TWO TYPES OF AGREEMENT

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In this paper I would like to explore the possibility that what is normally referred to as *agreement* is better understood as two closely related, but still not identical, phenomena that deserve a separate treatment in grammatical theory. We will try to motivate a distinction between what we term *morphosyntactic agreement* and *index agreement* as two agreement relations holding at different levels of representation and involving different types of information. Our hypothesis will be supported by both diachronic and synchronic evidence from agreement phenomena of several natural languages, and our analyses will be developed within the Head-Driven Phrase Structure Grammar (HPSG) framework, a monostratal, but multilevel, theory of natural language grammars.

1. Introduction

An important step towards the understanding of agreement phenomena is the recognition of the fact that one must distinguish at least two different kinds of agreement. One is internal to an NP and involves covariation of the categories of number, gender and case between a head noun and its 'modifiers', i.e., articles, adjectives, quantifiers, etc. This kind of agreement is often termed *concord*, although some other names have been used to refer to it like *internal agreement* (Lehmann, 1988) or *syntactic agreement* (Pollard and Sag, in press); it is exemplified by the typical Latin and German examples:[1]

[1] The abbreviations ST and WE in the German example denote the declension type of each constituent: *strong* or *weak*. Note that, as for declension type, there is obligatory 'disagreement' between the determiner and the other constituents of the NP, that is, if the determiner is strong, all other constituents must be weak and viceversa, if the determiner is weak, all other constituents must be strong. See Netter (forthcoming) for details and an HPSG analysis; see also Pollard and Sag (in press:§ 2.5.1 and 9.4.4) and Kathol (1991).

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(1) a. illarum duarum feminarum.

that.GEN.PL.FEM two.GEN.PL.FEM woman.GEN.PL.FEM

'of those two good women' (Lehmann, 1988:56)

b. der alte Beamte.

the.NOM.SG.MASC.ST old.NOM.SG.MASC.WE official.NOM.SG.MASC.WE

'the old official' (Netter, forthcoming:30)

The other type of agreement is prototypically represented by pronoun-antecedent agreement but, as we will argue, also subject-verb agreement should be analyzed as an instance of this type of agreement. It corresponds to Lehmann's *external agreement* and Pollard and Sag's *index agreement*.[2]

The main thesis of this paper will be that each type of agreement involves a relation between different types of information. In the first case, information that is specified as part of syntactic categories, whereas in the second case the relation is between referential indices.

This is not a widely accepted idea and the main tendency within linguistic theory is to conceive of all agreement relations as either purely syntactic or purely semantic phenomena. Thus most accounts of agreement within transformational grammar and Lexical Functional Grammar may

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[2] For the sake of clarity I will throughout this paper adopt Pollard and Sag's terminology; thus I will use the term *index agreement* for those agreement relations of the antecedent-pronoun type. I will however use the term *morphosyntactic agreement* instead or just *syntactic* to refer to the type of agreement exemplified in (1), to avoid confusion with what I call here *syntactic theories* vs. *semantic theories* of agreement. As will become clear, the sort of theory we advocate is not just only syntactic or only semantic but a combination of the two. Pollard and Sag (in press) argue that even a third type of agreement relation must be distinguished, which they term *pragmatic* or *anchoring-conditions agreement* and which arises in those situations where certain contextual background assumptions are required to be consistent. Pollard and Sag (in press:§2.5.3) provide an analysis of honorific agreement in Korean as an example of this third type of agreement relation. We will not deal with pragmatic agreement here, but only with those agreement relations which involve reference to some kind of grammatical feature.

be considered as attempts to develop purely syntactic theories of agreement.[3] On the other hand, some authors have argued that it is possible to work out a unified theory of agreement phenomena capable of encompassing all possible types of agreement in a purely semantic treatment (Lapointe, 1980; Lapointe, 1981; Lapointe, 1988; Dowty and Jacobson, 1988). However, although there seem to be good arguments against purely syntactic conceptions of agrement relations, as most partisans of semantic analyses have pointed out, there also seem to be several reasons that militate against purely semantic treatments. This has been discussed at length by Pollard and Sag (in press) and Kathol (1991) and we will summarize some of their main points here.

1.1. How Syntactic and How Semantic is Agreement?

The basic property of semantically-based theories of agreement of the sort advocated by, for example, Dowty and Jacobson (1988) is that all patterns of agreement result from compatibility conditions on denotation. Indeed, there are several cases where the agreement features on some expression seem to be dictated by properties of a certain nominal's referent, rather than by any formal properties of the nominal itself. A case in point is that of the agreement mismatches that arise in reference transfer situations (cf. (2)), or with certain uses of relative pronouns (cf. (3)), singular plurals (cf. (4)) and collective nouns (cf. (5)):[4]

(2) a. The ham sandwich at table six just made a fool of himself.

b. The hash browns at table nine says he can't find the men's room.

(3) a. The soldiers who/*which first entered the town were American.

b. The volcano which/*who has been dormant for a century erupted.

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[3] Thus, the SPEC-head agreement relation of Chomsky (1986)—see also Rizzi (1990)—is assumed to be determined and constrained by syntactic factors only. Similarly in LFG, where agreement as a relation between elements in f-structures (see the papers in Bresnan (1982) and Bresnan and Mchombo (1986)) is essentially a syntactic relation.

[4] Most of the following examples are from Pollard and Sag (in press:Ch. 2).

(3) c. The volcano who just left the room was Bill's kid.

d. The soldiers which were made of lead were thrown away.

(4) a. Eggs is my favorite breakfast.

b. Unleashed dogs on city sidewalks threatens the health and welfare of law-abiding citizens.

(5) a. The faculty is voting itself a rise.

b. The faculty are voting themselves a rise.

Thus in (2) we see that, in the jargon of American waiters, menu items can be identified as nonaggregate (i.e., singular) entities referring to a customer; the form of the verbs *made* and *says* as well as that of the pronouns that are coindexed with the reference-transferred subject is determined by agreement with the nonaggregate referent denoted by the NPs *the ham sandwich at table six* and *the hash browns at table nine*, not by agreement with the form of the NPs. Similarly in the other cases: in (3) the constraints that the relative pronoun *who* must have a human antecedent and that *which* must have a nonhuman antecedent are not violated as long as the context allows the attribution of these properties to the referent denoted by the antecedent; in (4) we see that certain entities (e.g., a menu item or a social problem) may be individuated as nonaggregate regardless of their being formally plural, which is reflected by the possibility of inducing singular agreement with the verb; finally, in (5) it is shown that English collective nouns appear to allow the objects they denote to be individuated either as a nonaggregate entity or as aggregate entities, yielding singular or plural agreement respectively.

However compelling may be the evidence that these examples provide for a purely semantic theory of agreement and against purely syntactic analyses, there are several problems whose solution is not apparent within the former kind of theories.

First, as observed by both Pollard and Sag (in press) and Chierchia (1988, 1989:150), the existence of *grammatical gender* languages like French, German or Italian defies a purely semantic analysis. That is, if, as Dowty and Jacobson (1988) point out, the possibility of being

referred to by a word of a certain gender class is to be treated as a semantic property of a given entity (i.e., the world is simply divided into singular, plural, masculine, feminine and neuter objects), then the fact, for example, that the word *Mädchen* ('girl') is neuter in German, but *fille* and *ragazza* are feminine in French and Italian, or that eggs in Italian are masculine in the singular (cf. *un uovo*) but feminine in the plural (cf. *due uova*), makes these semantic approaches extremely artificial if viable at all. Note that these languages also exhibit gender restrictions when pronouns are used deictically or in the discourse:

(6) [ponting to a table]
Elle/*Il est très longue/*long.
She/he is very long-FEM/long-MASC
'It is very long'

(7) [said to a stranger while waiting at a bus stop]
Ich hoffe, daß er/*es/*sie/ bald kommt.
I hope that he/it/she soon comes
'I hope that it comes soon'

(8) A: Dove sono le uova?
'Where are the eggs?'
B: Le/*li ho messe/*messi nel frigo.
them.FEM/them.MASC have put-FEM/put-MASC in the fridge
'I have put them in the fridge'

To strengthen a bit this point, note that in German pronominal reference in the case of human referents may follow either the grammatical or the natural gender pattern, while this is impossible with nonhuman animates where only grammatical gender prevails:

(9) a. Ich sah [das Mädchen]$_i$, als es$_i$/sie$_i$ hereinkam.
I saw the.NEUT girl when it/she came in

(9) b. Ich sah [das Mutterschaf]$_i$, als es$_i$/*sie$_i$ den Weidezaun übersprang.[5]
I saw the.NEUT mother ewe, when it/she the fence jumped

Examples of this sort can be multiplied at will by just giving a quick look at grammatical gender languages; typical examples of this sort are certain nouns denoting titles in Catalan, French, Italian and Spanish like *Santedat/Majestat, Sainteté/Majesté, Santità/Maestà, Santidad/Majestad* ('holiness/majesty') or the French and Italian *sentinelle/sentinella* ('sentry, guard') which in general take feminine agreements but may be coindexed with masculine personal pronouns when they have male referents.[6]

Second, number variation must remain fixed within grammatically specified domains. This is particularly striking with collective nouns in English. In discourse, there is nothing to stop a speaker from employing a new index for an old referent, as exemplified in (10):

(10) The faculty just voted itself a rise. Most of them were already overpaid to begin with.

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[5] The fact that the compound *Mutterschaf* is neuter is due to a rather regular rule in German morphology, according to which a word inherits the gender of the rightmost noun in compounding, or affix in derivation (e.g., derived words in *-ung* or *-keit* are always feminine, while derived words in *-chen* are always neuter). Thus, from *Mutter* ('mother', feminine) and *Schaf* ('ewe', neuter) we have the neuter compound *Mutterschaf*.

