German adjective agreement in GPSG*

ARNOLD M. ZWICKY

Abstract

Determiners and adjectives in German agree with their head nouns in case, gender, and number. In addition, all adjectives have three paradigms of inflectional forms, which are traditionally called declensions: strong, weak, and mixed. Which declension an adjective occurs in depends on the determiner it combines with, a phenomenon traditionally called agreement. Section 1 presents the main facts about adjective agreement in German, in a fairly theory-neutral fashion.

In a rich theory of syntax (like classical transformational grammar) it would be easy to write rules for German which have the right effects. My purpose here is to explore how to describe German adjective agreement in the distinctly lean theory of generalized phrase-structure grammar (GPSG). Section 2 enumerates the principal features of GPSG, paying special attention to those that might figure in a description of these German data; in particular, I argue that subcategorization, agreement, and government should be distinguished in the theoretical framework.

Sections 3 and 4 attack the problem of the three adjective declensions. In section 3, several functional accounts of the distribution of forms are subjected to scrutiny and found wanting, though this discussion leads to an adequate formulation of the morphological side of adjective declension. In section 4, I argue that the phenomena should not be described entirely via (postsyntactic) morphological rules of some sort, and that they should not be treated either as subcategorization or as agreement; the appropriate GPSG analysis involves government.

1. The facts

I begin with a reasonably precise, though unformalized, account of the relevant German facts.
The language has three grammatical genders (masculine, neuter, and feminine) and two grammatical numbers (singular and plural). Only four of the six combinations of gender and number are ever morphologically distinguished: masc-sg, neut-sg, fem-sg, pl.

There are four grammatical cases: nominative (nom), accusative (ace), genitive (gen), dative (dat). These combine with the four gender/number possibilities to yield a paradigm with 16 potentially distinct NP forms in it.

I now turn to a summary of the adjective declensions (section 1.1) and the corresponding classes of determiners (1.2). Declensions of nouns are treated in section 1.3, where it is pointed out that the ‘declensions’ of nouns and determiners are lexical categorizations, whereas the ‘declensions’ of adjectives in German are imposed by constituents with which the adjective is in construction. Section 1.4 looks briefly again at the grammatical categories of gender, number, and case, in comparison to the declension categories. And section 1.5 summarizes the whole business. The data here are well known; they are surveyed in such reference grammars as Grebe (1959), Curme (1960), and Hammer (1984 [1971]).

1.1. The adjective declensions

German adjectives occur in three paradigms of forms: (a) ‘strong’ forms, which occur when the determiner is absent and when the determiner is invariable (for instance viel ‘much’, allerlei ‘all kinds of’, etwas ‘some [sg]’, welch ‘what a!’, zwei ‘two’, or a prenominal possessive like Johanns ‘Johann’s’); (b) ‘weak’ forms (with massive leveling of the distinctions marked in the strong forms), which occur with dieser ‘this’ and a number of other determiners declined like dieser, among them der ‘the’, aller ‘all’, mancher ‘many a, some (pl)’, jener ‘that’, welcher ‘which’, and solcher ‘such’; and (c) ‘mixed’ forms (with some endings from each of the two other sets), which occur with ein ‘one, a’ and a number of other determiners declined like ein, in particular kein ‘no’, and the possessive pronouns (mein ‘my’, ihr ‘her’, sein ‘his’, unser ‘our’, and so on).

The strong forms can be seen in gut-er Mann ‘good man’ and gut-e Männ-er ‘good men’ (here I have indicated morpheme breaks by a hyphen); the weak forms in dies-er gut-e Mann ‘this good man’ and dies-e gut-en Männ-er ‘these good men’; the mixed forms in kein gut-er Mann ‘no good man’ and kein-e gut-en Männ-er ‘no good men’.

The endings for the three sets are shown in Tables 1–3. Notice that the mixed declension is indeed an amalgam of endings from the strong and weak declensions, though with the weak declension predominating: of the
Table 1. Strong adjective endings

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Table 3. Mixed adjective endings

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ten endings that differ in the strong and weak sets, the mixed set takes seven from the weak and three (italicized in Table 3) from the strong. With some justification, we might then consider the mixed declension as a special subtype of the weak declension. In what follows, I will call the strong declension 'declension S', the weak declension 'declension W', and the mixed declension 'declension W-MX'.

1.2. The determiner declensions

Several remarks should be made about this array of facts. First, the grouping of factors conditioning strong vs. weak vs. mixed adjective declension is not semantic, at least not on any account I can imagine. In particular, the determiners conditioning strong declension include both definites (like zwei and Johanns) and indefinites (like the absent determiner, viel, and etwas); the determiners conditioning weak declension also
include both definites (like *dieser* and *der*) and indefinites (*mancher* and *solcher*); and the determiners conditioning mixed declension also include both definites (like *mein* and *unser*) and indefinites (like *ein* and *kein*). That is, it appears that the division of determiners into three classes is a grammatical, and not a semantic, classification. The three classes might as well be named 'class I', 'class II', and 'class III' — and, indeed, in what follows I will use this nomenclature.

Next, two of the three classes of determiners are declinable, and for each class there is a single declension type. The endings for class II determiners are shown in Table 4, those for class III determiners in Table 5. Notice that the endings for class II determiners are almost identical to those conditioned by class I determiners — only the masc and neut gen sg endings (both *-es*)\(^1\) differ — and that the endings for class III determiners are closer to the adjective declension conditioned by class I determiners than to either of the others (the class III determiners share 11 of their 16 endings with adjectives conditioned by class I determiners, and only four endings with adjectives conditioned by class II or class III determiners).

To sharpen, and abbreviate, the observations of the previous paragraph: class I determiners are indeclinable; class II determiners belong to a subtype, call it 'declension S-ES', of declension S (with a special ending *-es* in the masc and neut gen sg); class III determiners belong to a subtype, call it 'declension S-ES-Z', of declension S-ES (with zero endings in the masc and neut nom sg and the neut acc sg, as well as the special ending *-es* in the masc and neut gen sg). In other words, though determiners of

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classes II and III condition adjectives of declensions W and W-MX, respectively, the determiners themselves belong to (subtypes of) declension S.

1.3. The noun declension

A final complexity is that nouns also have several declensional patterns, which I will describe as subtypes of declensions S and W. (These assignments are not entirely the same as the traditional classification of nouns as belonging to ‘strong’, ‘weak’, and ‘mixed’ declensions.)

Most native German common nouns have one of four plural markers: -e, with a zero allomorph, as in Arm-e ‘arms’ and Engel ‘angels’; -e, also with a zero allomorph, accompanied by umlaut in the base, as in Söhn-e ‘sons’ and Brüder ‘brothers’; -(e)n, as in Uhr-en ‘clocks’ and Schule-n ‘schools’; and -er accompanied by umlaut in the base, as in Büch-er ‘books’. Nouns of all three genders occur in all four groups (though by no means with equal frequency), except that no feminines have the -er pl. The masc and neut nouns in these groups have the suffix -(e)s in the gen sg, the suffix -(e) in the dat sg; all these nouns have -(e)n in the dat pl; otherwise, they show no suffixes. I will classify them all as belonging to nominal subtypes of declension S.

Many proper nouns and most loan words have -s throughout the pl, and in the gen sg of masc and neut nouns, and no suffixes otherwise: Klara-s ‘Clara’s, Claras’, Mueller-s ‘Mueller’s, Muellers’, Domino-s ‘domino’s, dominos’. These constitute another subtype of declension S.

Two further groups have -(e)n in all cases and numbers except the nom sg. A few of these, like der Name (Name-n ‘names’), also have -s in the gen sg (Name-n-s). Most, like Mensch ‘human being’, lack this -s (gen sg Mensch-en). Both groups I will classify as belonging to nominal subtypes of declension W.

