noun in the Dutch (16) is compatible with both singular and plural subjects.

(16) a. Zijn broer is ingenieur.
his brother is engineer
'His brother is an engineer.'

b. Zijn broers zijn ingenieur.
his brothers are engineer
'His brothers are engineers.'

The nouns in the predicate nominal are morphosyntactically singular, but their INDEX|NUMBER value is resolved to *singular* in the combination with a singular subject and to *plural* in the combination with a plural subject. It, hence, depends on the context whether it individuates a single entity or an aggregate. This also accounts for the mismatch in (10), repeated in (17).

(17) Hiervan zijn tevens zes Belgische Europarlementariërs lid.
here-of are also six Belgian Europarliamentarian.PL member.SG
'Six Belgian Europarliamentarians are members of this.'

The predicate nominal *lid* 'member' is morphosyntactically singular, but its index is underspecified and can, hence, be resolved to plural. The resulting interpretation is the distributive one, in which each of the six parliamentarians is claimed to be a member.

To counter the impression that this treatment is overly permissive it is worth stressing that the underspecification of the INDEX|NUMBER value is limited to certain nominals. In the same way as not every Spanish noun is like *Majestad* and not every French pronoun like *on* and *vous*, not every Dutch nominal is like *ingenieur* and *lid*. Of crucial relevance in that respect is the presence of a determiner. This is especially clear if we add the indefinite article to the predicate nominal, as in (18).

(18) a. Zijn broer is een ingenieur.
his brother is an engineer
'His brother is an engineer.'

b. ?? Zijn broers zijn een ingenieur.
?? his brothers are an engineer

As the question marks indicate, (18b) is much worse than (16b). This is due to the fact that the indefinite article requires a count noun with a singular index as its head. Its addition, hence, yields a predicate nominal which is only compatible with a target with a singular index. As a consequence, if the target is morphosyntactically plural, as in (18b), the combination is only possible if it is given a non-distributive interpretation, i.e. if my brothers jointly constitute one engineer. Since this interpretation is highly unnatural, (18b) is of doubtful quality. This also accounts for the illformedness of the English (19).

(19) * His brothers are both an engineer.

The presence of the floating quantifier *both* imposes a distributive interpretation on the subject, which is obviously incompatible with the non-distributive interpretation that the predicate nominal triggers.

By contrast, if the non-distributive interpretation makes good sense, the combination is impeccable. This accounts for the wellformedness of (11), repeated in (20).

(20) Politieke tegenstellingen zijn een wezenskenmerk van elke democratie.
political contrast-PL are a characteristic-SG of every democracy
'Political contrasts are a characteristic of every democracy.'

The most plausible interpretation of (20) is not that every single political contrast is a characteristic of democracy, but rather that the phenomenon of having political contrasts in general is a characteristic of democracy. Similar remarks apply to the German (9), repeated in (21).

(21) Die Hooligans sind eine Schande.
the hooligan-PL are a shame-SG
'The hooligans are a shame.'

The most plausible interpretation of this sentence is not that every single hooligan is a shame, but rather that the phenomenon of having hooligans in general is a shame.

Summing up, the addition of the indefinite article resolves the underspecification of the NUMBER|INDEX value of the predicate nominal, which in combination with the agreement constraint in (13) imposes a non-distributive interpretation on the subject. If the subject is morphosyntactically plural, this yields an anomaly if the assignment of a non-distributive interpretation is implausible, as in (18b), or

impossible, as in (19), but if that interpretation makes sense, the combination is wellformed, as in (20–21).

Not all determiners resolve the underspecification. The negative *geen* 'no', for instance, leaves the INDEX|NUMBER value underspecified. A relevant example is (22).[4]

(22) Zijn vijftien goals van vorig seizoen waren dan ook geen toeval.
his fifteen goal.PL of last season were then also no accident.SG
'His fifteen goals of last season were no accident.'

Because of the underspecification, this combination is ambiguous, allowing both the distributive interpretation, in which each of his fifteen goals was no accident, and the non-distributive interpretation, in which it is the totality of his fifteen goals that is no accident. Predictably, if *geen* 'no' is replaced by *een* the former interpretation is ruled out.

Other determiners that leave the INDEX|NUMBER value underspecified are the possessive pronouns and the prenominal genitives. That paves the way for an account of the mismatch in (12), repeated in (23).