[6] See Corbett (1991:Ch. 8) for more data and discussion of the possible agreement patterns these nouns—that he terms *hybrid nouns*—may induce. In fact, Corbett observes that agreement with these nouns is subject to a hierarchy of agreement targets such that agreement in the natural gender is more likely to occur as we move rightwards along the hierarchy. Corbett's hierarchy of agreement targets is given in (i):

(i) attributive < predicate < relative pronoun < personal pronoun

Note that the leftmost element in the hierarchy corresponds to the target of our morphosyntactic agreement, while the others correspond to targets of our index agreement. Given the fact that agreement with attributive targets hardly ever allows agreement in the natural gender, we may take this as supporting our two-way distinction of agreement relations; see below for further discussion.

Now, (10) would be accounted for by a semantic theory of agreement just in the same way that this theory would account for the fact that both (5a) and (5b) are possible in English. The problem for this theory, however, will be to explain why (11a) and (11b) are impossible:

(11) a. *The faculty is voting themselves a rise.

b. *The faculty are voting itself a rise.

That is, it is not clear what sort of semantic constraints could be invoked here, apart from (some formulation of) principle A of binding theory, which requires that anaphors be coindexed with their antecedents in certain *syntactic* environments. Similar observations hold for gender variation in connection with the possibility of referring to boats and ships in English with both neuter and feminine pronouns (cf. ***The ship lurched, and then she righted herself/*itself*** vs. ***The ship lurched, and then it righted itself/*herself***).

Third, polite pronous in several languages may involve plural agreement properties, but singular reference (e.g., French *vous* and German *Sie*); they may require third person agreement but still refer to the hearer in the discourse situation (e.g., Italian *lei* and German *Sie*); or may be formally feminine but able to refer to masculine entities (e.g., Italian *lei*). Note that in these cases mismatches arise depending on which properties different agreeing constituents are sensitive to:

(12) a. Vous êtes/*es belle/*belles, mademoiselle.
You-POL be-2ND.PL/be-2ND.SG beautiful-SG/beautiful-PL, lady

b. Sr. Rossi, lei è stato eletto direttore.
Mr Rossi, you-POL have-3RD.SG been-MASC elected-MASC director

c. *Sr. Rossi, lei è stata eletta direttore.
Mr Rossi, you-POL have-3RD.SG been-FEM elected-FEM director

On the light of the previous discussion, it seems that a theory capable of capturing the diversity of possible agreement relations must be somewhat more complex in the sense that it has to be able of encompassing both the semantic and syntactic (and perhaps pragmatic; see footnote 2) factors that are involved in agreement relations. That is, a theory of agreement cannot be either purely semantic or purely syntactic.

1.2. The Origins of Morphosyntactic and Index Agreement

In the previous subsection we tried to motivate the need for a theory of agreement which is not based only on purely syntactic or purely semantic considerations. Here we would like to elaborate on this conclusion by providing some additional evidence for the claim that at least two different types of agreement relations must be recognized.

An interesting point in this connection is made by Lehmann (1988). He observes that morphosyntactic agreement may involve the grammatical categories of number, gender, case and perhaps a few more, but, crucially, never involves person. Similarly, index agreement may involve number, gender, person and possibly other categories, but, again crucially, never involves case. The latter point, but not the former, is also made by Pollard and Sag and follows from their theory of agreement. This is not only supported by a wide range of cross-linguistic evidence, but there even seems to be an explanation for it to be so. The explanation is that diachronically each type of agreement arises from a different source. For example, Lehmann (1988:59) writes:

> This situation has definite diachronic correlates. The most important and most regular diachronic source of agreement is pronominal anaphora (including cataphora). More precisely, agreement markers usually stem from pronouns. However, given the referential and morphological differences between internal [i.e., morphosyntactic; SBR] and external [i.e., index; SBR] agreement, we can anticipate that they usually come from different kinds of pronouns. The markers of internal agreement are grammaticalized from weakly deictic demonstrative

pronouns, while the markers of external agreement are grammaticalized from personal pronouns.

Thus, if morphosyntactic agreement developed from the grammaticalization of demonstrative pronouns (which do not show a person distinction), while index agreement developed as the grammaticalization of personal pronouns (which do show a person distinction), we have an explanation for the fact that the former, when attested in some language, never involves person agreement and the latter, again, if overtly attested, involves, at least person agreement. This conclusion is currently held by numerous researchers who have provided ample evidence for one or the other process; see, for example, Greenberg (1978), Givón (1976), Wald (1979) and Marchese (1988), but also Moravcsik (1978), who expresses some doubts on the generality of the process.

An interesting side-effect of this hypothesis is that, if we are dealing with different phenomena, each with a distinct historical source, then they need not necessarily be synchronically attested in all languages; some may present both, but others one or the other, or even none of them. This seems in fact to be the case as the previously cited studies note in their consideration of a wide range of data; for example, Greenberg (1978:78) cites the case of Thai, whose numeral classifier system has spread into the demonstrative first and now it is beginning to show into some adjectives, such that true agreement phenomena begin to appear. In Thai, however, as in most East Asian languages like Chinese and Japanese, there is no trace of even an incipient system of (overt) subject-verb agreement.[7]

Another important point to consider within this perspective is the putative connection between subject-verb agreement, identification and government. If agreement markers originate from a grammaticalization process in which personal pronouns in a specific topicalization construction

[7] And possibly won't, if Givón (1976:151) is right in his prediction that "languages which use zero anaphoric pronouns and in particular do not use anaphoric pronouns in topic-shift constructions, will not develop subject-verb or object-verb agreement."

become incorporated onto the verb, as the full NP topic that was coindexed with the pronoun is reanalyzed as a subject (or an object, depending on the argument that was topicalized), the connection of agreement and identification with government is only indirect. In other words, if the process we are describing can be abstractly represented as in (13) (borrowed from Givón (1976:155)):

(13) The man, he came ⇒ The man he-came
TOP PRO SUBJ AGR

then, what is originally governed is the pronoun, not the NP, while agreement between that NP and the pronoun already exists and it still holds once the topic has been reanalyzed as a subject; government is a by-product of the reanalysis process and it cooccurs with agreement in the final stage, but it cannot be considered the trigger of agreement.

I will take these considerations, and further evidence that we will discuss presently, to be sufficient for keeping the two agreement phenomena separate and for a revision of Pollard and Sag's original proposals such that the possibility to enter into syntactic and/or index agreement relations is directly reflected in the internal structure of signs.

Space reasons prevent us from providing a theoretical synopsis of the HPSG framework; for a general overview the reader is referred to Pollard and Sag (1987), the most comprehensive presentation of the theory published so far. Here we follow the modified framework as set forth in Pollard and Sag (in press), of which Pollard and Sag (1992) and Sag and Pollard (1991) constitute a fairly detailed introduction. In this paper I will follow the usual HPSG conventions for the representation of signs: attribute-names will be set in small capitals (e.g., SYNSEM), sort-names in small italics (e.g., *phrase*), and signs are represented in the Attribute-Value Matrix (AVM) format where complex features are enclosed in square brackets ([]), lists are denoted by sequences of ordered elements enclosed in angle brackets (<>) and sets by sequences of elements enclosed in curly brackets ({}); structure sharing is represented by

cooccurrence of numbered, boxed tags (e.g., [1]). Other abbreviatory conventions will be introduced and explained as needed.

2. A Two-Layer Theory

In this section I would like to consider some of the facts concerning agreement phenomena on the light of the HPSG theory of agreement. I think that a theory of agreement like the one developed by Pollard and Sag (1988; in press), where the grammatical features that participate in agreement relations are part of referential indices, constitutes an ideal point of departure for our purposes. Pollard and Sag's theory is however not without problems and we will argue that it need be qualified in order to capture the facts observed above as well as some others that we will introduce here.

We would like to propose that all categories which show some inflectional behavior contain an additional level of information where the appropriate morphosyntactic categories are represented. In particular, we will argue for the introduction of a new feature INFL in the HEAD features of signs, which gathers the information that intervenes in morphosyntactic agreement patterns and which, in the case of nouns, will appear in addition to the INDEX specification found in the CONTENT attribute. Thus, for example, in our system nouns would look roughly as follows:[8]

(14)
$$\begin{bmatrix} \text{PHON} \\ \text{SYNSEM}|\text{LOCAL} \begin{bmatrix} \text{CAT}|\text{HEAD}|\text{INFL} \begin{bmatrix} \text{PERS} \\ \text{NUM} \\ \text{GEN} \\ \text{CASE} \end{bmatrix} \\ \text{CONT}|\text{INDEX} \begin{bmatrix} \text{PERS} \\ \text{NUM} \\ \text{GEN} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

[8] I follow the abbreviatory convention of representing feature-paths as sequences of attribute-names separated by a vertical bar.

Similarly with verbs, adjectives and determiners, although these, being functor categories, will strictly speaking not introduce an INDEX by themselves, but will be able to require that their arguments (i.e., those categories selected by their COMPLS, SUBJ, SPEC or MOD attributes) bear specific INDEX and/or, as we will argue, INFL values. Of course, this is a rough and ready characterization of what we intend here. First, it is clear that the internal structure of INFL will be susceptible of both cross-categorial and cross-linguistic variation. For example, the INFL we have given in the AVM above would be appropriate for personal pronouns in languages like German or Spanish—and even not for all of them, since not all German and Spanish personal pronouns show a gender distinction. It will obviously not do for common nouns, since common nouns in these two languages cannot be said to inflect for person (although they presumably introduce third person indices) nor for gender.[9] In addition, Spanish nouns should not have CASE in INFL, while German may require an additional DTYPE (declension type) attribute. Similarly, German and Spanish verbs should only be specified for NUM and PERS, while also GEN will be appropriate for Arabic, and some verbal forms in Slavic languages like Polish or Russian. Furthermore, here we have mentioned nouns, verbs, adjectives and determiners as categories with INFL, but this is not universal. Prepositions in Celtic languages should have an INFL as well, while it is likely that English adjectives lack it altogether. Thus, it is obvious that INFL is sorted and that the sorting is category- and language-specific. We will not attempt here any characterization of how this could work in some languages.