What is important here is that nouns, like determiners but unlike adjectives, are individually (and essentially arbitrarily) assigned to particular declension classes. Mann ‘man’ belongs to the S class with -er pl, but Knabe ‘boy’ belongs to the W class with -(e)n throughout but no gen sg -s. Declension class is a lexical property of particular nouns and determiners; adjectives, however, belong to no declension class lexically, but are assigned to a class by virtue of the type of determiner with which they are in construction. The declension class of the noun with which an adjective is in construction plays almost no role (but see Durrell 1979: 71) in determining the declension class of an adjective: dies-er gut-e Mann ‘this good man’ has a W adjectival form occurring with an S noun; gut-er
Mann ‘good man’ has an S adjectival form with the same noun; dies-er gut-e Knabe ‘this good boy’ has a W adjectival form occurring with a W noun; and gut-er Knabe ‘good boy’ has an S adjectival form occurring with the same noun.

1.4. Other grammatical categories

Gender, like declension class, is a lexical property of particular nouns; nothing predicts that in contrast to the neuter Buch ‘book’, Arm ‘arm’ is masculine and Hand ‘hand’ feminine. The gender classification of both adjectives and determiners is determined by the gender of the noun with which they are in construction: dies-er Arm ‘this arm’ and gut-er Arm ‘good arm’, dies-es Buch ‘this book’ and gut-es Buch ‘good book’, dies-e Hand ‘this hand’ and gut-e Hand ‘good hand’.

The remaining grammatical categories that play a role in German adjective inflection, number and case, are in general not lexical properties of any word class. However, a determiner, adjective, and noun in construction with one another must agree in both number and case. Case is, of course, a property of whole noun phrases, determined by the syntactic context in which they occur. I will assume that number is also a property of whole noun phrases, one that is ‘freely chosen’ rather than determined by context.

1.5. Summary of the facts

—Declension is a lexical property of nouns and determiners, but not adjectives; nouns are essentially either declension S (strong) or declension W (weak), and determiners either belong to a subtype of declension S or are indeclinable.

—Determiners are lexically (and arbitrarily) assigned to class I, class II, or class III.

—The declension of an adjective is determined by the class of the determiner with which it is in construction (declension S for a determiner of class I, declension W for a determiner of class II, and declension W-MX for a determiner of class III).

—Gender is a lexical property of nouns, but not of determiners or adjectives.

—The gender of a determiner or adjective is determined by the gender of the noun with which it is in construction.

—Case and number are assigned to noun phrases as wholes.

—And the case and number of an NP must be duplicated as properties of the determiner, adjective, and noun within that NP.
. Generalized phrase-structure grammar

In this section I outline the central features of GPSG, following the presentation by Gazdar and Pullum (1982a, 1982b; hereafter GP). These will be familiar to readers of this volume and require extended discussion only where I propose to extend or amend the more-or-less standard framework for the purpose of describing German adjective agreement.

.1. Context-free rules

GPSG requires that all syntactic rules be context-free. That is, every syntactic rule in a language describes a possible branching, of a mother category into a set of daughter categories, in constituent structures in that language. A full constituent structure is consistent with the grammar if all the branchings in it are described by rules for that language.

.2. Decomposition of categories

GPSG decomposes categories into sets of properties. Thus, a category like NP is decomposed into two components, one indicating that it is a noun-type, or nominal, category, the other indicating that it is a two-bar, or phrasal, category; this decomposition can be represented by the following notation, which has the spirit of GP’s proposals, while differing from it in details: {CAT:N, BAR:2}. In such representations, a property like CAT:N is actually a pairing of an attribute, here CAT, and a value, here N.

The version of GPSG given by GP treats categories as complexes of properties, with internal structure. In particular, there are significant subtypes of properties within a category. GP distinguish (a) head properties (they call them ‘head features’), (b) foot properties (they call them ‘foot features’), and (c) properties that are neither head nor foot properties; within the set of head properties, they distinguish (a1) agreement head properties from (a2) all other head properties; within the set of foot properties, they in effect distinguish between (b1) foot properties (like REFL and WH) that occur in lexical entries and (b2) the special SLASH foot property, which is used in GPSG analyses of constructions with gaps in them.

To represent this categorial substructure, I will follow GP in treating HEAD, FOOT, AGR, and SLASH themselves as attributes, taking sets of properties — that is, categories — as values.4 For example, I will suppose that number and case are head properties, whose attributes are
NUM and CASE, respectively; that number and case are argument properties; that reflexive constituents belong to a category having a foot property with the attribute REFL; and that CAT and BAR are attributes of properties that are neither head nor foot properties. Given all of these assumptions, the representation of an acc pl reflexive NP would be {CAT:N, BAR:2, HEAD:{AGR:{NUM:+, CASE:ACC}}, FOOT:{REFL:+}}.

2.3. Metagrammars

GPSG also allows for the possibility of generating, rather than listing, rules; a metagrammar, the repository of generalizations about the set of rules, describes the content of the grammar itself. The principles in this metagrammar can be of many sorts — some universal, some language-particular; some summarizing sets of rules in a single formula, some deriving sets of rules from a rule prototype, some predicting the existence of sets of rules on the basis of the existence of other sets.

2.4. Free instantiation, implications, and defaults

The metagrammar includes conditions, of several different types, on the occurrence of properties within categories.

For example, in German the number of an NP can generally be 'freely chosen' — that is, does not depend on the number of neighboring constituents. Here we posit a prototype rule that does not mention number, but merely introduces NP, and let the values of the NUM property be freely instantiated. Every such prototype rule acts as an abbreviation for two rules, one mentioning the property NUM:— and one mentioning the property NUM:+. In general, we can suppose that property values are freely instantiated, except where this would be contradicted by some other principle of the metagrammar.

In another sort of case, the range of values for some property is determined by other property values within the same category. For instance, in section 1.3 above I remarked in passing that there are no feminine nouns with the -er pl. The general principle here is implicative in form: if a noun is feminine it does not belong to the -er subclass.

Another type of relationship between properties within a category is 'nearly implicative', in the sense that one set of properties is usually associated with another. Consider, for example, the grammatical case of the direct object of a German verb. There are verbs that require their
direct objects to be dat (ähneln ‘resemble’), and verbs that require their
direct objects to be gen (genesen ‘be delivered of, give birth to’), but nearly
all verbs require (or permit) their direct objects to be acc. The acc is the
default assignment of case to direct objects in German. In general the
metagrammar includes principles that assign a certain value to some
property within a category in the absence of some other principle
assigning a value to that property in that category.

2.5. Principles governing property agreement

Given the GPSG proposal that rules describe nothing more than a mother
category and its daughter categories, there can be only two types of
conditions on the cooccurrence of properties between constituents: those
relating the properties in the mother category and the properties in (one
or more) daughter categories; and those relating the properties in two (or
more) daughter categories under the same mother. GP suggest conditions
of both types.

The three such conditions proposed by GP are all positive, and (in
combination with assumptions about free instantiation, implications, and
defaults) they all have the effect of requiring that certain properties agree,
that is, have the same values. Two of the conditions, the head feature
convention and the foot feature principle, govern mother–daughter
property agreement; the remaining condition, the control agreement
principle, governs property agreement between certain pairs of sisters.⁵