(23) Die politici zijn niet bepaald elkaars beste vriend.
those politician-PL are not exactly each-other-GEN best friend-SG
'Those politicians are not exactly each other's best friends.'

The predicate nominal is grammatically singular, but has an underspecified index, so that it is compatible with a subject that has a plural index. The resulting interpretation is unambiguously distributive: Not being each other's best friend is predicated of each member of the set that is denoted by *die politici* 'those politicians'.

To round off this survey, let us again compare (6b) with (13), repeated in (24) and (25).

(24) AGR(selector) $\approx$ INDEX(argument)

(25) INDEX(selector) $\approx$ INDEX(argument)

The former was proposed for the predicative adjectives of the Romance languages in Kathol (1999), but is not appropriate for the predicate nominals of the Germanic languages: It assigns an implausible interpretation to (16b) and (17), it models only one of the two interpretations of (22), and it erroneously discards (23) as ill-formed. By contrast, (25) gets the more plausible distributive interpretation of (16b) and (17), it captures both interpretations of (22), and it treats (23) as wellformed. In sum, there is ample evidence in favor of (25). At the same time, there is a residual problem: It cannot smoothly be integrated in the canonical HPSG treatment of clauses with a predicative complement.

[4]The identifier of this sentence is dpc-rou-000360-nl-sen.p.4.s.1.

5 The Fregean treatment of predicative complements

The canonical HPSG treatment of clauses with a predicative complement can best be understood by comparing it with the treatment of clauses with an object complement, as in (26).

(26) a. Kim hired a plumber.
b. ∃ x y [Kim(x) & plumber(y) & hired(x,y)]

In the semantic analysis of (26) the subject and the direct object each introduce a discourse marker and the role of the verb is to relate those two discourse markers. By contrast, in the semantic analysis of a clause with a predicative complement, such as (27), the subject introduces a discourse marker, but the predicate nominal does not. Instead, it is assumed to denote a property which is attributed to the referent of the subject, as in (27b).

(27) a. Kim is a plumber.
b. ∃ x [Kim(x) & be(plumber(x))]
c. ∃ x [Kim(x) & plumber(x)]

Moreover, the copula is assumed to be semantically vacuous and, therefore, omitted from the semantic representation, yielding (27c). I call this treatment Fregean, since it is an integral part of predicate calculus, see Frege (1892).

Converted into the TFS style notation of HPSG, the object complement in (26) denotes a scope-object, while the homophonous predicative complement in (27) denotes a state-of-affairs (*soa*). This is important in the present context, since scope-objects have an index, while states-of-affairs do not, as is clear from their definition in Ginzburg and Sag (2000, 387).

(28)
$$\begin{bmatrix} \textit{scope-object} \\ \text{INDEX} \quad \textit{index} \\ \text{RESTR} \quad \textit{set}\left(\textit{fact}\right) \end{bmatrix} \qquad \begin{bmatrix} \textit{soa} \\ \text{QUANTS} \quad \textit{list}\left(\textit{quant-rel}\right) \\ \text{NUCLEUS} \quad \textit{relation} \end{bmatrix}$$

In words, a scope-object consists of an index and a set of constraints on its denotation, while a state-of-affairs consists of list of quantifiers and a relation. The distinction is also made in the AVMs of the verbs. The transitive *hire* takes two arguments which both denote a scope object and assigns semantic roles to their indices, as in (29).

(29)
$$\begin{bmatrix} \text{PHON} \quad \langle \textit{hire} \rangle \\ \text{ARG-ST} \quad \langle \text{NP}_{\boxed{1}} , \text{NP}_{\boxed{2}} \rangle \\ \\ \text{SYNSEM} \mid \text{LOCAL} \mid \text{CONTENT} \mid \text{NUCLEUS} \begin{bmatrix} \textit{hire-rel} \\ \text{HIRER} \quad \boxed{1}\,\textit{index} \\ \text{HIRED} \quad \boxed{2}\,\textit{index} \end{bmatrix} \\ \\ \end{bmatrix}$$

The copula, by contrast, takes a predicative complement that denotes a state-of-afairs and identifies its own CONTENT value with that of its complement, as spelled out in (30), quoted from Pollard and Sag (1994, 147).[5]

