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Case, Gender and Number Underspecification in the oldest Indo-European languages

I.

1.

Wunderlich (1996: 267)¹ characterizes Minimalist morphology as follows:

“Minimalist morphology has been proposed as a model of inflectional morphology that extends the minimalist program to morphological objects. The only sources used are a set of stems and a set of affixes, both maximally underspecified. The stems are classified in terms of the major lexical categories and the affixes in terms of functional categories, both represented as morphological feature specifications. Affixes and stems can be freely combined. The generation of complex word forms and the construction of paradigms in which all the generated word forms are minimally contrasted with each other rely on a small, i.e. minimal, set of general principles. An inflectional word form that is admitted in a paradigm can be projected into syntax, even if it is still underspecified for certain categorical dimensions. Syntactic mechanisms such as agreement checking and case checking are ultimately based on the information available in the word forms contrasted in a paradigm.”

Wunderlich describes further assumptions as follows: “Minimalist morphology assumes that the learners acquire all the facts

¹ Wunderlich/Fabry 1995.

concerning (productive) inflectional morphology on the basis of pairwise minimal contrasts, and that they compute paradigms only once they have acquired the relevant affixes” (Wunderlich 1995: 104). It is not necessary “to compare whole paradigms, which would be quite an expensive procedure. However ... thematic vowels, as well as other phonological properties of the stems, can easily be found by pairwise contrasts and can thus function as relevant class features” (Wunderlich 1996: 274). Wunderlich's perspective on feature theory is not without antecedents. The notion that underspecified feature representations are needed for the description of grammatical information can be found in the early literature on feature theory. Compare Roman Jakobson (1984a: 1): “If Category I announces the existence of A, then Category II does not announce the existence of A, i.e. it does not state whether A is present or not. The general meaning of the unmarked Category II, as compared to the marked Category I, is restricted to the lack of ‘A-signalization’”.

Following Jakobson (1984a), Wunderlich (1996) and Gallmann (1998) we assume that in a given pair, one of the features is functionally marked with respect to the other feature. Usually, the marked feature is labeled with a positive value, the unmarked with a negative value, e.g. [+ á] vs. [- á]. If an item is not positively marked with respect to a given feature pair, it does not need to be explicitly marked negative; it can be underspecified with respect to this feature class.

Compare the following examples in written English:

- (1)(a) Each judge dons his/*her robe before the ceremony.
- (1)(b) If anyone asks about it, send him/*her to me.
- (1)(c) Before any president can balance the budget, he/*she must reduce spending.

This data demonstrates an obvious asymmetry. Only masculine

forms can refer to groups including members of both sexes. Thus we should say that the feminine form is specified [+ Fem], but the masculine form is unspecified (i.e. []). Because the masculine form is unspecified, it can appear in mixed gender contexts. Without this assumption, an ad hoc rule must be imposed, stating that antecedents of mixed gender are [- Fem]².

Another example:

(2)(a) Ich zerstöre was mich ärgert.

(2)(b) ?Ich zerstöre wer mich ärgert.

(2)(c) *Ich zerstöre wen mich ärgert.

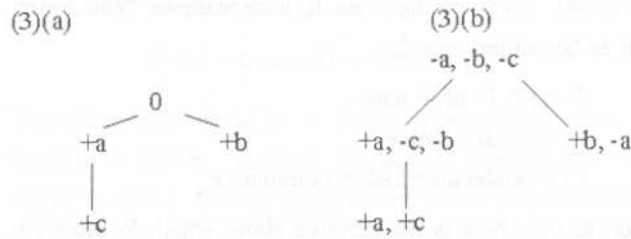
Here the verb in the matrix clause (*zerstören*) requires an accusative object. But the subject of the “free” relative clause is assigned nominative case. It seems that somehow the head of the free relative clause in these constructions is asked to realize both of these cases. While the form *wer* (non-neuter) typically appears only in nominative contexts, and *wen* (non-neuter) appears only in accusative contexts, the form *was* (neuter) appears in either accusative or nominative contexts. Since only the form *was* is unspecified for the feature that distinguishes these two cases, only *was* can appear in the Case conflict context (Lumsden 1992: 470f.; vgl. Lumsden 1987).