The head feature convention (HFC) ensures that the head properties in
a mother category and the head properties in the daughter category that is
the head of the construction are identical. Assuming that the internal
structure of a German NP involves the branching of NP into Det and
Nom, Nom into AP and N, AP into A’, and A’ into A (as in the tree
below), then the HFC ensures that the head properties in the following
pairs of categories are identical: NP and Nom, Nom and N, AP and A’, A’
and A.

```
  NP
   /\
  Det  Nom
     /\   |
    AP  N  A'
       /|
      A  A
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The control agreement principle (CAP) interacts with the HFC to describe grammatical agreement in languages. Given a list of what I will call *agreement pairs*, certain pairs of sister categories, the CAP has the effect of ensuring that the two sister categories in a pair have the same agreement head properties. The list of agreement pairs — for the moment we do not have to be concerned here with where this list comes from — includes NP and VP, Det and Nom, AP and N.

In German, the HFC and CAP together ensure that determiners, adjectives, and nouns in construction with one another have the same values for the properties of number, case, and gender. Speaking very loosely, gender markings ‘originate with’ the lexical item N, while number and case markings ‘originate with’ the NP node dominating the whole business. The HFC requires that the gender marking on N be duplicated on Nom and then on NP; the CAP requires that the gender marking on Nom be duplicated on Det; the CAP also requires that the gender marking on N be duplicated on AP; and the HFC ultimately requires that the gender marking on AP be duplicated on A. As for case and number, the HFC requires that their markings on NP be duplicated on Nom and then N, and the CAP and HFC, as before, require that these markings be reproduced ultimately on Det and A.

The third agreement principle, the foot feature principle (FFP), requires that a mother category possess every foot property appearing in any one of its daughter categories. In GP’s treatment, the FFP acts as a constraint on the free instantiation of foot properties, and only as such a constraint; it does not ‘propagate’ properties appearing in categories by virtue of rule or metarule application.

2.6. **Universal aspects of property-agreement principles**

GP assume that all the content of the HFC, FFP, and CAP is universal. What is potentially particular to a given language, in this view, is the list of head properties; the specification of which daughter constituent is the head of a construction; the list of foot properties; the list of agreement head properties; and the list of agreement pairs.

In fact, GP entertain two further restrictions on parochial variation. First, they observe that X-bar syntax generally assumes some universal principle (referring to category membership and bar level) that picks out the head constituent if there is one. Their own proposal takes a somewhat different tack, marking heads explicitly but then using the HFC to predict their category membership. In any event, it seems clear that selecting the head and assigning it category membership are not independent operations.
Second, CP propose that the list of agreement pairs be universally determined. Indeed, they propose (building on ideas in Keenan 1974) that the list can be derived from the semantic principles associated with syntactic branchings; their statement of the CAP requires that two syntactic constituents standing semantically in a ‘controller’–‘controllee’ (roughly, argument–functor) relationship have the same agreement head properties. I will not explore this proposal here. It is sufficient to observe that on any reasonable interpretation, the CAP will require that German nouns and their accompanying adjectives and determiners all have the same agreement head properties.

If universal versions of the HFC and the CAP are to ‘provide the basis for a highly effective theory of agreement’ (GP 1982a: 31), then the interaction of these two principles must be the ONLY source of systematic agreement in head properties between two categories neither of which dominates the other; in particular, the CAP must be the only source of systematic agreement in head properties between two sister categories. The GP proposal for agreement would be completely undercut if there could be language-particular (meta)rules requiring identity of properties between sister categories. There is already genuine variation from language to language as to which properties are agreement properties, including the possibility that the set of agreement properties is empty. If languages with an empty set of agreement properties could nevertheless have idiosyncratic agreement rules, then there would be no pattern of property agreement or disagreement that could not be given a description; the CAP would not constrain grammatical theory at all. We appear to need something like the following property agreement restriction (PAR): no language-particular (meta)rule requires agreement in one or more properties between two sister constituents.6

2.7. Two distinct types of ‘agreement’

The CAP is designed to cover only phenomena of grammatical agreement, in a narrow sense. It provides no account of agreement between anaphoric elements and their antecedents, as when it is said that the pronoun er agrees with its antecedent der Mann in the sentence Der Mann sagt, dass er krank ist ‘The man says that he is sick’. Anaphor–antecedent agreement in GPSG needs a different sort of account from the one the theory makes available for describing (for instance) the agreement in gender and number between the article der and the noun Mann in this example.
2.8. **Lexical subcategorization by rule index**

GPSG rejects thoroughly semantic accounts for the subcategorization of lexical items with respect to the set of sister categories they can combine with; instead, it is argued that at least some subcategorization facts require a syntactic treatment.

In particular (following Gazdar 1982), GP propose assigning each phrase-structure rule an index and letting this index be represented as a property in any lexical category introduced by the rule. If, for instance, rule 6 expands NP as Det Nom, then the Det introduced by the rule will have the index 6 represented as one of its properties. And any determiner that can combine with a Nom will have the index 6 represented as one of its properties in the lexicon.

2.9. **Syntactic government**

'Syntactic government, speaking rather loosely, is the selection of the morphosyntactic shape of one constituent ... by virtue of its combining with another' (Zwicky 1985a: 7). The selection of morphological cases (such as nom, acc, gen, and dat in German) falls under this heading insofar as it depends upon the syntactic context of the case-marked NP. Excluded are instances of semantic determination — as in languages, like Finnish, where a (morphological) partitive case is used for direct objects 'understood partially', other cases being used for direct objects 'understood totally'; so far as the syntax is concerned in such a language, the partitive is simply an alternative to the other cases. Included, however, are some phenomena not involving the grammatical category of case, such as the selection of inflectional forms of English VPs (infinitive, past participle, present participle) on the basis of the preceding auxiliary (see Pullum and Wilson 1977; Gazdar, Pullum, and Sag 1982).

Within the framework of GPSG sketched so far, if a set of properties of category A selects some governed property or properties of category B, then A and B must stand in a mother–daughter or sister–sister relationship. More abstract, and structurally more wide-ranging, notions of 'government' (such as those in the government–binding framework of Chomsky 1981) are simply not available. Nor is direct reference to grammatical relations like subject-of, direct-object-of, and the like, despite the intuitive appeal of principles like 'ACC is the case of the direct object'.

2.9.1. **Types of government.** I will distinguish two sorts of government, **vertical** and **horizontal**, according as the governing element is the mother
or the daughter, respectively, of the governed element. In turn, horizontal government is at least potentially of two types, *phrasal* or *lexical*, according as the governor (the governing element) belongs to a phrasal or a lexical category. And the set of governors in lexical government might constitute a syntactic and/or semantic class (*systematic* government) or might be, at least in part, a matter of arbitrary marks associated with particular lexical items (more or less *idosyncratic* government).

Vertical government can be illustrated by English pronominal possessives like *this evening's* in *this evening's events*. These NPs have the property CASE:GEN by virtue of appearing as a daughter of Det, rather than S, VP, or PP.

It can be difficult to distinguish vertical from horizontal government. The analysis of nominative NPs in English will illustrate the problem. Suppose that CASE:ACC is the default assignment for CASE, so that it is the task of some syntactic rule(s) of English to say where CASE:NOM occurs. Then an NP might have this property by virtue of appearing as the daughter of S — rather than Det, VP, or PP — or by virtue of appearing as the sister of VP — rather than as the sister of V or P, or without any sister. The two treatments are indistinguishable unless either (a) NP and VP can be sisters under some category other than S, or (b) NP and some category other than VP can be sisters under S (or NP can appear as the sole daughter of S).

All reasonably clear examples of horizontal government that I know of illustrate, in fact, lexical rather than phrasal government. This is true of case government by verbs and prepositions, and also of verb-form government by numerals in Russian (where certain numerals govern a gen sg Nom, others a gen pl, while still others impose no government). And if the relationship between a complementizer and the S it combines with is viewed as government of the S by the complementizer (so that *that* governs a finite S, *for* an infinitive S, WH-words a slashed finite S, etc.), then this too is horizontal government with a lexical category serving as the governor. So there is some question as to whether a horizontal-government analysis of nominative case should be available, since the governing category would be the phrasal category VP.