(30)
$$\begin{bmatrix} \text{PHON} & \langle \textit{be} \rangle \\ \text{ARG-ST} & \langle \boxed{1}, \text{XP}\,[+\,\text{PRD}\,,\,\text{SUBJ}\ \langle \boxed{1} \rangle] : \boxed{2} \rangle \\ \text{SYNSEM}\,|\,\text{LOCAL} & \begin{bmatrix} \text{CAT}\,|\,\text{HEAD} & \textit{verb}[+\,\text{AUX}] \\ \text{CONTENT} & \boxed{2}\ \textit{soa} \end{bmatrix} \end{bmatrix}$$

This identification captures the assumption that it is semantically vacuous. If the verb which selects a predicative complement is not semantically vacuous, its CONTENT value contains a relation of its own, but also then the predicative complement denotes a state-of-affairs, as in the following AVM of the German *erscheinen* 'seem', quoted from Müller (2002, 104–109).[6]

(31)
$$\begin{bmatrix} \text{PHON} & \langle \textit{erscheinen} \rangle \\ \text{ARG-ST} & \langle \boxed{1}, \text{NP}[\textit{dative}]_{\boxed{3}}, \text{XP}\,[+\,\text{PRD}\,,\,\text{SUBJ}\ \langle \boxed{1} \rangle] : \boxed{2} \rangle \\ \text{SYNSEM}\,|\,\text{LOCAL}\,|\,\text{CONTENT} & \begin{bmatrix} \textit{erscheinen} & \\ \text{EXPERIENCER} & \boxed{3}\ \textit{index} \\ \text{SOA-ARG} & \boxed{2}\ \textit{soa} \end{bmatrix} \end{bmatrix}$$

The dative NP is assigned the EXPERIENCER role.

Taking stock, it is an integral part of the canonical HPSG treatment of clauses with a predicative complement that the latter denotes a state-of-affairs, rather than a scope-object. As a consequence, since a state-of-affairs does not contain an index, the predicative complements cannot be required to share the number value in their index with that of their target. At this point, we are faced with a dilemma: Either we stick to the canonical treatment of clauses with a predicative complement and modify the treatment of agreement, or we keep the treatment of agreement as it is and modify the canonical treatment of predicative complements. The option that will be chosen and defended in this paper is the second one, mainly because the Fregean analysis of predicative complements runs into a number of problems anyway, as will be shown now.

For a start, notice that the assignment of CONTENT values of type *state-of-affairs* to the predicate nominals implies that all nouns undergo a type shift, as they are canonically assumed to denote a scope-object, i.e. a pair of an index and a set

[5] This is not an exact copy of the original. The major difference is due to the fact that Pollard and Sag (1994, 147) describes the use of *be* in existential sentences, such as *there is a unicorn in the garden*, in which *there* is treated as an extra-argument. This is left out in (30). A minor difference concerns the replacement of SUBCAT with ARG-ST.

[6] This is not an exact copy of the original either. Also here I use ARG-ST instead of Müller's SUBCAT and XCOMP.

of constraints on its denotation.[7] To model this shift Pollard and Sag (1994, 360) employs a lexical rule.[8]

(32) PREDICATIVE NP LEXICAL RULE:

$$\left[\begin{array}{l}\text{CAT}\left[\begin{array}{ll}\text{HEAD} & \left[\begin{array}{ll}\textit{noun} & \\ \text{PRD} & -\end{array}\right] \\ \text{SUBJ} & \langle\ \rangle\end{array}\right] \\ \text{CONTENT}\left[\begin{array}{ll}\textit{scope-obj} & \\ \text{INDEX} & \boxed{1} \\ \text{RESTR} & \boxed{2}\ \textit{set}(\textit{psoa})\end{array}\right]\end{array}\right] \Rightarrow \left[\begin{array}{l}\text{CAT}\left[\begin{array}{ll}\text{HEAD} & \left[\begin{array}{ll}\textit{noun} & \\ \text{PRD} & +\end{array}\right] \\ \text{SUBJ} & \langle\ \text{XP}_{\boxed{1}}\ \rangle\end{array}\right] \\ \text{CONTENT}\ \boxed{2}\end{array}\right]$$

In words, for every nonpredicative noun which denotes a scope-object, there is a homophonous predicative noun which denotes the set of restrictions which are part of the scope-object (2). In the type hierarchy of Pollard and Sag (1994), which treats the RESTRICTION value as a set of parametrized states of affairs, this rule yields a semantic object which can be identified with the CONTENT value of the copula.[9] Besides, while the nonpredicative noun has an empty SUBJ list, its predicative counterpart selects a subject whose index is identified with the index of the nonpredicative noun (1). In combination with the assumption that the predicate selecting verbs are subject raisers, this has the effect of ensuring that the property which the predicate nominal denotes is attributed to its target.