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[9] The *-a* and *-o* endings of most Spanish common nouns, even though they show an overwhelming correlation with gender (i.e., *-a* feminine, *-o* masculine) are, in all likelihood not gender markers. There are several reasons for this: one is that not all nouns ending in an *-o* are masculine (e.g., *radio* 'radio') nor all nouns ending in an *-a* are feminine (e.g., *poeta* 'poet'); another is that Spanish has nouns ending in other vowels such as *-i, -u, -e* with no systematic correlation with gender; finally, Spanish nouns may end in a consonant as long as it belongs to those consonants capable of occupying a syllable-final position (e.g., *-n, -d, -j, -z*). It seems that the presence of these final vowels can be explained on morphophonological grounds; see Harris (1991) who calls these vowels 'word markers'. I leave open the question whether affixation of *-isa*, as in *poeta/poetisa* ('poet-MASC/poet-FEM'), in Spanish or of *-in*, as in *Lehrer/Lehrerin* ('teacher-MASC/teacher-FEM'), in German is a true inflectional process or a derivational one, since it appears to share properties with both types of processes; see Carstairs (1987) for discussion.

Our proposal, then, is so far not different from that of Kathol (1991)—see also Kathol (forthcoming), who also argues for the introduction of an INFL feature with almost identical functionality as ours. We won't develop a proposal for the role that INFL plays in the morphology/phonology interface, but we are willing to accept Kathol's suggestion that the PHON value of a lexical entry is functionally dependent on its INFL and STEM values, such that signs of sort *word* would look as in (15):[10]

(15)
$$\begin{bmatrix} \text{PHON } f([1],[2]) \\ \text{SYNSEM|LOC|CAT|HEAD|INFL } [1] \\ \text{STEM } [2] \end{bmatrix}$$

2.1. Why Two Layers?

There are a number of arguments in favor of introducing this apparent redundancy in the representations. Kathol (1991) cites some, including NP-internal agreement in German which is by and large his main argument and the one he devotes most space to. We will not review it here, for which the reader is referred to Kathol's work, but we will mention some of the other arguments he gives in his paper.

2.1.1. French Polite Forms. Kathol's first observation concerns the analysis that Pollard and Sag (in press) give of predicative constructions with polite forms in French as that shown in (16):

(16) Vous êtes belle.
you-POL are-2ND.PL beautiful-SG.FEM

[10] Actually, Kathol argues for stating the link between STEM, INFL and PHON as a relational constraint. We will not make a decision in one or another direction here. Moreover, the fact that there is a relation between the different levels of morphophonological information may be a property of the sort *word*, but it may be preferable to state it as a property of its subsorts, since the operation need not be the same for the different categories; see Kathol (forthcoming) for details.

Pollard and Sag's analysis of this construction runs as follows: the polite pronoun *vous* introduces a second person plural index (plus all pragmatic information necessary to indicate that the speaker is honoring the addressee); the verbal form *êtes*, being a second person plural form requires that its subject have a second person plural index. Thus, index agreement between the verb and the subject holds. The problem is accounting for the agreement between the pronoun and the predicative adjective, since the latter is singular, and the former is plural. Pollard and Sag's solution is to assume that predicative adjectives in French introduce no specification for number, but only for gender, while imposing the condition that the index be anchored to a nonaggregate (i.e., singular) or an aggregate (i.e., plural) entity; thus, the adjective and the pronoun show index agreement in gender but *pragmatic* or *anchoring-conditions* agreement in number.

Kathol finds this account counterintuitive for several reasons. First, Kathol notes (1991:4), "... there is no sense in which a functor category can be specified for particular features other than that it requires that these features be on the index of the specific argument (e.g., the subject) that it is said to be in agreement with." This view is, according to Kathol, against the widely accepted idea that agreement involves some sort of covariation in the form of both the target and the controller of an agreement relation, which is, precisely, what makes it different from government. In Pollard and Sag's analysis nothing of this sort is reflected, which is tantamount to treating agreement as a form of selectional restriction.

As Kathol shows, (16) can be given a much more simple analysis within the two-layer approach. His first assumption is that subject-verb agreement in French is morphosyntactic, i.e., at the INFL level, while agreement with predicative adjectives is semantic, i.e., at the INDEX level. Thus, both *vous* and *êtes* have second person plural INFLs, and agreement between them is indicated by INFL-sharing. On the other hand, the predicative adjective introduces a feminine singular index, which is shared with the index of the pronoun, thus making it 'semantically' singular, while it is 'morphosyntactically' plural.

2.1.2. Impersonal Verbs. Another difficulty for the one-layer approach of Pollard and Sag arises with impersonal forms of verbs, as in the German impersonal passive that Kathol gives as an example:

(17) An dem Abend wurde viel gelacht.
During that evening was much laughed

Here, *wurde* does not select for a subject NP, and presumably there is no subject-verb agreement of any sort, consequently the relation Pollard and Sag assume that exists between the morphological form of a verb and the INDEX of the subject it selects does not obtain. However, impersonal passives are systematically third person singular. Clearly, this is no problem for the two-layer theory, which need only state that impersonal forms of verbs have a third person singular INFL. Similar considerations apply for impersonal forms in other languages like *hay* ('[there] is/are') in Spanish.

2.1.3. Reference Transfer in German. Finally, Kathol observes that not all languages show the same behavior as English in reference transfer situations as exemplified in (18):

(18) The hash browns at table six wants to pay his check.

Where the subject is morphologically plural but 'agrees' with a singular verb. German, for example, requires number agreement between subject and verb, as shown in the following example taken from Kathol's paper:

(19) Die Bratkartoffeln an Tisch 7 *will/wollen bezahlen.
The.PL.NOM home fries at table 7 want.SG/want.PL to pay

Thus, even if the INDEX of the NP *die Bratkartoffeln an Tisch 7* is singular or restricted to be anchored to a nonaggregate entity due to a reference transfer process, its INFL must remain plural and be shared with that of the verb to insure morphosyntactic agreement.[11]

To all the arguments above due to Kathol, we would like to add some more in support of the two-layer theory.

2.1.4. Verb Inflection in Gyarong. In recent work, S. Anderson (Anderson, 1992) provides an example of inflection in the Tibeto-Burman language Gyarong that supports the two-layer theory of agreement. In his discussion, Anderson observes:

> In this language, a third person NP that is the Subject of a transitive Verb is marked for Case as ergative. The Verb itself is marked for a first- or second-person argument, regardless of that argument's role. Finally, when the Object is 'higher' on a hierarchy of person than the Subject, another marker (glossed "DIR") appears to indicate that fact. (Anderson, 1992:99-100)

Anderson provides the following data:

(20) a. ŋa mə nasŋo-ŋ.
I s/he scold-1ST.SG
'I scold him/her'

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[11] Similar observations apply to the German equivalent of *eggs is my favorite breakfast:*

(i) Eier sind/*ist mein Lieblingsessen.
Eggs are/is my favorite food

(20) b. ŋə-njɔ mə nasŋo-č.

I-DUAL s/he scold-1ST.DUAL

'We two scold him/her'

c. ŋə-ñiɛ mə nasŋo-i.

I-PL s/he scold-1ST.PL

'We scold him/her'

d. mə-kə ŋa u-nasŋo-ŋ.

S/he-ERG I DIR-scold-1ST.SG[12]

'S/he scolds me'

e. ŋə-ñiɛ-kə ŋa u-nasŋo-ŋ.

S/he-DUAL-ERG I DIR-scold-1ST.SG

'They two scold me'

f. mə-kə ŋə-njɔ u-nasŋo-č.

S/he-ERG I-DUAL DIR-scold-1ST.DUAL

'S/he scolds us two'

He adds:

> Rules that introduce the markers /-ŋ/ "first person singular", /-č/ "first person dual" and /-i/ "first person plural" in Gyarong (as well as corresponding second person markers) refer simply to the presence of the relevant features in the Morphosyntactic Representation of the Verb, without regard to the precise structural position in which the features concerned are to be found. (Anderson, 1992:100)

Anderson's notion of 'Morphosyntactic Representation' is not too far from what we have been calling INFL here.

That is, unlike in English, in German singular agreement is also impossible in this case.

[12] I follow Anderson's conventions for the transcription of the Gyarong data, where the special marker is glossed as DIR.