*Idiosyncratic* government is not uncommon. In languages in which verbs or prepositions can govern several different cases, for instance, it is typical that one cannot predict, on the basis of their syntactic or semantic properties, exactly which items govern a nondefault case; the class of governors is partly arbitrary. This is certainly true for the German verbs and prepositions governing the dat or gen rather than the default acc.
2.9.2. *The analysis of government*. The GPSG framework as already sketched has three ways in which (some or all) government phenomena might be described: as subcategorization; as agreement, via the CAP; or by stipulation of features in an individual rule. I will argue that a fourth way is the correct one, that the metagrammar should include some principles specifically describing government — generalizations, across rules, concerning governing and governed properties in mother–daughter or sister–sister pairs. In the discussion that follows I will consider how DAT and GEN case marking on German object NPs might be managed in each of these four approaches to government.

In the subcategorization approach, three separate rules (which can be collected into a rule schema) license the branching of VP into V and NP; in one of these rules, NP has the property CASE:ACC, in another CASE:DAT, in the third CASE:GEN. V will then be subcategorized according to these properties. This alternative makes the analysis of case marking in German entirely parallel to the subcategorization of English verbs according to whether they occur with various types of objects (one NP, two NPs, one NP plus a PP in *to*, one NP plus a PP in *for*, etc.).

In the agreement approach, there is only one rule licensing the branching of VP into V and NP. CASE:DAT and CASE:GEN are treated as lexical properties of specific verbs, and all remaining verbs are assigned CASE:ACC as a default. Given that case is a head agreement property and (V, NP) is on the list of agreement pairs, the CAP will ensure that NP objects share case values with their verbs.

In the stipulated-feature approach, there is again a single rule licensing the branching of VP into V and NP. A condition on this particular rule stipulates that if V has the property SUBCLASS:X, NP has the property CASE:DAT, that if V has the property SUBCLASS:Y, NP has the property CASE:GEN, and that otherwise NP has the property CASE:ACC.

In a metagrammar approach, exactly the same condition holds, but it is treated as a condition on any branching of VP into a set of categories including V and NP, rather than as a condition on a particular rule.

The metagrammar approach is obviously to be preferred to the stipulated-feature approach if distinct rules license the branching of VP into a set of categories including V and NP, as is the case in German as in English. The stipulated-feature approach clearly misses generalizations that are captured in the metagrammar approach.

The tradition in GPSG seems to be to treat government as either subcategorization or agreement, a strategy that has much to recommend it on metatheoretical grounds since it keeps the number of types of metagrammatical principles to a minimum. Nevertheless, I believe that this conceptual reduction should not be made.
First, consider government reduced to subcategorization. Intuitively, government and subcategorization work in opposite directions: in government V determines the features of the object NP, while in subcategorization the object NP determines the subclass of V. But intuitions are no sure guide to theory construction.

I will instead object to a reduction of government or agreement to subcategorization because government/agreement and subcategorization behave quite differently with respect to the resolution of feature conflicts in coordination (here I draw on the discussion in Pullum and Zwicky 1985). Phonologically identical words with distinct subcategorization features cannot be treated as identical in coordination. For instance, English want occurring with an NP object and want occurring with an infinitival complement have irreconcilable subcategorization features, despite their phonological identity: *I want a sandwich and to have a good time. In contrast, phonologically identical words with distinct governed properties can, in certain circumstances, be treated as identical in coordination. For instance, the fortuitously identical past participle and base forms of the English verb come are so treated in It was the ugliest thing I ever have or ever will come upon, where perfective have governs the past participle and modal will the base form; and the dat and acc pl forms of the German noun Frau, which are phonologically identical (Frauen) by virtue of a morphophonemic rule, are so treated in Er findet und hilft Frauen, where the verb finden governs an acc object, helfen a dat object. There are similar phenomena involving agreement, as in the Xhosa data treated in Voeltz (1971).

Next, consider government reduced to agreement. Again, speaking intuitively, government and agreement work in opposite directions: in agreement the head of a construction determines the form of a modifier, while in government a modifier determines the form of the head (see Zwicky 1985a: sec. 2 for further discussion). And again, this intuition as to direction of determination need not guide theory construction; in fact, most extant versions of the CAP, including the one in GP, are quite symmetric, reflecting no logical directionality in the relationship between the determinans and determinatum in grammatical agreement.

One substantive problem in reducing government to agreement is that for the CAP to apply in instances of government, the governor must bear the properties that appear on the governed category. For German case government treated as agreement, the consequences of this requirement are merely odd: V must bear case properties, even though no V ever shows any mark of its case-governing propensities, much less inflection for case. For other instances of government treated as agreement, in particular verb-form government by auxiliaries in English, the consequences are
entirely unacceptable: for perfective have to govern the past participle, it
would have to have the property VFORM: PSTPRT itself — but then all
instances of perfective have would necessarily be in the past participle
form, which is of course wrong.

I conclude that government can be reduced neither to subcategoriza-
tion nor to agreement, but must be described in (metagrammatical)
principles of another sort.

3. Analyzing the declensions: functional proposals

The GPSG framework of section 2 permits a satisfactory description of
many details about the forms that German prenominal adjectives take. In
particular, agreement with respect to case, gender, and number has
already been sketched within this framework. What remains is an account
of the strong, weak, and mixed adjective (S, W, and W-MX) declensions
as they relate to subtypes of determiners (I, II, and III).

Sections 3.3 through to 3.6 examine a series of ‘functional’ proposals,
all versions of the idea (presented in section 3.2) that the relationship
between determiner subtypes and adjective declensions follows from a
general principle requiring characteristic — unambiguous and nonredu-
dant — exponents of the morphosyntactic categories CASE GEND
NUM (which I will refer to as ‘CGN’). I am unable to concoct any
adequate formulation of this proposal.

Section 3.7 points out that such a constraint would be both transderiva-
tional and (in part) phonological, therefore not available in GPSG rules in
any case. However, it would be expressible in a surface filter, rather than
in a rule of syntax, assuming that surface filters apply to morphophonolo-
gical representations. Even this last treatment, I argue, is inadequate.
Syntactic rules must relate determiner subtypes and adjective declensions,
and rules of allomorphy that are adequate for German (sketched in
section 3.8) do not refer to functional notions like ambiguity and
redundancy and do not even have to refer to the phonological form of
endings.

3.1. Property values and conventional references to them

In the interests of making it possible to formulate at least a few rules
explicitly, I digress here on formal matters. Some readers might want to
skip to the main body of the exposition in section 3.2.

In the remainder of this paper, for the sake of brevity and clarity I will
use 'NOM', 'ACC', 'GEN', and 'DAT' to refer to the four cases of German; 'FEM', 'MASC', and 'NEUT' to refer to the three genders; 'SG' and 'PL' to refer to the two numbers; 'I', 'II', and 'III' to refer to the three determiner classes; and 'S', 'S-ES', 'S-ES-Z', 'W', and 'W-MX' to refer to the declension classes of adjectives and determiners. These are all to be understood as standing for property values, some of which were presented as simple in section 2 but which are in fact best treated as complex.

For instance, I assume (following Bierwisch 1967) that the attribute CASE takes as its value a set of two properties, with bivalent attributes OBL (for the oblique cases, gen and dat, versus the direct cases, nom and acc) and GOV (for the necessarily governed, or object, cases, acc and dat, versus the ungoverned, or subject, cases, nom and gen). A reference to 'DAT' is then a reference to CASE:{OBL:+, GOV:+}. I also assume (again following Bierwisch) that the attribute GEND takes as its value a set of two properties, with bivalent attributes F (for the feminine gender as against the masculine and neuter) and M (for the masculine gender as against the feminine and neuter). A reference to 'FEM' is then a reference to GEND:{F:+, M:-}. And of course, 'SG' and 'PL' are references to NUM:- and NUM:+, respectively.