As argued in Müller (2009), the lexical rule in (32) does not interact properly with the canonical HPSG treatment of nominal adjuncts. This can be illustrated with a predicate nominal that contains an attributive adjective, as in (33).

(33) John is a good candidate.

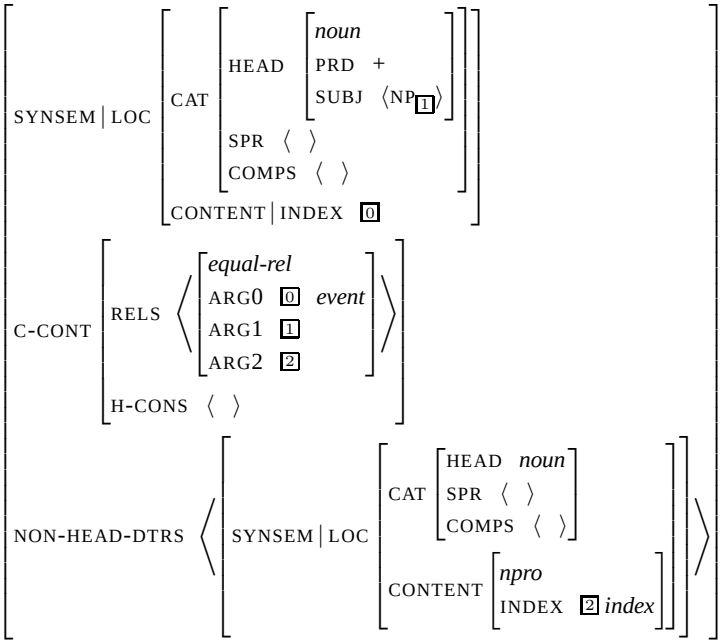
In the canonical HPSG treatment the adjective selects an N-bar head and identifies its own index with that of the noun, but if the noun is in predicative position, it has no index! To repair this Müller (2009) applies the type shift at the level of the full NP, rather than at the lexical level. More specifically, he employs a unary syntactic rule which transforms a nonpredicative NP into a predicative one.

[7] The notion of type shift was introduced in Partee (1987).

[8] Pollard and Sag (1994) uses the term *nominal-object* for what is called a *scope-object* in Ginzburg and Sag (2000). I use the latter term.

[9] In the type hierarchy of Ginzburg and Sag (2000), which treats the RESTRICTION value as a set of facts, the type shift has to be modeled in another way, but since the equivalent of (32) in Ginzburg and Sag (2000, 409) does not mention the CONTENT values, it is not made clear how this is done.

(34) PREDICATIVE NP PROJECTION SCHEMA:
np-pred-phrase ⇒



In words, the rule turns a fully saturated nonpronominal NP which denotes a scope-object (= the non-head-daughter) into a predicative NP which selects a subject and which denotes a relation of type *equal-rel* between the indices of the subject (1) and the NP daughter (2).[10] Moreover, the relation has a third argument whose value is of type *event*.

This treatment avoids the problem with (32), since the type shift is now applied after the addition of the adjuncts. At the same time, since (34) explicitly requires a fully saturated NP daughter, it does not subsume the determinerless predicate nominal in (35).

(35) Er ist Lehrer.
he is teacher
'He is a teacher.'

To cover this, Müller (2009) keeps a version of lexical rule (32), but the exact form of that version is not spelled out.

Returning to the issue of how to model the agreement between a predicate nominal and its target, Stefan Müller's unary syntactic rule is an improvement, since the mother node contains indices for both the predicative complement (2) and its target (1). The lexical rule, however, does not provide an index for the predicative complement, at least not in the version of Pollard and Sag (1994). Moreover, as

[10]The C-CONT attribute captures the constructional aspects of the semantic composition.

Pollard and Sag (1994, 360) acknowledges, the lexical rule is problematic for predicative proper nouns, as in (36), since it does not make much sense to treat a proper noun as denoting a state-of-affairs. The same is true for predicative pronouns, as in (37).[11]

(36) Cicero is Tully.