Now, our interpretation of the facts described by Anderson is the following: A Gyarong verb like *nasŋo-ŋ* in (20a) has an INFL which is first person singular and selects a subject whose INDEX is first person singular too. On the other hand, the verb *u-nasŋo-ŋ* in (20d), still has the same INFL because these properties did not change; what is different is how it identifies its arguments: it selects for an ergative subject and for an object with a first person, singular INDEX. Thus, we can interpret the agreement markers as indicators of the morphological form of the verb, and the presence of the /u-/ prefix as the indication of a relation changing process which has as a consequence the modification of the agreement patterns. For example, in an analysis of ergative verbs similar to that of Kathol (forthcoming) and Pollard (forthcoming), where an ERG feature is introduced, we could say that Gyarong verbs share its INFL value with the INDEX of the NP not in the ERG list; such NP will be the subject in transitive verbs and the object in ergative (/u-/ prefixed) verbs, as shown in (21a) and (21b) respectively.[13]

(21) a.
$$\begin{bmatrix} \text{PHON } \textit{nasŋoŋ} \\ \text{SYNSEM|LOC|CAT} \begin{bmatrix} \text{HEAD|INFL } [2] \\ \text{ERG } \{[1]\,\text{NP}\} \\ \text{SUBCAT } \langle \text{NP}_{[2]}, [1] \rangle \end{bmatrix} \end{bmatrix}$$

b.
$$\begin{bmatrix} \text{PHON } \textit{unasŋoŋ} \\ \text{SYNSEM|LOC|CAT} \begin{bmatrix} \text{HEAD|INFL } [2] \\ \text{ERG } \{[1]\,\text{NP}\} \\ \text{SUBCAT } \langle [1], \text{NP}_{[2]} \rangle \end{bmatrix} \end{bmatrix}$$

[13] In lists we use the traditional category labels NP, VP, etc., to denote objects of the corresponding categories. When additional LOCAL features are needed, these are added, following the GPSG practice, enclosed in square brackets next to the category label; subscripted tags denote the CONTENT values of elements in a list, in this case the INDEX of the NPs. Thus, in (21a) the occurrence of the tag [2] indicates that the INFL value of the verb is shared with the INDEX value of the NP in the ERG list. This latter convention will often alternate, for typographical reasons, with the practice of specifying CONTENT values after a colon. For example NP[*plu,masc*][*1st,plu,masc*] and NP[*plu,masc*]:[*1st,plu,masc*] are both equivalent representations for an NP with a masculine plural INFL and a first person plural masculine INDEX. Moreover, I assume, for the sake of the argument, Pollard's (1990) proposal that only nonfinite forms of verbs have a SUBJ and a COMPLS list instead of a SUBCAT list, although in Balari (1992) I argue for extending it to all forms of verbs.

Note, moreover, that with this two-layer analysis we avoid having to assume that /-ŋ/ in (20a) is a subject marker, but an object marker in (20e).

Clearly, a two-layer approach like the one outlined here requires that something be said about what the relation is between the INFL value of a functor category and the INFL and/or INDEX values of the arguments it agrees with. Kathol explicitly assumes that this relation is structure sharing of (the relevant parts of) the INFL of the functor with (the relevant parts of) the INDEX or the INFL of the agreed with argument. Kathol acknowledges however that this relation is not cross-categorially nor cross-linguistically systematic, that is, not all categories and not all languages will show the same pattern of sharing. For example, his analysis of English subject-verb agreement assumes that the INFL value of the verb is shared with the INDEX value of the subject, but no constraint is imposed on the subject's INFL value. On the other hand, German follows a different agreement pattern, namely INFL with INFL sharing, with no constraints on the INDEX of the subject. Similarly, as Kathol's analysis of French polite forms in copulative constructions seems to indicate, French parallels German as far as the subject-verb agreement pattern is concerned (i.e., INFL and INFL sharing), but English in the subject-predicative adjective agreement pattern (INFL and INDEX sharing).

One question Kathol does not explicitly address in his work is whether there also is a systematic relationship between the INFL and the INDEX of nouns. That is, is there any direct relation between the morphosyntactic form of a noun and the index it introduces? The answer to this question seems to be no, on the light of the examples of reference transfer, polite forms etc. Thus, it seems that we must assume that in nouns there is free covariation of INFL and INDEX values, but not sharing. One could argue however that this is not sufficient evidence, since reference transfer and polite pronouns may be considered relatively peripheral phenomena where pragmatic considerations override grammatical principles. We should be able to find an example in which no such pragmatic considerations could be invoked. A good example of this kind would be one where some nominal element shows morphosyntactic and index agreement at the same time. In this case, if we assume that there is sharing between INFL and INDEX of the nominal we would predict that both agreement relations will involve the same features; i.e., for

example, if there is morphosyntactic agreement in the feminine singular, coindexation will be with an element showing exactly the same values for number and gender. On the other hand, if no sharing is assumed we will predict the possibility that mismatches arise between index and morphosyntactic agreement. I think that the latter prediction is confirmed by constructions involving possessive pronouns in several languages. My examples will be drawn from Spanish, but similar considerations apply, as far as I can tell, for Catalan, French, German, Italian and Portuguese.

2.1.5. Possessives. Spanish possessive pronouns always show (morphosyntactic) agreement in number—and often gender—with the possessum; at the same time, they may be coindexed with a superordinate constituent denoting the possessor: in this case, index agreement involves person and number, but may involve gender too if the possessive is coindexed with a personal pronoun, since Spanish only fails to exhibit a gender distinction in the first and second person singular pronouns (i.e., *yo* 'I' and *tú* 'you.SG').[14] Consider the following examples first, where possessives are set in boldface:

(22) a. He$_i$ perdido **mis**$_i$ notas.
[I] have lost **my** notes

b. He$_i$ perdido **mi**$_i$ libro.
[I] have lost **my** book

c. Hemos$_i$ vendido **nuestra**$_i$ casa.
[We] have sold **our** house

[14] The possessive system in Spanish is defective in the third person and some distinctions are not made, whereas other Romance languages make them. Spanish only has two forms, *su* (singular) and *sus* (plural), which only mark the plurality of the possessum, while both are used indistinctively for singular and plural possessors. Compare with Catalan: *seu, seva, seus, seves* (singular possessor) vs. *llur, llurs* (plural possessor); French: *son, sa, ses* (singular possessor) vs. *leur, leurs* (plural possessor); and Italian: *suo, sua, suoi, sue* (singular possessor) vs. *loro* (plural possessor). Note that Catalan and Italian make a four way distinction in one-possessor pronouns depending on the number and gender of the possessum, while French has lost the gender

(22) d. Hemos$_i$ vendido **nuestros**$_i$ libros.

[We] have sold **our** books

The possessive pronouns in (22a, b) are, in some sense, singular, since they belong to the paradigm of the first person singular pronouns including *yo* (strong, nominative), *mí* (strong, oblique), *me* (weak, accusative or dative) and *mío, mía, míos, mías* (strong, possessive). In fact, they 'agree' with the null subject (indicated by coindexation with the inflected auxiliary), which is also first person singular. On the other hand, the possessive in (22a) is plural and it obligatorily agrees in number with the noun *notas*, while that in (22b) is singular and agrees with the noun *libro*. Similarly with the possessives in (22c, d) which are, in some sense, plural, belonging to the paradigm of the first person plural pronouns: *nosotros/nosotras* (strong, nominative or oblique; masculine/feminine), *nos* (weak, accusative or dative) and *nuestro, nuestra, nuestros, nuestras* (strong, possessive). They show index agreement with the null subject and morphosyntactic agreement with the noun, the latter involving also gender in this case. Note that in Pollard and Sag's theory of agreement the only alternative is to analyze possessives like *mis* as introducing a first person singular index and selecting, through the SPEC attribute, an N' with a plural index; again this kind of solution is subject to the very same criticisms that we mentioned above concerning the analysis of French polite forms in predicative constructions: technically, agreement is reduced to a form of selectional restriction, and the observation that possessive-noun agreement, for example, shows alliterative concord (Corbett, 1991), whereas subject-verb agreement doesn't becomes a mere accidental fact of Spanish agreement and morphology. I would like to suggest that *mis* has the following representation:

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distinction in the plural; on the other hand, both French and Catalan make a number (but not gender) distinction in the more-than-one-possessor pronouns, while Italian doesn't.

(23)
$$\left[\begin{array}{l}\text{PHON } \textit{mis} \\ \text{SYNSEM|LOC}\left[\begin{array}{l}\text{CAT|HEAD}\left[\begin{array}{l}\text{SPEC } \overline{\text{N}}\left[\text{INFL}\left[\text{NUM } [1]\right]\right]:\left[\begin{array}{l}\text{IND } [2] \\ \text{REST } [3]\end{array}\right] \\ \text{INFL}\left[\begin{array}{l}\text{PERS } 1st \\ \text{NUM } [1]\,pl\end{array}\right]\end{array}\right] \\ \text{CONT|INDEX } [4]\left[\begin{array}{l}\text{PERS } 1st \\ \text{NUM } sg\end{array}\right] \\ \text{CTXT|C-INDICES|SPEAKER } [4]\end{array}\right] \\ \text{QSTORE}\left\{\left[\begin{array}{l}\text{DET } \textit{the} \\ \text{REST|IND}\left[\begin{array}{l}\text{IND } [2] \\ \text{RESTR}\left\{\left[\begin{array}{l}\text{RELN } \textit{poss} \\ \text{POSSR } [4] \\ \text{POSSD } [2]\end{array}\right]\right\} \cup [3]\end{array}\right]\end{array}\right]\right\}\end{array}\right]$$

Thus, the possessive is inflected in the first person plural and agrees in number with the N' it selects (cf. tag [1]).[15] On the other hand it introduces a first person singular index which is also a contextual index connected to the speaker of the discourse situation. In addition, following the analysis of possessive pronouns of Pollard and Sag (in press:§1.8), the possessive is also a determiner that introduces a quantifier in its QSTORE.

Let us now consider a slightly more complex example, namely, that of strong possessive pronouns. Strong forms function as NPs, they can appear isolated or preceded by an article:

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[15] The presence of a person value in the INFL of the pronoun depends on how we conceive the paradigmatic organization of the personal pronouns of a language. If we assume that pronouns are organized into paradigms along the person dimension, i.e., there are three paradigms, one for each person, then, strictly speaking, we cannot say that pronouns have person inflection and the person feature should not appear in INFL. Alternatively, we could suppose that personal pronouns are organized into a *macroparadigm* (in the sense of Carstairs (1987)) such that all forms are derived by inflection of some abstract stem; in this case, we can say that pronouns inflect for person. I included the person feature for expository purposes only and not as an indication that I support the latter view. Should one or the other view prove correct for the morphological analysis of personal pronouns, our representation will be able to capture this; the person feature might as well be absent and our arguments would not be affected by this fact. For the purposes of this paper, I will continue to include person features in the INFL of pronouns.