Similar decompositions are needed for the properties of determiner class and adjective/determiner/noun declension. Without defending these choices, I enumerate the properties I will be referring to below. The bivalent attribute EIN separates the 'ein words' (the class III determiners) from the 'der words' (the class II determiners). The attribute DECL takes as its value a set of two properties, with bivalent attributes WK (for the weak and mixed declensions versus the strong declension) and MX (for the mixed versus the weak declension). As a result of these decisions, a reference to 'W-MX' is a reference to DECL:{WK:+, MX:+}, and a reference to 'III' is a reference to EIN:+.

Finally, I will need a notation to indicate that an attribute lacks a value, in particular to indicate that a lexical item belongs to no declension class whatsoever: that is, is indeclinable. For this purpose I will use the null value 'θ'; for the opposite purpose, to indicate that an attribute has a value, I will use the universal value 'U'. In the case at hand, the class I (indeclinable) determiners have the property DECL:θ, and the class II and III determiners, together with all adjectives and declinable nouns, share the property DECL:U.

3.2. The characteristic-exponent proposal

Faced with the complex details of agreement in German prenominal adjectives, some linguists — and language teachers — have sought a
functional account of the facts. In particular, it has repeatedly been suggested that what lies behind the principles of adjective declension is the general condition that EACH CGN COMBINATION SHOULD HAVE ITS OWN CHARACTERISTIC EXponent AT SOME POINT WITHIN AN NP. On this proposal, the function of inflection (whether of a noun, a determiner, or an adjective) is to convey information about the morphosyntactic categories of the NP (see Durrell 1979: 71f.), and in the ideal case this information is conveyed both unambiguously and nonredundantly.

The characteristic-exponent proposal is sometimes presented to language learners via useful hints about how to remember the details of the adjective declensions, as in the following passages from an outline grammar of German (Eltzner and Radenhausen 1930):

Weak Declension of Adjectives. — When an adjective is preceded by a der word, the case endings of the der word shows the gender, number, and case of the noun modified. The adjective, therefore, does not repeat these endings; it takes only the endings -e or -en (p. 22).

[Mixed Declension of Adjectives] When an adjective follows an ein word which lacks a case ending, the adjective supplies the ending. … When the ein word has the characteristic case ending, the adjective has the weak ending … (p. 23).

The key word in the first quotation is ‘therefore’; adjectives, it is implicitly claimed, have distinctive endings only when these are not redundant expressions of CGN. Thus, klein ‘little’ in der kleine Mann ‘the little man’ takes the nondescript form kleine because the determiner der already indicates the CGN values NOM SG MASC. The key word in the second quotation is ‘supplies’; NPs, it is implicitly claimed, must have unambiguous indications of their CGN, and if these are not supplied by the determiner, they must be supplied by the adjective. Thus, klein in ein kleiner Mann ‘a little man’ has the strong form kleiner because this indicates the NOM (vs. ACC) and MASC (vs. NEUT) values not unambiguously supplied by the determiner ein.

3.3. The unadorned proposal

There are a number of complexities in turning these useful hints into a putative rule in the grammar of German. One was introduced in section 1.3 above: head nouns bear (some) marks of case and number, and so can contribute something to the pool of CGN marks within an NP. Durrell (1979: 83) points out that noun forms can ‘resolve ambiguities in the paradigm of the definite article’, in cases like der Beamte ‘the official’
(NOM SG) vs. der Beamten ‘the officials’ (GEN PL) and die Fremde ‘the (female) stranger’ (NOM/ACC SG) vs. die Fremden ‘the strangers’ (NOM/ACC PL). We must decide whether a functionally based rule treats the entire NP ‘as a morphological prime’ (Durrell 1979: 82) or whether it takes only determiners and adjectives into account (as seems to be suggested in the Eltzer and Radenhausen quotations above).

Putting this issue aside for a moment, I observe that the simplest formulation of the characteristic-exponent proposal, (I) below, is obviously wrong.

(I)

a. A German NP A with CGN values I must contain inflectional material M making A unambiguously an exponent of I; that is, M must be phonologically distinct from the inflectional material in any NP with CGN values different from I.

b. In addition, M must be a nonredundant exponent of I; that is, removing any of the inflected words in A must yield an A' that is phonologically identical to an NP with CGN values different from I.

A great many German NPs are ambiguous in the sense of (Ia), and some unambiguous NPs are redundant in the sense of (Ib). The NP Frauen ‘women’, for instance, is completely ambiguous as to its case, being either NOM, ACC, GEN, or DAT. And the NP den Büchern ‘the books’ (DAT) is unambiguous but redundant, since removing the determiner den yields an NP, Büchern, that is unambiguously DAT PL (its plurality indicated by umlaut and the suffix -er, its dative case indicated by the final suffix -n).

3.4. First restriction

Perhaps the conditions affect not all NPs, but only those with prenominal adjectives:

(II)

a. A German NP A having CGN values I and containing a prenominal adjective must contain inflectional material M making A unambiguously an exponent of I.

b. In addition, M must be a nonredundant exponent of I.

But (II) will not do either. NPs like das grosse Buch ‘the large book’ (NOM or ACC), die kluge Frau ‘the wise woman’ (NOM or ACC), and einer kluger Frau ‘a wise woman’ (GEN or DAT) are all ambiguous as to case, and no inflectional affix carries the information that des grossen Buch(e)s ‘the large book’ (GEN) is NEUT rather than MASC, or that einem grossen Tisch ‘a large table’ (DAT) is MASC rather than NEUT. 2000AF
Moreover, the NPs *grosen Büchern* 'large books' and *den grossen Büchern* 'the large books' are redundant, since removing either the determiner *den* or the adjective *grosen* yields the unambiguous *Büchern* again.

3.5. *Two further restrictions*

Two amendments now suggest themselves, one for (IIa), the other for (IIb). The counterexamples I advanced to (IIa) involved CGN distinctions that are *never* indicated by inflectional material within an NP: NOM and ACC are always identical in form in the NEUT and FEM SG and throughout the PL; GEN and DAT are always identical in the FEM SG; and MASC and NEUT are always identical in the GEN and DAT SG. Consequently, one might revise (IIa) along the following lines:

(III) a. A German NP \( A \) having CGN values \( I \) and containing a prenominal adjective must contain inflectional material \( M \) sufficient to make \( A \) phonologically distinct from any NP having CGN values \( I' \), where \( I \) and \( I' \) are different CGN values that receive phonologically distinct exponents for at least one form class of German.

For (Ib) and (IIb), my counterexamples involved CGN values that were unambiguously indicated by noun inflection: *Büchern* can only be DAT PL. Consequently, one might revise (IIb) so as to focus on prenominal material only, along the following (somewhat hazy) lines:

(III) b. In addition, inflectional affixes on a prenominal adjective must not supply information about \( I \) already supplied by those on a determiner.

One might have thought that by making the characteristic-exponent conditions so astoundingly particular — by now, they are generalizations over very small finite collections of relevant data — I would have succeeded in protecting them from counterexamples. But no. The NP *den grossen Flicken* 'the large patch(es)', which is either ACC SG or DAT PL (the MASC noun *Flicken* 'patch' being phonologically unaffected by shifts in case and number), serves as a counterexample to (IIIA). And the NP *eine kluge Frau* 'a wise woman' (NOM/ACC SG FEM) serves as a counterexample to (IIIB), because both the determiner *eine* and the mixed-declension adjective *kluge* distinguish the NOM/ACC SG FEM from all other CGN values: the indefinite article *eine* has no PL forms, and it has the ending *-e* in the SG only in the NOM/ACC FEM (see Table 4 in section 1.3); and the mixed declension of adjectives has *-e* only in the NOM/ACC FEM SG (see Table 3 in section 1.1).
3.6. A final round of restrictions

I believe that the characteristic-exponent proposal cannot be made to cover the facts for all three declensions of German. We might, however, lower our sights still further and try to describe only the mixed declension, taking the other two declensions as given. This restriction won't help (IIIb), however, since the counterexample to it in the previous paragraph involved the mixed declension. So we abandon the fight against redundancy and constrict the field of battle against ambiguity by two-thirds:

(IV) A German NP A with CGN values I, a determiner of class III, and a prenominal adjective must contain inflectional material M sufficient to make A phonologically distinct from any NP having CGN values I', where I and I' are different CGN values that receive phonologically distinct exponents for at least one form class of German.

Incredibly enough, even though (IV) has a tiny domain, there is at least one type of counterexample, illustrated by the MASC NP meinen grossen Flicken 'my large patch(es)', which is ambiguous between ACC SG and DAT PL. I conclude that further contention is pointless, and declare the characteristic-exponent proposal vanquished.

Undoubtedly, the language exhibits some tendency toward characteristic exponents, and it is utterly reasonable that it should do so (otherwise, there would be no function for the inflectional apparatus of adjectives to perform and it should wither away over the generations — as, in fact, in some dialects of German it has). But there is no rule enforcing characteristic exponents.

3.7. The status of these proposals

What if one of these proposals had turned out actually to describe the facts of German? They are all generalizations about the surface forms of NPs in German. And powerful generalizations at that, for they are transderivational in character (they require that different paradigms be compared, rather than that one structure, or even one derivation for that structure, be examined) and also refer to phonology, morphology, and syntax all at once (they are sensitive to the phonological identity of inflectional affixes within a particular syntactic constituent type).