(37) a. Kim is somebody with good taste.
b. That bag is mine.

Another problem which applies both to the lexical rule and the unary syntactic rule is the assumption that the target of the predicative complement can be identified with its unexpressed subject. This is not only awkward for predicative proper nouns and pronouns, obliging one to assume that words like *Tully, somebody* and *mine* take a subject, it also makes erroneous predictions about predicative gerunds, as illustrated in (38).

(38) The greatest pleasure on earth is eating oysters and drinking champagne.

The unexpressed subject of eating and drinking is not the pleasure but rather PRO with arbitrary reference. The same holds for the Dutch bare infinitives in predicative position.

(39) Zo'n schoolreis is altijd weer hard werken.
such-a school-trip is always again hard work
'Such a school trip is always hard work.'

The understood subject of the infinitive is not the school trip, but PRO with arbitrary reference. Depending on the context it might refer to the teachers, the pupils, the bus driver, the parents, the secretary of the school, a local guide, etc.

Summing up, my treatment of the agreement between a predicative complement and its target as an instance of index agreement is not compatible with the canonical treatment of predicative complements in HPSG, but this does not mean that it should be given up, since the canonical treatment is marred by a number of problems anyway.

6 A Montagovian treatment of predicative complements

An alternative for the canonical HPSG treatment of predicative complements is proposed in Van Eynde (2008) and Van Eynde (2009). It is based on the assumption, originally due to Quine (1960) and formalized in Montague (1974), that the predicative complement introduces its own referent (or discourse marker) and that the function of the copula is to relate it to the referent of the subject, as in (40b).

[11] Perhaps for that reason, Müller (2009) excludes the application of the unary rule to pronominal predicates.

(40) a. Kim is a plumber.

b. ∃ x y [Kim(x) & plumber(y) & is(x,y)]

In terms of the semantic ontology of HPSG the predicative complement and its target both denote a scope-object and the function of the copula is to relate their respective indices. Speaking in more general terms, verbs which select a predicative complement denote a relation between the index of that complement and the one of its target, as in (41–42).

(41)
$$\begin{bmatrix} \textsc{phon} & \langle \textit{be} \rangle \\ \textsc{arg-st} & \langle \textsc{np}_{\boxed{1}}, \textsc{xp}_{\boxed{2}} \rangle \\ \textsc{synsem}\,|\,\textsc{loc}\,|\,\textsc{content}\,|\,\textsc{nucleus} & \begin{bmatrix} \textit{be-rel} \\ \textsc{theme} & \boxed{1}\ \textit{index} \\ \textsc{attribute} & \boxed{2}\ \textit{index} \end{bmatrix} \end{bmatrix}$$

(42)
$$\begin{bmatrix} \textsc{phon} & \langle \textit{erscheinen} \rangle \\ \textsc{arg-st} & \langle \textsc{np}_{\boxed{1}}, \textsc{xp}_{\boxed{2}}, \textsc{np}[\textit{dative}]_{\boxed{3}} \rangle \\ \textsc{synsem}\,|\,\textsc{loc}\,|\,\textsc{content}\,|\,\textsc{nucleus} & \begin{bmatrix} \textit{erscheinen-rel} \\ \textsc{theme} & \boxed{1}\ \textit{index} \\ \textsc{attribute} & \boxed{2}\ \textit{index} \\ \textsc{experiencer} & \boxed{3}\ \textit{index} \end{bmatrix} \end{bmatrix}$$

This analysis does not require any type shift for the predicate nominals, since they canonically denote a scope-object anyway, and it avoids the problems with the predicative proper nouns and pronouns. It also avoids the problem with the predicative gerunds and bare infinitives, since the link between the predicative complement and its target is not defined in terms of subject raising. Moreover, and that is what matters most in the context of this paper, it provides the means to express the agreement between a predicative complement and its target. More specifically, the agreement can be modelled in terms of a constraint on the predicate selecting lexemes, as in (43).