(24) a. Estos libros son (los) míos.
These books are (the) mine

b. Había muchos libros en la sala, pero los míos habían desaparecido.
[There] were many books in the room, but the mine had disappeared

There are a few things to note here. First, the pronoun shows syntactic agreement in number and gender with the article (which is optional in the predicative construction). Second, it is coindexed with a previously mentioned NP, *estos libros* in (24a) and *muchos libros* in (24b), which are both masculine plural. Third, the NP *los míos* in (24b) is a subject and it agrees with the verb in the third person plural. Fourth, the pronoun somehow carries the information that the possessor is the speaker in the discourse situation, i.e., the form used is *míos* which is a first person form and not, say, *tuyos* which is a second person form. Thus, the pronoun is morphologically first person plural and masculine; it introduces a masculine plural index, but no specification for person, since it can agree with a third person verb;[16] and it introduces a first person singular contextual index which indicates that the possessor is the speaker of the discourse situation. Thus, the representation of a strong possessive form like *míos* should look more or less like this:

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[16] This information is supplied by the NP it is coindexed with and/or the verb it is a subject of, since parallel examples to (24) are ungrammatical with first person (cf. (i a)) or second person (cf. (i b)) agreement:

(i) a. *Había muchos libros en la sala, pero los míos habíamos desaparecido.
[There] were many books in the room, but mine had-1ST.PL disappeared

b. *Había muchos libros en la sala, pero los míos habíais desaparecido.
[There] were many books in the room, but mine had-2ND.PL disappeared

But nothing prevents a strong form from being coindexed with a second person NP, as in the following example which could be uttered by a rather possessive lover to his/her partner:

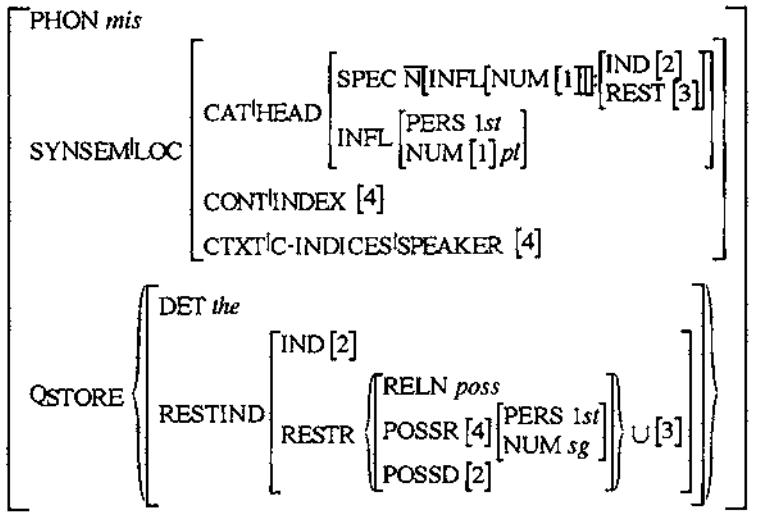
(ii) Tú eres mío/mía.
You are mine-MASC/mine-FEM

(25)
$$\begin{bmatrix} \text{PHON } \textit{mios} \\ \text{SYNSEM|LOC} \begin{bmatrix} \text{CAT|HEAD|INFL} \begin{bmatrix} \text{PERS } 1\textit{st} \\ \text{NUM } \textit{pl} \\ \text{GEN } \textit{masc} \end{bmatrix} \\ \text{CONT|INDEX } [1] \begin{bmatrix} \text{NUM } \textit{pl} \\ \text{GEN } \textit{masc} \end{bmatrix} \\ \text{CTXT} \begin{bmatrix} \text{BACKGROUND } \left\langle \begin{bmatrix} \text{RELN } \textit{poss} \\ \text{POSSR } [2] \\ \text{POSSD } [1] \end{bmatrix} \right\rangle \\ \text{C-INDICES|SPEAKER } [2] \begin{bmatrix} \text{PERS } 1\textit{st} \\ \text{NUM } \textit{sg} \end{bmatrix} \end{bmatrix} \end{bmatrix} \\ \text{QSTORE} \{\ \} \end{bmatrix}$$

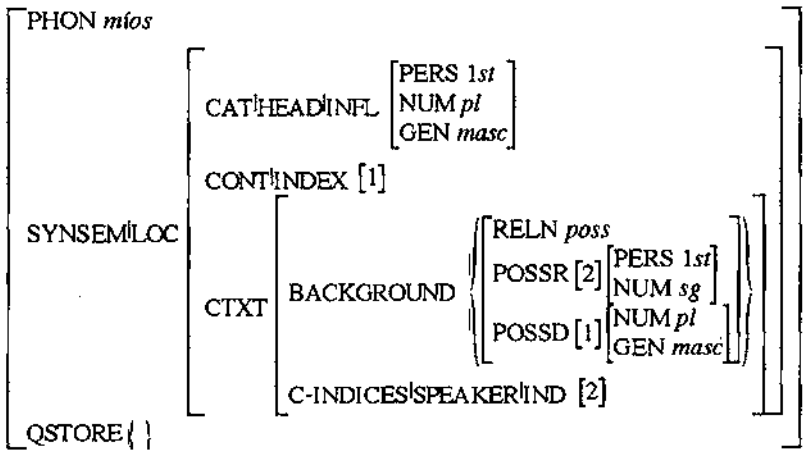
There is a crucial difference between weak possessive forms and strong possessive forms then, namely, that the INDEX introduced by weak forms identifies the POSSESSOR in the *possession* relation, while the INDEX of strong forms identifies the POSSESSED in the *possession* relation. The contextual index and the index in CONT need not (in strong forms of the possessive, must not) be shared. Therefore, our representation of the weak and strong pronouns in (23) and (25) can be made a bit more perspicuous and be modified as follows:[17]

[17] Formally the AVMs in (26) and (27) are equivalent to those in (23) and (25), respectively, in virtue of structure sharing. However, these lexical entries are in some sense 'derived', either by inflection or some other mechanism capable of capturing the generalization that *mis* and *mios* are morphologically related with each other and perhaps with other first person pronouns (for example within a macroparadigm). With this in mind, our representations in (26) and (27) better express the idea that the information in the indices 'originates' as the values of the arguments of the *possession* relation such that whatever morphological process is responsible of the derivation of the strong and weak forms is also responsible of establishing the appropriate sharings, which we assume to be predictable.

(26)



(27)



Note that the only observable paradigmatic regularity in personal pronouns is that the person value of the contextual index has a morphological reflex (but see footnote 15), that is, we might assume that there is structure sharing between the PERS feature in INFL and the PERS feature in the contextual index.[18]

[18] As pointed out by Klaus Netter (p.c.), there seems to be some redundancy in these representations, since the CONTENT of the possessive is always structure shared with either the POSSESSOR or the POSSESSED of the *possession* relation. This suggests a possible refinement in the analysis of nouns such that their CONTENT is in fact a relation (*possession* in the case of possessives) instead of just an INDEX; thus, the referential index

In conclusion, then, it seems that the relation between INFL and INDEX in nominals is in general a rather weak one. In fact, while the relation between INFL and some morphophonological form is rather systematic—which we insure by assuming that PHON is functionally (or relationally) dependent on INFL and STEM—the index is subject to much more variability dependending on lexical, syntactic or semantic/pragmatic factors.

3. A Revised Two-Layer Theory

In the previous section we tried to motivate the need for a system where the grammatical features that participate in agreement relations are represented in two independent layers at different levels of representation, i.e., a morphosyntactic level (INFL in HEAD) and a semantic level (INDEX in CONTENT).[19] We were thus defining the two different loci at which the different agreement relations are supposed to occur; in this connection we observed that, since the two agreement relations are different phenomena and that may involve different kinds of information, the connection between INFL and INDEX in nominals is rather weak, that is, the presence of a certain value for an INFL-feature does not necessarily mean that the parallel feature in INDEX will instatiate the same value. In other words, we argued against sharing of INFL and

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introduced by nominals will be an argument of that relation. This slightly different view would allow us to provide a unified account of the content of nouns and verbs, but would also commit us to a revision of binding theory, perhaps along the lines of recent work by E. Williams (1985; 1987; 1989). I will leave the analysis of nominals for further reasearch, but I will come back to the role of thematic relations in binding theory in the sections to come.

[19] Some clarification concerning our use of the term 'semantic' is perhaps necessary here. We conceive of the information found in the CONTENT and CONTEXT features of signs as *semantic* in the sense that it is this part of the informational structure of signs that is model-theoretically interpreted—e.g., in the language of situation theory; see Pollard and Sag (in press:Ch. 8) for details. Thus, our use of 'semantic' here would be better paraphrased as 'linguistic information that is relevant for semantic interpretation'; that is, from a model-theoretical perspective, indices are not semantic objects of any kind, but syntactic ones. In this sense, the sort of information we find in CONTENT and CONTEXT has, mutatis mutandis, the same function as LF in GB. We will keep on using the term 'semantic' with this double meaning, since its interpretation should be clear from the context.

INDEX values in nominals, which we supported with evidence coming from possessive pronouns.

As for the functionality of INFL in functor categories, we reviewed a recent proposal by A. Kathol who, within a two-layer framework similar to ours, suggested that two different relations should be recognized between the INFL of a functor and the agreement features of its arguments. One possible relation is that the INFL of the functor is shared with the INFL of the argument, whereas the other possible relation is sharing between the INFL of the functor and the INDEX of the argument. That is, according to Kathol, certain functors are capable of identifying the INFL of their arguments, while other functors are capable of identifying the INDEX of their arguments. For the sake of clarity, I will give a name to the two patterns Kathol describes: I will term the former *Morphosyntactic Identification* (henceforth MI) and the latter *Index Identification* (henceforth II). Thus, and using our terminology, Kathol argues that the pattern that governs subject-verb agreement in German and French is MI, while English subject verb-agreement and agreement with predicative adjectives in French involve II.