On both grounds, they could not possibly be encoded in GPSG (meta)rules: clearly, neither derivational nor transderivational reference is possible in the framework I sketched in section 2; and, as Pullum and
Zwicky (1984) point out, reference to phonology is also out of the range of a GPSG syntax. Even in a transformational framework they would be extraordinary: transderivational constraints have not found wide acceptance in such frameworks, and it was proposed as long ago as Zwicky (1969) that reference to phonology in transformational rules should be prohibited. That is, there are good reasons for supposing that even if a principle like (I)–(IV) had turned out to be correct, it would not function as a condition on the application of a syntactic rule.

If such a principle is to be any sort of grammatical generalization, it must be a surface filter, a condition on the surface form of NPs in German. Such an analysis would be possible in a transformational framework; but GPSG has not traditionally countenanced negative conditions, that is to say surface filters, in addition to its positive conditions, that is to say its phrase-structure rules (though embracing surface filters of a fairly general kind would not alter the generative capacity of the GPSG framework). In any case, the transderivational and phonological nature of (III) would eliminate it as a candidate for a filter even in an extension of GPSG that embraced negative conditions.

However, there are arguments (developed some in Zwicky and Pullum 1983) that surface filters apply not to syntactic surface structure, but rather to a level of morphophonological representation, namely the output of rules of allomorphy. As a theory of syntax, GPSG says nothing directly about phonology, although it has some indirect consequences for phonological theory (see Pullum and Zwicky 1984 on the principle of superficial constraints in phonology). Surface filters referring to phonology and morphology, even with transderivational power, are not ruled out in principle. A generalization like (I)–(IV) might then have a natural place as a surface filter.

But even this is not to be. Consider why surface filters are posited in the first place. In Perlmutter's original presentation (1971), a surface filter eliminates a configuration arising from the operation of several different rules (either separately or in interaction with one another). The rules are then permitted to apply without restriction, and the filter applies to the outputs resulting from the full set of rules.

In the German case we have been examining, the rules in question would include those distributing the values of adjective declension (S, W, and W-MX), those distributing the values of determiner class (I, II, and III), and allomorphy rules spelling out combinations of CGN values with declension class as particular endings. In a filter analysis, the declension-class values would be freely distributed with respect to the determiner-class values; endings would be freely distributed as exponents of the CGN/declension values; and (finally) principles like (I)–(IV) would act to
terminate distributions of endings which were either ambiguous or redundant.

Unfortunately, such principles just can't do enough work. There are many ways of achieving an unambiguous, nonredundant distribution of endings, given the available stock of them. A principle like (I)-(IV) cannot predict the particular distribution of endings German exhibits; these must, at least in part, be listed as the exponents of particular CGN/declension values.

3.8. An adequate description of the mixed declension

Although (IV) is inadequate as a generalization about German NPs and could not predict the actual endings of German NPs even if it had happened to be adequate, it can serve as the germ for an analysis of the allomorphy side of the phenomenon.

The key is to treat the weak and strong declensions as truly 'given' when the mixed declension allomorphs are being realized. I will assume that allomorphy rules say (a) for adjectives, what the phonological realization is for any CGN/declension combination if the value of DECL is S or W; and (b) for determiners, what the phonological realization is for any CGN/declension combination. Some of these allomorphy rules are generalizations, not mere spellings-out. One says that the ACC SG MASC (S or W) is -en, and another that the default for the ACC SG is to be identical to the NOM SG. One says that the NOM SG W ending is -e, and another that the default for W is -en. These proposals are developed in some detail in Zwicky (1985b).

What remains is to account for the mixed-declension endings on the basis of the endings in the other two declensions. The mixed declension of adjectives (Table 3) differs from the weak declension (Table 2) in only two respects, NOM SG MASC and NOM/ACC SG NEUT, which have the endings -er and -es, respectively, both drawn from the strong declension (Table 1). These are all the places, and the only places, where class III determiners (which condition the mixed declension) have zero endings. The following generalization, which mentions neither ambiguity nor redundancy, is then true for German:

(V) The ending of an adjective in the mixed declension is chosen from the strong paradigm if the preceding determiner has a zero ending, otherwise from the weak paradigm.

Principle(V) actually predicts what the mixed-declension endings are, and it does so correctly, but it is still not a trouble-free allomorphy rule. It
refers to the makeup of a word adjacent to the one whose inflectional apparatus is being described, and it refers to (phonological) zero. (Consequently, as a syntactic rule distributing declension features it would be impossible.) The reference to the internal morphological composition of other words is quite unusual in a rule of allomorphy, although such rules can refer to properties of the syntactic structures in which the affected word occurs and to the phonological composition of adjacent words (see Zwicky 1985c); nothing in principle rules out reference to morphological composition, but it is rare at best. However, we can take a clue from the description above of where the weak ending -e occurs and can reformulate (V) entirely in terms of word-internal morphological properties:

(VI) The ending of an adjective in the mixed declension is chosen from the strong paradigm in the non-FEM⁸ NOM SG, otherwise from the weak paradigm.

Rule (VI) covers the NOM SG MASC and NOM SG NEUT occurrences of -e directly. It covers the ACC SG NEUT by virtue of the assumption (above) that the default for the ACC SG ending is to be identical to the NOM SG, an instruction that is not countermanded by any other statement. It does not cover the ACC SG MASC, because this ending is explicitly specified (above, again) as -en.

The allomorphy rule (VI) accounts correctly for the forms of the mixed paradigm on the basis of those in the strong and weak paradigms, and it does so without extravagant theoretical moves. There are many details to be worked out; in particular, the mechanisms of default setting need attention, as do those that have the effect of setting one ending identical to another. But so long as the declension values S, W, and W-MX are distributed correctly in phrase structures, allomorphy rules along the lines of (VI) can describe the morphological exponents of CGN values.

A final note: a reasonably explicit formulation of (VI) can be constructed, given the assumptions of section 3.1. What (VI) says is,

(VI) Something with a category C not distinct from \{CAT:A, BAR:0, HEAD:{AGR:{CASE:{OBL:−}, GOV:−}, GEND:{F:−}, NUM:−}}, DECL:{WK:+, MX:+}\} takes endings identical to those for category C', where C' is derived from C by changing the value of DECL to {WK:−, MX:−}.

The rule does not have to say that the weak paradigm is the default case; this is an automatic consequence of treating the mixed declension as a subtype of the weak declension, a decision made back in section 1.1 and formalized via the property WK:+ in section 3.1.
4. Analyzing the German adjective declensions in GPSG

Given the power of the sort of allomorphy rules described in section 3.8, we must entertain the possibility that these rules can be made to bear the entire burden of describing the adjective declensions. In section 4.1 I argue against this line of analysis.

Two further potential mechanisms for describing the relationship between determiner subtypes and adjective declensions were presented in section 2: subcategorization of adjectives with respect to determiners (which I consider in section 4.2) and property agreement via the CAP and HFC (which I consider in section 4.3). Neither treatment turns out to be suitable.

In section 4.4 I present an analysis in which this aspect of German adjective 'agreement' is in fact treated as government. The analysis is built around two principles in the metagrammar for German, declension government and declension inheritance, though a number of other principles and default settings must be made explicit if the workings of these two are to be understood.

4.1. Allomorphy rules

I first consider the possibility that the three paradigms of adjective forms are specified directly by rules of allomorphy, without any mediating reference to attributes like DECL, WK, and MX. On this proposal, instead of saying that a DAT MASC SG adjective in the strong declension (that is, one with the property DECL:{WK: − }) has the suffix -em, our rule would say that a DAT MASC SG adjective has this suffix when it follows a word of class I.

There is nothing wrong with the form of such an allomorphy rule. But this approach forces us to miss generalizations all over the place. In particular, it gives us no way to state single generalizations across adjective, determiner, and/or noun paradigms. Recall, for instance, the fact that class II determiners, the der words, belong inherently to a subtype of the strong declension; we need to say, among other things, that they have the DAT MASC SG suffix -em. If we cannot refer to DECL:{WK: − } or some equivalent property, then we must simply say that class II words have the suffix -em in the DAT MASC SG, and nothing will connect this fact to the corresponding fact for adjectives following a class I word. The best we can do is reference to the disjunction 'class II, or adjective following a class I word' — a disjunction that will then appear in a number of other rules.