(43)
$$\begin{bmatrix} \textsc{arg-st} & \boxed{A} \oplus \langle \textsc{np}_{\boxed{1}}, \textsc{xp}_{\boxed{2}} \rangle \oplus \boxed{B} \\ \textsc{ss}\,|\,\textsc{loc}\,|\,\textsc{content}\,|\,\textsc{nucleus} & \begin{bmatrix} \textsc{theme} & \boxed{1}\left[\textsc{number}\ \boxed{3}\ \textit{number}\right] \\ \textsc{attribute} & \boxed{2}\left[\textsc{number}\ \boxed{3}\right] \end{bmatrix} \end{bmatrix}$$

In words, lexemes which select a predicative complement, such as *be*, *seem* and *consider*, require token-identity of the number value in the index of the argument which supplies the ATTRIBUTE role, and the corresponding value in the index of the argument which supplies the THEME role; this is the subject if $\boxed{A}$ is the empty list, and the direct object otherwise.

A further piece of evidence for (43) is provided by the fact that predicate nominals show the same kind of agreement with their target when they are introduced by an argument marking preposition, as illustrated by a comparison of (44) with (45).

(44) a. We consider Kim an acceptable candidate.
b. ?? We consider his brothers an acceptable candidate.

(45) a. We regard Kim as an acceptable candidate.
b. ?? We regard his brothers as an acceptable candidate.

The presence of the indefinite article in (44) resolves the INDEX|NUMBER value of the predicate nominal to singular, so that the target must have a singular index as well. This is unproblematic for *Kim*, but not for *his brothers*, since the assignment of a non-distributive interpretation to this plural is implausible. Turning to (45) the data are exactly the same, but the analysis requires an extra step, i.e. the assumption that the index of the PP[*as*] is token-identical with the index of the NP that it contains. Interestingly, this extra step need not be stipulated, since it is independently needed for the treatment of binding and control relations, as spelled out in Sag et al. (2003, 209–213). The binding facts in (46), for instance, show that NPs which are introduced by an argument marking preposition behave in the same way as NP complements, and the control data in (47) confirm this.

(46) a. They$_i$ washed themselves$_i$ / *them$_i$.
b. They$_i$ talk to themselves$_i$ / *them$_i$.

(47) a. They$_i$ asked us$_j$ [PRO$_j$ to behave ourselves$_j$ / *themselves$_i$].
b. They$_i$ appealed to us$_j$ [PRO$_j$ to behave ourselves$_j$ / *themselves$_i$].

Also here, there is no need to tinker with the constraints on binding and control if it is assumed that the index of the PP is identical to the one of the NP that it contains.

Similar data for Dutch are provided in (48–49).

(48) a. Ze vindt hem een idioot.
she finds him an idiot-SG
'She considers him an idiot.'
b. ?? Ze vindt ons een idioot.
?? she finds us an idiot-SG

(49) a. Ze houdt hem voor een idioot.
she holds him for an idiot-SG
'She considers him an idiot.'
b. ?? Ze houdt ons voor een idioot.
?? she holds us for an idiot-SG

In contrast to *vinden*, the nearly-synonymous *houden* requires its predicative complement to be introduced by the preposition *voor* but this does not make any difference for the agreement data.

Finally, notice that (43) also captures the agreement in number between predicative adjectives and their target in the Romance languages, if we make two ancillary assumptions. The first one is that predicative adjectives denote a scope-object, just like the predicate nominals, as in (50).

(50) a. Tim is friendly.
b. ∃ x y [Tim(x) & friendly(y) & is(x,y)]

This is not too far-fetched, since the homophonous attributive adjectives are canonically treated in this way, as shown in (51).

(51) a. Tim is a friendly guy.
b. ∃ x y [Tim(x) & friendly(y) & guy(y) & is(x,y)]

The second ancillary assumption is that the number value in the index of the adjective is token-identical with its morphosyntactic number value. An adjective with a singular index, for instance, is also morphosyntactically singular.

This, in turn, paves the way for an account of the fact that the predicative adjectives of English, Dutch and German do not show overt agreement with their target. Given that inflectional variation correlates with the CAT|HEAD distinctions, rather than with the CONTENT|INDEX distinctions, their inflectional invariance can be attributed to the fact that they lack the AGR|NUMBER feature. This assumption is not incompatible with the fact that the attributive adjectives of German and Dutch show agreement with the nominals they modify, since that agreement is canonically modeled in terms of government. In Pollard and Sag (1994, 88-91), for instance, the adjective in *ein kluges Mädchen* 'a clever girl' is claimed to select a nominal that is singular, neuter and either nominative or accusative, but the adjective itself does not have these features. In other words, while the adjective has an index, just like the noun it modifies, it does not have CASE or AGR features of its own. The adjectives of the Romance languages, by contrast, have AGR features of their own, and therefore show inflectional variation, also in nonattributive positions.