However, even though I think Kathol is right in postulating these two agreement patterns, I disagree with his interpretation of the data. In particular, I would like to suggest that MI is the pattern attested in morphosyntactic agreement, while II is the one attested in index agreement. According to this hypothesis, German and French subject-verb agreement does not involve MI, as Kathol suggests; therefore, the differences in behavior wrt reference transfer, singular plurals, etc., between English, on one hand, and German and French on the other must be accounted for by some other mechanism which we believe to be closely connected to the phenomenon of null subjects. A precise characterization of this latter problem is beyond the scope of this paper, but see Balari (1992) for a first attempt of an explanation based on diachronic factors. Here we will limit ourselves to further motivate our distinction between morphosyntactic and index agreement as instantiations of MI and II respectively.

Our first criticism of Kathol's proposals is that it is very difficult to explain why subject-verb agreement should be MI in some languages but II in others, the only available explanation

being, as far as I can tell, the very same reasons that Kathol assumes motivate the postulation of the two patterns: in this sense, the argument appears to be circular. Furthermore, if both MI and II may characterize subject-verb agreement, our observations of section 1.2 concerning the synchrony and the diachrony of agreement phenomena would be very difficult to accomodate: for example, the fact that subject-verb agreement originates as a pronoun-antecedent relation, that is, as an instance of index agreement.

Finally, it seems that a theory of agreement along the lines of Kathol's is doomed to fall into serious problems with certain phenomena. Our example comes from a recent paper by R. Ingria (Ingria, 1990), who presents it as a puzzle for unification-based theories of agreement.

Ingria is concerned with the well-known Hungarian verbal paradigms which have different forms depending on the definiteness properties of the accusative complement, i.e., it appears that we can say that in Hungarian the verb shows definiteness agreement with the object. The first set of data illustrates this point:[20]

(28) a. Akart egy könyvet.
[He] wanted.UNDEF a book

b. *Akarta egy könyvet.
[He] wanted.DEF a book
'He wanted a book'

c. *Akart a könyvet.
[He] wanted.UNDEF the book

d. Akarta a könyvet.
[He] wanted.DEF the book
'He wanted the book'

[20] All Hungarian data and their glosses are taken from Ingria's paper.

This pattern is preserved under extraction of the object, such that, for example, the relative pronoun (*amit* or *amelyiket*; 'which' –DEF and +DEF, respectively) agrees in definiteness with the verb:

(29) a. Egy könyv amit akart.
A book which.UNDEF [he] wanted.UNDEF

b. *Egy könyv amit akarta
A book which.UNDEF [he] wanted.DEF
'A book which he wanted'

c. Ez az a könyv amelyiket akarta.
This that the book which.DEF [he] wanted.DEF

d. *Ez az a könyv amelyiket akart.
This that the book which.DEF [he] wanted.UNDEF
'This book is the one which he wanted'

Sentential objects (*hogy*-clauses) require a definite matrix verb form, as shown in (30):

(30) a. János akarta, hogy elhozzak egy könyvet.
János wanted.DEF that [I] bring.UNDEF a book

b. *János akart, hogy elhozzak egy könyvet.
János wanted.UNDEF that [I] bring.UNDEF a book
'János wanted me to bring a book'

Then Ingria (1990:197) writes:

> WH phrases and topicalized constituents in Hungarian typically appear immediately preceding the verb; verb and WH word or topicalized phrase must agree in definiteness.

According to the examples Ingria gives, our interpretation of that description of the facts is the following: a fronted WH-phrase, when extracted from a clausal complement, must have the same definiteness as the matrix verb; since verbs with clausal objects are always definite, it follows that indefinite NPs cannot be long-extracted. These are Ingria's examples:

(31) a. Ez az a könyv amelyiket akarta hogy elhozzam.
This that the book which.DEF [he] wanted.DEF that [I] bring.DEF
'This is the book which he wanted me to bring'

b. *Egy könyv amit akarta hogy elhozzak.
A book which.UNDEF [he] wanted.DEF that [I] bring.UNDEF
'A book which he wanted me to bring'

Unfortunately, this generalization is false, since, as Ingria observes, there are situations in which long-extraction of an indefinite NP is possible. These crucially involve verb forms which are morphologically ambiguous as far as definiteness is concerned.[21] Consider (32):

(32) a. A könyv amit akarnánk, hogy elhozzon.
The book which.UNDEF [we] would-want that [he] brings.UNDEF
'The book which we would want him to bring'

b. Egy könyv akartam, hogy elhozzon.
A book [I] wanted that [he] brings.UNDEF
'It was a book that I wanted him to bring'

In (32a), the WH-phrase *amit* is –DEF, as is the subordinate verb *elhozzon*. The matrix verb *akarnánk* could be either –DEF or +DEF. Although Ingria is not more explicit about this latter point, I take it to be an indication that both *akarnánk a könyvet* ('[we] would want the book') and *akarnánk egy könyvet* ('[we] would want a book') are grammatical in Hungarian. Similarly with (32b) where the topicalized NP *egy könyv* is –DEF as it is the embedded verb *elhozzon*,

[21] The first person singular past indicative and the first person plural present conditional.

while the matrix verb *akartam* could be either. Now, Ingria considers this to be a terrible puzzle for a unification-based theory of agreement because the WH or the topicalized phrase and the *hogy*-clause induce contradictory values for definiteness into the matrix verb. Let us consider how Kathol's theory would handle the Hungarian facts.

In the two-layer approach the first thing we have to consider is whether DEF is an INFL or an INDEX feature, or both. Second, we have to see what kind of agreement pattern Hungarian verbs instantiate of the two that Kathol recognizes, namely, sharing of the relevant parts of the INFL of the functor with the relevant parts of the INFL of the argument (i.e, MI), or sharing of the relevant parts of the INFL of the functor with the relevant parts of the INDEX of the argument (i.e., II). An answer to the first question will give us an answer to the second. As for verbs, DEF must be in INFL given the correlation we assume between the values of INFL and the morphophonology of the word. As for nouns, DEF cannot be in INDEX because the HPSG analysis or relative clauses assumes coindexation (i.e., INDEX sharing) between the relative pronoun and its antecedent, but, as shown in (32), an indefinite relative pronoun may have a definite antecedent, which on the coindexation analysis would be impossible if DEF were part of the INDEX. So we conclude that DEF is an INFL feature for nouns too. Therefore, Hungarian instantiates the MI agreement pattern. But here, the two-layer theory, as presented by Kathol, has two serious problems. First, since INFL is a HEAD feature it will appear on the top node of a clause, in virtue of the HPSG analysis of complementizers as markers (i.e., as nonheads with selectional properties) and the Head Feature Principle. This will in fact predict that matrix verbs agree in definiteness with subordinate verbs, due to the sharing of INFL values between the functor and the argument, which is a false prediction; as we saw, verbs taking clausal complements are always marked +DEF regardless of the definiteness of the subordinate verb. This problem could be overcome by assuming a CP-analysis of clausal complements, i.e., one in which the complementizer is the head and is specified as having a +DEF INFL; thus +DEF marking of verbs taking clauses is insured in virtue of MI. But here the two-layer theory runs precisely into the sort of puzzle that Ingria observes. In fact, the ambiguous verbs *akarnánk* and *akartam* will be unspecified for DEF and they will instantiate the value of their complement (in

virtue of the sharing of INFL values). In the case of (32) DEF will be instantiated as + since the complement is clausal, but then filler-verb agreement, which is in all likelihood also INFL sharing, induces a contradictory value on the verb because the relative pronoun and the topicalized phrase are both –DEF.

In conclusion, in a two-layer analysis of the sort Kathol advocates, we are confronted with Ingria's Puzzle in predicting that (32) is ungrammatical because of a unification-clash.

Let us provide an analysis of the problematic Hungarian data within the two-layer theory but with a slightly different perspective. The crucial point here is that a different relation must be recognized which does not involve sharing between the INFL value of the functor with the INFL nor the INDEX of the argument. We will assume that DEF is appropriate for the INFL of both nouns and verbs.[22] Now, a Hungarian verb which is unambiguously +DEF (e.g., *akarta*) will have the following lexical entry, where only the relevant information is shown:

(33)
$$\left[\begin{array}{l} \text{PHON } \textit{akarta} \\ \text{SYNSEM|LOC|CAT} \left[\begin{array}{l} \text{HEAD|INFL} \left[\begin{array}{l} \text{PERS } 3\textit{rd} \\ \text{NUM } \textit{sg} \\ \text{DEF} + \end{array}\right] \\ \text{SUBCAT} \left\langle \text{NP}, \text{NP[+DEF]} \vee \text{S}[\textit{hogy}] \right\rangle \end{array}\right] \end{array}\right]$$

That is +DEF in the INFL of the verb indicates subcategorization for a +DEF NP *or* for a *hogy*-clause (hence the disjunctive specification in the object position of the SUBCAT list), but there is no actual sharing of values, just covariation. In the case of NPs there is covariation between DEF in the INFL of the verb and DEF in the INFL of the NP, but with clauses there is covariation between DEF in INFL of the verb and the MARKING feature of the S. In fact, since INFL is a HEAD feature, the clause will be –DEF if the embedded verb is –DEF as it happens in (32).

[22] Although this is not a necessary assumption for nouns, since we could suppose that DEF actually originates in the determiner from which the NP node inherits it. Nothing in our argument hinges on a precise analysis of the organization of information in Hungarian NPs, however.