A somewhat more satisfactory variant of this proposal assumes the mediation of declension properties, which are, however, distributed by special postsyntactic principles (analogous to the rules that distribute marks of syntactically conditioned morphonological operations). These postsyntactic principles in turn feed rules of allomorphy.

To see how this proposal works, consider the DAT MASC SG adjective in *Johanns klugem Freund(e)* 'to John's clever friend'. According to this proposal, no declension properties are assigned to the adjective by syntactic rules. The adjective picks up these properties by a postsyntactic rule that says that a class I determiner triggers DECL:{WK:−} on an adjective that it immediately precedes and c-commands. The property DECL:{WK:−} in combination with the CGN properties is then realized as the suffix *-em* by rules of allomorphy.

What is familiar in this account is the trigger condition (see Lieber 1983 and Zwicky 1984 with reference to the Welsh consonant mutations), requiring that a morphonological trigger be immediately adjacent to, and c-command, the word it affects. What is new is the application of the trigger condition to the distribution of properties that are not directly interpretable as conditioning morphonological rules. Much follows from this difference: properties that are syntactically distributed can appear on all parallel conjuncts, and they can appear on the head word of a constituent, whether or not that word is immediately adjacent to the trigger, whereas morphonologically distributed properties can appear only on the constituent immediately adjacent to the trigger.

It is clear that the declension properties are syntactically, rather than morphonologically, distributed. In particular, they appear on all parallel conjuncts (*Johanns altem klugem Freund[e]* '[to] John's old clever friend'), and they appear on the head A (*Johanns sehr altem Freund[e]* '[to] John's very old friend'). A syntactic account of the adjective declensions is needed.

4.2. Subcategorization

I turn now to syntactic proposals for describing the implicational relationship between the determiner classes I, II, and III and the adjective declension classes S, W, and W-MX, respectively. In line with the preceding discussion, I assume that describing this relationship is the only aspect of adjective declension in German that syntactic rules are responsible for; everything else is a matter of morphology and rules of allomorphy.

One mechanism GPSG provides for describing relationships between
properties of nodes is subcategorization (by rule index; see section 2.8). A
lexical category introduced in a rule is subcategorized with respect to the
other constituents introduced by the same rule. The rule $NP \rightarrow \text{Det}, \text{Nom}$
introduces the lexical category Det. Accordingly, determiners can be
lexically marked as to whether they occur with Nom as their only sister
under P (there might be other rules introducing Det as a daughter of NP).

For our purposes, the subcategorization mechanism determines things
in the wrong direction: the category Det is subcategorized by Nom, rather
than the other way around. The property determined by the subcategoriza-
tion mechanism is the wrong one: occurrence with Nom in general,
rather than occurrence with Nom of the subtype S, W, or W-MX. And
the node subcategorizing Det is the wrong one: Nom rather than its
daughter A. Even if we wanted to have Det subcategorized by A, rather
than the other way around, we would have to deal with the fact that Det
and A are not sister nodes, hence cannot affect one another directly in
GPSG.

The only subcategorization analysis that I can construct has declension
S, declension W, and declension W-MX as properties of A which must be
duplicated as properties of the Nom node above A; then these properties
subcategorize Det. Two things are peculiar about this analysis. First, it
must treat the strong/weak/mixed distinction as lexically associated with
adjectives; but the distinction is not lexical at all. Second, the rule
introducing Nom and Det as sisters must explicitly mention these
properties of Nom, if subcategorization is to be invoked. This analysis can
be made to work, but it is eminently unsuitable.

4.3. Agreement

Another mechanism that might be appealed to is agreement, with the
HFC working together with some principle requiring that the relevant
properties of Det and Nom agree. This principle must in fact be the CAP,
since the property agreement restriction of section 2.6 prohibits language-
particular (meta)rules requiring property agreement between sister con-
stituents; we are not free to construct an agreement account specifically
for German.

The first problem with this proposal is that the use of the HFC is
suspect. The head feature convention would function to distribute within
phrases properties that were not realized morphologically on the heads of
those phrases; a head noun doesn’t show any sort of morphological
indication of the class of its determiner. Cooper (i.p.) argues that the HFC
should not be permitted to apply to such ‘silent features’.
Things are no better if, noting that the determiner-class properties are associated with specific lexical items, we attempt to treat properties like class II as foot properties rather than head properties, and so appeal to the FFP rather than the HFC. The FFP would require only that class II (for instance) on Det be duplicated as class II on NP; it would not ensure that class II, or some reflex of it, appeared on A.

A second problem is that if the CAP is to say that 'the form of a functor depends on properties of its argument expression' (Bach 1983: 70), then the determination of declension class runs in the wrong direction — Det is certainly the functor, Nom the argument expression, but the form of Nom depends on properties of Det. However, as I observed in section 2.9.2, standard formulations of the CAP do not encode a directionality of determination, so that this constitutes a problem only from outside the GPSG framework.

The third and fourth problems follow from the fact that in an agreement analysis the agreeing properties must be those picking out class I/II/III, not those picking out declension S/W/W-MX; this is clearly so because (as I observed in section 1.2) though determiners of classes I, II, and III require declension S, declension W, and declension W-MX, respectively, in their associated adjectives, they belong themselves to an indeclinable set, declension S-ES, and declension S-ES-Z, respectively.9

Given that it is the class properties that would have to be subject to the CAP, we are faced with a very odd sort of agreement. The class properties have no inflectional realization whatsoever on their 'source' (Det) constituents, and they have no direct inflectional realization on their 'affected' (A) constituents — we would have to predict the actually realized DECL properties there on the basis of the class properties inherited via the CAP. These two consequences involving inflectional realization make the case at hand look unlike anything linguists have called 'agreement'.

4.4. Government

The analysis I opt for here builds directly on the observations in the previous section. There is no sort of agreement;10 instead, a difference in lexical class in the determiners is projected onto the adjectives as a difference in inflection. 'The form of an argument depends on properties of the functor', as Bach (1983: 70) has it in his delineation of government. The part of German adjective agreement that involves the determination of declension class is not agreement at all, but rather government — in the terms of section 2.9, idiosyncratic government.

What the syntax of German must say is that determiners of class I
impose the S declension on a following adjective, that determiners of class II impose the W declension, and that determiners of class III impose the W-MX declension. In a GPSG framework, this cannot be done in one step, since Det and A are not coconstituents. Recall the discussion in section 2.5: Det and Nom are coconstituents under NP, Nom branches into AP and N, AP branches into A', and A' branches into A. Two different principles are called for, one imposing properties on Nom by virtue of properties belonging to Det, the other propagating these properties 'down' from Nom, eventually to A. I will call these principles declension government (DG) and declension inheritance (DI), respectively.

Both of these principles belong to the metagrammar. DG acts as a rider on the branching of NP into Det plus Nom, DI as a rider on any branching of a category X into some set of categories, one of which is AP, A', or A — that is, one of which has the property CAT:A. Formulating the latter is straightforward:

Declension inheritance: If category X has a daughter category Y with the property CAT:A, then X and Y must have identical values for the attribute DECL.

DI is reminiscent of the HFC; both require identity of certain properties between AP and A', and between A' and A. But it could not be collapsed with the HFC, for the HFC does not require property identity between Nom and its modifier daughter AP, and the DI does.

DI is also reminiscent of the FFP, as Donka Farkas has pointed out to me. If DECL were classified as a foot feature for categories with the property CAT:A, then the FFP would do the work of DI. Whether this analysis is available or not depends on whether the FFP can apply to parochial features like DECL; see note 6.

Formulating DG is a trickier business and requires some use of the formalism developed in section 3.1, because the exact shape DG takes will depend on how the default values for WK and MX in DECL are chosen; DG need mention only properties of Nom that have nondefault values, all remaining properties being filled in by default. For WK, at least, there is fairly clear evidence about the default. Recall from section 1.1 that the strong declension of adjectives is used both with invariable determiners like zwei 'two' and also with a zero determiner, as in the mass NP braunes Bier 'brown beer' (NOM/ACC) and the plural NP brauner Bücher 'of brown books' (GEN). The natural analysis for such NPs is that they have no Det, not that they have determiners whose phonological realizations are null; certainly the null-determiner analysis would require justification. If there is a branching of NP into only one daughter, Nom, then there is no Det to govern an adjective declension in this construction, and the