In sum, the Montagovian treatment not only avoids the problems of the Fregean treatment with predicative proper nouns, pronouns, gerunds and bare infinitives, it also accommodates the independently motivated treatment of the agreement between predicative complements and their target.

7 Conclusion

In many languages, predicative complements show number and/or gender agreement with their target. In terms of the distinction between concord and index agreement, it sides with the latter, at least in the Romance and Germanic languages.

The most detailed proposal to model it is in Kathol (1999), but it chiefly focusses on predicative adjectives and the attempt to apply it to the predicate nominals of the Germanic languages does not give satisfactory results. There is an obvious way to repair it, but this way cannot be fitted in the canonical HPSG treatment of clauses with a predicative complement. Since that treatment has some other shortcomings anyway, it is replaced by an alternative, developed in Van Eynde (2008) and Van Eynde (2009). Adopting that treatment, the agreement can be modeld in terms of a constraint on the lexemes which select a predicative complement. In the present version, it only covers number agreement. In future work I will explore how it can be extended to include gender agreement.

References

Corbett, Greville. 1991. *Gender*. Cambridge: Cambridge University Press.

Frege, Gottlob. 1892. Über Begriff und Gegenstand. *Vierteljahrsschrift für wissenschaftliche Philosophie* 16, 192–205.

Ginzburg, Jonathan and Sag, Ivan. 2000. *Interrogative Investigations*. Stanford, CA: CSLI Publications.

Kathol, Andreas. 1999. Agreement and the syntax-morphology interface in HPSG. In R.D. Levine and G.M. Greene (eds.), *Studies in Contemporary Phrase Structure Grammar*, pages 223–274, Cambridge: Cambridge University Press.

Montague, Richard. 1974. The proper treatment of quantification in ordinary English. In R. Thomason (ed.), *Formal Philosophy*, pages 247–270, New Haven: Yale University Press.

Müller, Stefan. 1999. *Deutsche Syntax deklarativ. Head-driven Phrase Structure Grammar für das Deutsche*. Linguistische Arbeiten, No. 394, Tübingen: Niemeyer.

Müller, Stefan. 2002. *Complex predicates: verbal complexes, resultative constructions and particle verbs in German*. Studies in constraint-based lexicalism, No. 13, Stanford, CA: CSLI Publications.

Müller, Stefan. 2009. On predication. In Stefan Müller (ed.), *Proceedings of the 16th International Conference on Head-driven Phrase Structure Grammar*, pages 213–233, Stanford, CA: CSLI Publications.

Partee, Barbara. 1987. Noun Phrase Interpretation and Type-shifting Principles. In Jeroen Groenendijk, Dick de Jongh and Martin Stokhof (eds.), *Studies in Discourse Representation Theory and the Theory of generalized quantifiers*, pages 115–143, Dordrecht: Foris.

Pollard, Carl and Sag, Ivan. 1994. *Head-driven Phrase Structure Grammar*. Stanford/Chicago: CSLI Publications and University of Chicago Press.

Quine, W.V.O. 1960. *Word and object*. Cambridge, MA: MIT Press.

Sag, Ivan A., Wasow, Thomas and Bender, Emily. 2003. *Syntactic theory. A formal introduction. Second Edition*. Stanford, CA: CSLI Publications.

Van Eynde, Frank. 2008. Predicate complements. In Stefan Müller (ed.), *Proceedings of the 15th International Conference on Head-driven Phrase Structure Grammar*, pages 253–273, Stanford, CA: CSLI Publications.

Van Eynde, Frank. 2009. On the copula: from a Fregean to a Montagovian treatment. In Stefan Müller (ed.), *Proceedings of the 16th International Conference on Head-driven Phrase Structure Grammar*, pages 359–375, Stanford, CA: CSLI Publications.

Van Noord, Gertjan, Bouma, Gosse and Van Eynde, Frank et al. 2012. Large Scale Syntactic Annotation of Written Dutch: Lassy. In Peter Spyns and Jan Odijk (eds.), *Essential Speech and Language Technology for Dutch: resources, tools and applications*, Berlin: Springer.

Wechsler, Steve and Zlatić, L. 2003. *The many faces of agreement*. Stanford, CA: CSLI Publications.