Now, a verb which is unambiguously +DEF with a clausal complement will block extraction of a –DEF complement of the embedded verb, however we formulate the rule of DEF agreement between the filler and its sister clause—presumably as INFL sharing. On the other hand, an ambiguous verb is truly ambiguous, and has no specified value for DEF so that it can have +DEF or –DEF NP complements as well as clausal complements. The fact that it takes a clausal complement does not mean that its DEF value is instantiated as +, on the contrary, it remains unspecified; thus it will only be instantiated by agreement with the filler. This is shown in the lexical entry for the verb *akarnánk*:

(34)
$$\begin{bmatrix} \text{PHON } \textit{akarnánk} \\ \text{SYNSEM|LOC|CAT} \begin{bmatrix} \text{HEAD|INFL} \begin{bmatrix} \text{PERS } \textit{1st} \\ \text{NUM } \textit{plu} \end{bmatrix} \\ \text{SUBCAT} \langle \text{NP,NP v S}[\textit{hogy}] \rangle \end{bmatrix} \end{bmatrix}$$

Were DEF is left unspecified in the INFL of the verb[23] such that it will only receive a value in case some morphosyntactic agreement relation holds between the verb an some other constituent, as is the case of extraction. Thus, the distribution of DEF values in (32a) is actually as shown in (35):

(35) A könyv amit akarnánk, hogy elhozzon.

–DEF –DEF –DEF

Which should be compared with the distribution Ingria suggests:

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[23] Unspecification of vaules is indicated by omitting the attribute-name from the AVM representation. Its 'presence' is insured by the *appropriateness* condition on feature structures and the constraints that they must be *totally well-typed* and *sort resolved*, i.e., a feature structure has no more and no less attributes than those which have been defined as appropriate for it; see Pollard and Sag (in press:Ch. 1) for an informal characterization of these notions and Carpenter (1992) for a comprehensive development of the formal framework assumed by Pollard and Sag.

(36) A könyv amit akarnánk, hogy elhozzon.

–DEF ±DEF +DEF –DEF

Thus, our analysis of Ingria's Puzzle within the two-layer theory is based on a reinterpretation of the data. In fact, the sort of relation we have identified that holds between a Hungarian verb and its object is not an agreement relation at all, rather it is just government where the verb selects for specific INFL values of its complement. In our analysis the only agreement relations that are recognized are the one between the extracted phrase and the matrix verb and the one between the relative pronoun and its antecedent. This reinterpretation of the putative agreement relation between a verb and its complement may seem, at first sight, rather unmotivated, but, as Givón (1976) observes, one of the possible side-effects of the development of an agreement marker is the fixation of certain government patterns which are preserved even once the marker has lost its function. Presumably, then, definiteness agreement in Hungarian was originally a true agreement relation which evolved (or is evolving) toward the fixation of a government relation.

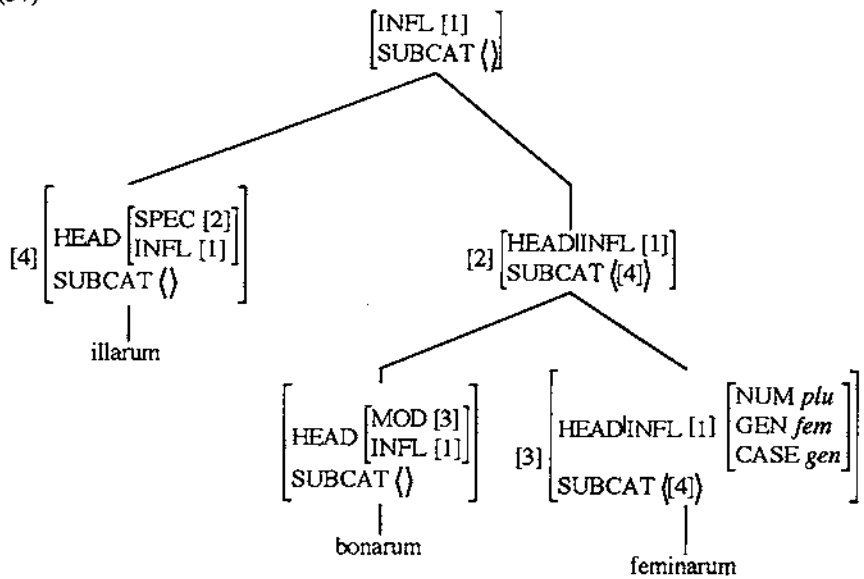
Finally, note that our reanalysis of Hungarian object-verb agreement in terms of government might be extended to the other problems Ingria discusses in his paper, which, although he refers to them as agreement phenomena, arguably all are government phenomena, namely, case assignment in German free relatives, case assignment in conjoined VPs, etc. Ingria's suggestion is that that sort of paradoxes can be overcome by assuming that in these cases no feature-unification is involved but rather just a non-distinctness check. Now, note that our analysis of Hungarian with two layers for agreement features plus disjunctive specifications in subcat lists has exactly the same effect as the formal operation performing non-distinctness checks that Ingria's presents in his paper. It appears then that the two-layer theory, as developed here, may not only provide an adequate account of agreement phenomena, but presumably also of the sort of syncretisms discussed by Ingria.

Before we conclude, we would like to provide a more precise characterization of the two types of agreement relations we have been arguing for.

3.1. Morphosyntactic Agreement

We have explicitly stated that morphosyntactic agreement involves a specific relation between the INFLs of the constituents standing in agreement with each other, namely MI. Thus, in the Latin NP *illarum bonarum feminarum* ('of those good women') all three elements share their INFLs. Let us see how (irrelevant details omitted).[24]

(37)



Where I follow standard HPSG in assuming that determiners select an N' through their SPEC feature, adjectives select an N' through their MOD feature, and nouns select a determiner through their SUBCAT feature. Observe that the only way to insure INFL sharing is by stipulating it in the lexical entry for each element. Note moreover that all three elements are functors that share their INFLs with those of their arguments. Thus, in virtue of the sharings of

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[24] Here I follow another widespread convention of using a tree-like representation combined with the usual AVM format. The branches in the tree represent the dominance relations as established in the DAUGHTERS attribute found in all phrasal-signs, with the exception of terminal nodes where dominance in the tree is to be interpreted as the value of the PHON attribute. All other conventions are the same, but the reader should bear in mind that what we represent in (37) as a tree with AVMs in its nodes is actually just one single AVM.

the various INFL features and the explicit relation we assume between INFL and the actual morphophonological form of a word, we insure that morphosyntactic agreement holds among the different constituents of the NP.

Note that morphosyntactic agreement combines two relations, namely, government, understood as selection through some subcategorization feature (i.e., MOD, SPEC, SUBCAT, etc.) of specific features, and MI, understood as structure sharing of the INFL value of the functor with the INFL value of the argument. This characterization involves the prediction that a functor may govern an argument but non necessarily agree with it morphosyntactically; similarly with the case of subjects and verbs, where we assume that government may, but need not, cooccur with index agreement.

3.2. Index Agreement

In the previous sections we explicitly assumed that subject-verb agreement should be characterized as II. Our main argument for that being its historical origin, i.e., a pronoun-antecedent relation. However, as already mentioned in footnote 6 the phenomenon of hybrid nouns and the sort of agreement patterns they induce appears to further support our view. In his detailed exposition of the problem, Corbett (1991:Ch. 8) observes that hybrid nouns (e.g., German *Mädchen* 'girl.NEUT', French *Sainteté* 'holyness.FEM', or Russian *vraČ* 'doctor.MASC') show a strong tendency to induce what Corbett terms agreement *ad formam* with attributive targets, namely, adjectives, determiners, etc., in NP internal configurations, while this tendency becomes weaker and weaker as we move rightwards in the agreement hierarchy, which we repeat here:

(38) attributive < predicate < relative pronoun < personal pronoun

Thus, already with predicate targets (i.e., subject-verb, noun-predicative adjective, etc.) agreement *ad sensum* may occur. This observation supports our conception of agreement where predicate, relative pronoun and personal pronoun agreements have been characterized as

instances of index agreement, whereas attributive agreement has been characterized as morphosyntactic agreement. Moreover, the tendency of index agreement to be influenced by semantic and pragmatic factors is not suprising given the role indices play in semantic interpretation; similarly, the almost impossibility for attributive agreement to override morphosyntactc constraints is also expected in our theory, since we assumed that it should be characterized as INFL sharing, INFL being one of the key elements in the determination of the morphophonological form of a word.

In this latter connection, Corbett's study provides even more supporting evidence for our general framework. In fact, Corbett notes that in the evolution of a language, *ad sensum* agreement may eventually spread into attributive agreement, as is the case of Russian *vrač* which may take feminine modifiers if the referent is explicitly identified as a female doctor. This is not a stable state, however, and there are two possible outcomes Corbett identifies: (a) the creation of a new gender class; (b) the change in the morphological properties of the hybrid noun so as to conform the formal gender assignment rules of the language.[25] One or another outcome depending on a variety of factors including the possibility to readjust the morphology of the noun. Thus, although we do not have a solution for the analysis of this transitory stage in which the morphosyntactc agreement pattern is violated, the fact that formal adjustments of the system only begin precisely when this violation occurs appears to be good evidence for our proposals concerning the nature of agreement relations and its splitting into two different types.

Turning then to index agreement, let us first introduce a minor qualification as to what actually has to be considered as II. Instead of assuming that II is identification of (i.e., sharing of information with) the INDEX of an NP in the SUBCAT, COMPLS or SUBJ list, I will assume that

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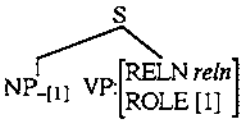
[25] For details and data the reader is referred to Corbett's work, but a rather good example of the (b) case could be the vacillation found with the Spanish forms *ministro/ministra* 'minister-MASC/minister-FEM' or *doctor/doctora* 'doctor-MAS/doctor-FEM' in morphosyntactc agreement contexts when the referent is explicitly identified as a female (cf. *La Ministro/Ministra Portavoz del Gobierno* 'The Government Spokesman/woman's Minister').