adjective declension that appears there must be the default. It follows that WK has the default value –. As for MX, I will assume that it too has a – default:

Defaults for DECL: In any category with the property CAT:A, the default value for WK and MX in DECL is –.

The task of DG is, then, to say when Nom has the properties WK: + and MX: +. The first property is predictable from the fact that Det is declinable, the second from the fact that Det is an ein word:

Declension government: In a branching of NP into Det and Nom, if Det has the property DECL:U then Nom has the property DECL:{WK: +}; and if Det has the property EIN: + then Nom has the property DECL:{MX: +}.

With these formulations of DG and DI, the main part of my description of the German adjective declensions is finished. There are still some details worth discussing, having to do with the fact that German adjectives are sometimes declined, sometimes indeclinable.

The large generalization about this phenomenon is that adjectives are declined only when they are prenominal; I will disregard further details here. We need to describe the contrast between Die Frau ist klug ‘The woman is wise’, with the undeclined adjective form klug, and die kluge Frau ‘the wise woman’, with a declined form. The attribute in question is DECL, which I will say has the default value θ (‘indeclinable’) for adjectives. This default is overridden within a prenominal AP, that is, within an AP that is the daughter of Nom.

An additional wrinkle comes in the fact that there are some reasons (not the least being their inflectional paradigms) for grouping the open classes of adjectives and nouns together with the closed classes of personal pronouns and determiners, at least in German; and the default value of DECL for all of these classes except the adjectives is certainly U. The natural property for these four groups of lexical items to share is the property N: +, in the system that GP provide for the analysis of the major word-class properties N (= {N: +, V: –}), A (= {N: +, V: +}), V (= {N: –, V: +}), and P (= {N: –, V: –}). Putting all of these observations about declinability together, we have the two following principles:

Prenominal adjectives: AP as a daughter of Nom has the property DECL:U.

Defaults for DECL: The default value for DECL is θ for categories with the property CAT:A. The default value for DECL is U for categories with the property CAT:{N: +}.
The value settings run through three levels here: DECL for an AP daughter of Nom has the value U, overriding the default \( \theta \) value for categories with the property CAT:A, which in turn overrides the default U value for categories with the property CAT:{N: + }.

This completes the sketch of the syntactic side of adjective agreement in German. Two universal metagrammatical principles, the HFC and CAP, require that the CGN properties of N or NP be duplicated on a prenominal adjective. Two principles of the metagrammar for German, DG and DI, in concert with default settings and a parochial principle involving DECL, ensure that the adjective has the declension property appropriate to its context.

A syntactic analysis along these lines ought to be constructible regardless of the sort of morphological analysis it is destined to be combined with. The details will vary with the morphological framework, of course, and there is no denying that my analysis is tailored to a specific view of inflectional morphology. In this view (sketched in Zwicky 1985b), inflectional morphology describes the way in which (bundles of) morphosyntactic properties of words are realized as affixes (or morphological processes, which I have not dealt with here). The primary descriptive tool is the rule of allomorphy, which either assigns phonological content to the properties or refers the assignment to another combination of properties (as when the assignment for the ACC SG is referred to that for the NOM SG, or when the assignment for the mixed declension is referred to that for the strong declension under certain conditions). Like my syntactic analysis, this approach to inflectional morphology relies heavily on principles (some of them rather complex) giving default assignments, with competition between principles resolved in favor of the more specific principle (as when the assignment for the ACC SG MASC overrides the assignment for the ACC SG).\(^{11}\)

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Notes

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1. There are principles governing which endings are identical to which others. For instance: for all gender/number combinations except masc sg, the acc is identical to the nom. See section 3.8 for further development of this idea.

2. The definite article has idiosyncratic allomorphy in the nom and acc forms: wherever *des* would be expected in these forms, *das* occurs instead, and wherever *de* would be expected in these forms, *die* occurs instead. (As it happens, *des* does occur where expected in the gen.) These facts about allomorphy do not affect the syntactic generalizations to be made.

3. The variation between -*es* and -*s*, -*e* and zero, -*en* and -*n* is conditioned by phonological, morphological, lexical, and stylistic features that do not need to concern us here.

4. A somewhat different formalization for category-valued features is provided by Gazdar et al. (1985: ch. 2).

5. Listing the HFC, CAP, and FFP does not preclude the existence of other general principles governing the distribution of features in constituent structures. Indeed, Gazdar et al. (1982) entertain an analysis of conjunction in which the feature CONJ is neither a head nor a foot feature and obeys its own (universal) principles of occurrence.

6. I am inclined to believe that, in addition to the PAR, universal grammar should permit only a finite number of attributes and values — indeed, that universal grammar should provide finite lists of the attributes and values available for service in any particular grammar, a universal head property list (UHPL) and a universal foot property list (UFPL). The attributes on the UHPL correspond to the familiar grammatical categories of person, number, gender, definiteness, case, tense, aspect, voice, mood, negation, and the like. The attributes on the UFPL include at least WH, REFL, and SLASH.

This proposal has been challenged by Pullum and by Gazdar, on two different grounds. Pullum (1985) attacks the idea that a UHPL would be finite. Maintaining that 'there is no plausibility to the notion that some principle of universal grammar restricts the class of agreement categories available to natural languages to some interestingly constrained set' (1985: 81), he cites large inventories of gender and case categories as suggesting that there is no end to the properties that might figure in agreement.

As it stands, Pullum's argument is not compelling, since it amounts to little more than astonishment at the range of agreement properties in attested languages, combined with an inability to see where it all will end. It might appear that his case would be greatly strengthened by systems of categorization like those for nouns in Jacaltec (Craig 1977: 154), which has 21 semantic classes, among them such culture-specific categories as 'female deity', 'dog', 'corn', 'thread', 'fiber rope', 'stone', and 'salt'. But these classes figure only in the selection of noun classifiers and in anaphor–antecedent agreement, NOT in grammatical agreement of the sort covered by the CAP. There really does seem to be no end to classifications relevant for anaphor–antecedent agreement; any categorization of interest to human beings might turn up. But only a few of these categorizations ever seem to play a role in grammatical agreement.

Gazdar's challenge (in personal communication) cuts deeper. He observes that there is a serious correspondence problem involved in talking about 'the illative case' in two different languages: what allows us to identify the two grammatical cases? Similarly for other agreement properties, other head properties, and foot properties as well.

This is not the place to mount a full response, but I believe it is possible to require that every property on the lists have semantic concomitants. I am not maintaining here
that these properties are to be identified with semantic features; grammatical categories are virtually always arbitrarily distributed (from the semantic point of view) in the lexicon to some extent. I am suggesting that a head or foot property is never a fully arbitrary and language-particular categorization of words and phrases: it has a semantic core that runs across languages. Fully arbitrary and language-particular categorizations of words are indeed possible — declension classes of nouns and conjugation classes of verbs are clearly like this in some languages — but (like the fully semantic categorizations of nouns I mentioned above) they do not, so far as I know, ever play a part in grammatical agreement. In German and Latin, adjectives agree with their head nouns in case, gender, and number — but not in declension class.

7. Indeed, in at least one work that builds on and revises the GPSG framework (Pollard 1984) both government and agreement are treated as subcategorization.

8. Note that in the system of property values adopted in section 3.1, the non-FEM genders constitute a natural class, namely the class of categories with the property GEND:{F:-}.

9. If the UHPL and UFPL proposals of note 6 are adopted, then an agreement treatment of adjectival declension is ruled out, since the parochial class properties will certainly appear on neither universal list.


11. This exploitation of a generalized proper inclusion precedence, or ‘elsewhere’, condition on morphological rules it shares with lexical, or level-ordered, morphology (see Kiparsky 1982 and the references therein), with which it is not in principle inconsistent.

References


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