II is identification of the INDEX which is the value of some role in the content of verbs.[26] Although both alternatives appear to be equivalent—the INDEX is eventually shared with the INDEX of some NP in one of the subcategorization lists, they are not. In fact, if role assignment to NPs is ultimately to be derived by some general principle (see, for example, Wechsler (1991) for an HPSG proposal), this means that different patterns of role assignment may in some cases result in different agreement patterns as well; this is for example the case of split-ergative languages like the Gyarong case discussed above or what has been described as 'agreement with the initial 1' in Relational Grammar to capture the agreement phenomena of Achenese (Perlmutter, 1984).

Thus, subject-verb agreement is in fact coindexation between the subject NP and some role in the CONTENT of the verb, which is tantamount saying that roles of verbs may have referential properties.[27] The situation in which a subject and a verb agree can be abstractly represented as in (39):

(39)



Where the subscripted tag preceded by a dash represents the INDEX of the NP.

4. Conclusion

In this paper we have tried to motivate the separation of what is generally known as agreement into two different relations, a morphosyntactic and a semantic one that we termed, respectively, morphosyntactic agreement and index agreement. The basis for this distinction within

[26] I restrict my discussion to verbs only and gloss over the agreement relations where other functor categories participate. In addition, my considerations here should only be taken as referring to verbs with thematic subjects. For the time being I will eschew a precise characterization of impersonal and raising verbs.

agreement relations, we argued, is reflected by several properties of each relation: (a) their historical origins; (b) the sort of grammatical features that participate in each relation; (c) the different degree of availability of mismatches between target and controller (e.g., hybrid nouns).

Following Kathol (1991), to capture this observations, we proposed within the HPSG framework a two-layered representation of the grammatical features that participate in agreement relations, such that each type of agreement is analyzed as structure sharing of the morphosyntactic or the semantic reflex of these features.

In this connection we motivated a revision of the two-layer approach such that agreement between functors and arguments is better captured by assuming that, in NP-internal configurations the only possible agreement pattern is the morphosyntactic one—i.e., what we termed MI— while agreement between verbs (and predicative categories in general) and their arguments is index agreement only—i.e., II. We then showed that certain putative morphosyntactic agreement relations involving verbs and their arguments (e.g., Hungarian definiteness agreement) have to be reinterpreted as mere government relations.

In Table 1 we provide a comparison of our theory with Kathol's, where we advance some of the conclusions reached in Balari (1992b:Ch.2) with respect to certain problems that for space reasons we left unresolved here, in particular, German, French and English subject-verb agreement. In the table, the ≈ symbol between two attribute-names indicates structure sharing of their values; an arrow between two atrribute-names denotes covariation of values; a subscripted 'f' or 'a' indicates whether the attribute belongs to the functor or the argument, respectively:

[27] This conception is almost identical to that of Williams (1989).

Table 1. Two-Layer Approaches

Relation	*Two-Layer Theory (Kathol, 1991)*	*Revised Two-Layer Theory*
MI $INFL_f \approx INFL_a$	German and French subject-verb agreement.	German and Latin NP-internal agreement. Spanish possessive-possessum agreement with weak forms.
II $INFL_f \approx INDEX_a$	English subject-verb agreement. French noun-predicative adjective agreement.	Spanish, Italian, ... subject-verb agreement. Gyarong argument-verb agreement.
Government $INFL_f$ —> $INFL_a$	— — —	Hungarian definiteness agreement. German, French (English?) subject-verb agreement.

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References

Anderson, S. R. (1989) *A-Morphous Morphology*, Cambridge University Press, Cambridge.

Balari, S. (1992a) 'Agreement and θ-Roles. Towards an Account of Null Subjects in HPSG', CLAUS Report, Computerlinguistik, Universitäat des Saarlandes, Saarbrücken; In press.

Balari, S. (1992b) *Feature Structures: Linguistic Information and Grammatical Theory*, PhD Diss., Universitat utònoma de Barcelona.

Bresnan, J. (ed) (1982) *The Mental Representation of Grammatical Relations*, MIT Press, Cambridge, MA.

Bresnan, J. and S. Mchombo (1986) 'Grammatical and Anaphoric Agreement' in *Proceedings of the 22nd Regional Meeting. Parasession on Pragmatics and Grammatical Theory*, Chicago Linguistic Society, Chicago, IL.

Carpenter, B. (1992) *The Logic of Typed Feature Structures*, Cambridge University Press, Cambridge; In press.

Carstairs, A. (1987) *Allomorphy in Inflexion*, Croom Helm, London.

Corbett, G. (1991) *Gender*, Cambridge University Press, Cambridge.

Chierchia, G. (1988) 'Aspects of a Categorial Theory of Binding' in R. T. Oehrle et al. (eds) *Categorial Grammars and Natural Language Structures*, Reidel, Dordrecht.

Chierchia, G. (1989) 'Structured Meanings, Thematic Roles and Control' in G. Chierchia et al. (eds) *Properties, Types and Meaning II: Semantic Issues*, Kluwer, Dordrecht.

Chomsky, N. (1986) *Barriers*, MIT Press, Cambridge, MA.

Dowty, D. R. and P. Jacobson (1988) 'Agreement as a Semantic Phenomenon' in *Proceedings of the 5th Eastern States Conference on Linguistics*, Ohio State University, Columbus, OH.

Givón, T. (1976) 'Topic, Pronoun and Grammatical Agreement' in C. N. Li (ed) *Subject and Topic*, Academic Press, New York, NY.

Greenberg, J. A. (1978) 'How Does a Language Acquire Gender Markers?' in J. A. Greenberg et al. (eds) *Universals of Human Language 3. Word Structure*, Stanford University Press, Stanford, CA.

Harris, J. W. (1991) 'The Exponence of Gender in Spanish', *Linguistic Inquiry*, 22, 27-62.

Ingria, R. J. P. (1990) 'The Limits of Unification' in *Proceedings of the 28th Annual Meeting*, Association for Computational Linguistics, Pittsburgh, PA.

Kathol, A. (1991) 'Agreement in HPSG Revisited', Ms. Ohio State University.

Kathol, A. (forthcoming) 'Passives without Lexical Rules' in J. Nerbonne et al. (eds) *German Grammar in HPSG*, University of Chicago Press, Chicago, IL.

Lapointe, S. G. (1980) *A Theory of Grammatical Agreement*, PhD University of Massachusetts, Amherst.

Lapointe, S. G. (1981) 'General and Restricted Agreement Phenomena' in M. Moortgat et al. (eds) *The Scope of Lexical Rules*, Foris, Dordrecht.

Lapointe, S. G. (1988) 'Toward a Unified Theory of Agreement' in M. Barlow and C. A. Ferguson (eds) *Agreement in Natural Language*, Center for the Study of Language and Information, Stanford, CA.

Lehmann, C. (1988) 'On the Function of Agreement' in M. Barlow and C. A. Ferguson (eds) *Agreement in Natural Language*, Center for the Study of Language and Information, Stanford, CA.

Marchese, L. (1988) 'Noun Classes and Agreement Systems in Kru: A Historical Approach' in M. Barlow and C. A. Ferguson (eds) *Agreement in Natural Language*, Center for the Study of Language and Information, Stanford, CA.

Moravcsik, E. A. (1978) 'Agreement' in J. A. Greenberg et al. (eds) *Universals of Human Language 4. Syntax*, Stanford University Press, Stanford, CA.

Netter, K. (forthcoming) 'Morpho-Syntax of German Noun Phrases' in J. Nerbonne et al. (eds) *German Grammar in HPSG*, University of Chicago Press, Chicago, IL.

Perlmutter, D. M. (1984) 'The Inadequacy of Some Monostratal Theories of Passive' in D. M. Perlmutter and C. G. Rosen (eds) *Studies in Relational Grammar 2*, University of Chicago Press, Chicago, IL.

Pollard, C. J. (1990) 'On Head Non-Movement', Paper read at the Symposium on Discontinuous Constituency, Tilburg University, Tilburg.

Pollard, C. J. (forthcoming) 'Toward a Unified Account of Passive in German' in J. Nerbonne et al. (eds) *German Grammar in HPSG*, University of Chicago Press, Chicago, IL.

Pollard, C. J. and I. A. Sag (1987) *Information-Based Syntax and Semantics 1: Fundamentals*, Center for the Study of Language and Information, Stanford, CA.

Pollard, C. J. and I. A. Sag (1988) An Information-Based Theory of Agreement, Report CSLI-88-132, Center for the Study of Language and Information, Stanford, CA.

Pollard, C. J. and I. A. Sag (1992) 'Anaphors in English and the Scope of Binding Theory', *Linguistic Inquiry*, 23, 261-303.

Pollard, C. J. and I. A. Sag (in press) *Head-Driven Phrase Structure Grammar*, University of Chicago Press, Chicago, IL.

Rizzi, L. (1990) *Relativized Minimality*, MIT Press, Cambridge, MA.

Sag, I. A. and C. J. Pollard (1991) 'An Integrated Theory of Complement Control', *Language*, 67, 63-113.

Wald, B. (1979) 'The Development of the Swahili Object Marker: A Study of the Interaction of Syntax and Discourse' in T. Givón (ed) *Discourse and Syntax. Syntax and Semantics 12*, Academic Press, San Diego, CA.

Wechsler, S. (1991) *Argument Structure and Linking*, PhD Stanford University.

Williams, E. S. (1985) 'PRO and Subject of NP', *Natural Language and Linguistic Theory*, 3, 297-315.

Williams, E. S. (1987) 'Implicit Arguments, the Binding Theory, and Control', *Natural Language and Linguistic Theory*, 5, 151-180.

Williams, E. S. (1989) 'The Anaphoric Nature of θ-Roles', *Linguistic Inquiry*, 20, 425-456.

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