Though such an analysis is absolutely convincing, a minimal characterization of words or morphemes is very unusual in the field of linguistics where my data originates, i.e. the extinct Indo-European languages. In Indo-European linguistics, scholars reconstruct morphological items for the most part. They are not used to looking at paradigms from the viewpoint of a learner. Nevertheless it would be desirable to apply the theory of

² In colloquial English speakers do not use the masculine default anymore; the plural *they/them* has become the generic, e.g. *If anyone asks about it, send them to me.*

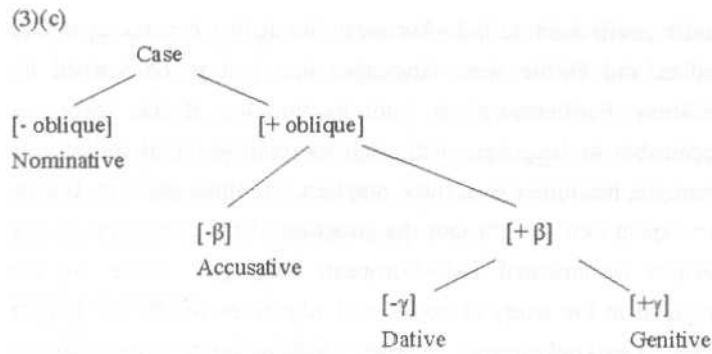
underspecification to Indo-European linguistics, because even Old Indian and Hittite were languages that had to be learned by children. Furthermore we want to find out if this theory is applicable to languages with rich morphology. Old Indian, for example, has nine cases, three numbers and three genders. If it is, we expect new insight into the structure of the paradigms of our earliest documented Indo-European languages. Since we are engaged in the study of nouns and adjectives within our project “Das Lexikonkonzept: Nomen substantivum und Nomen adjectivum” I shall confine myself to the morphology of nouns.

The information that the lexical entry provides for a noun can be organized in a default inheritance tree in which the subnodes inherit all the information not yet specified by the dominating node:



(Wunderlich 1997: 48)

Consider the hierarchical ordering of German case features, following the same scheme:



(Gallmann 1998: 146)

Wunderlich (1995: 106f.) posits two configurational features for verbal arguments, [+/- hr] ('there is a/no higher theta-role') and [+/- lr] ('there is a/no lower theta-role'), as first proposed by Kiparsky (1989, 1992): on the basis of these features, Wunderlich defines three 'structural cases':

- (3)(d)
- [+ lr] & [+ hr] = dative
 - [+ hr] = accusative
 - [] (= underspecified) = nominative

In addition to this there is the genitive about which Wunderlich (1995: 107) gives the following description:

- (3)(e) [+ hr, + nominal] = genitive

The theta-roles to which structural cases are linked in the default case are:

| | | | | | | | | |
|--------|-------------|-------------|-------------|------|---------|-------------|-------------|-----------|
| (3)(f) | λz | λy | λx | VERB | (x,y,z) | λy | λx | NOUN(x,y) |
| | | +hr | +hr | | | | | +hr |
| | | | +r | | | | | |
| | acc | dat | nom | | | | | gen |

As Gallmann (1998: 147) points out though, this approach is misleading. Cases are not identical to configurational features; there are only 'structural Case relations'. Slightly modifying Wunderlich's approach, Gallmann (1998: 146f.) states the following relations:

- (4)
- [+ lr] & [+ hr] → dative
 - [+ hr] → accusative
 - [] (= underspecified) → nominative

And for the genitive:

- [+ hr, + nominal] → genitive

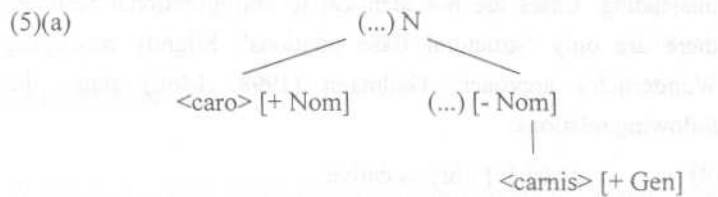
The alternative would be to assume homophonic cases, e.g. for German a dative₁, assigned to indirect objects (the 'structural dative'), and a dative₂, assigned by some prepositions to their complements (a sort of 'lexical dative') and so on. However, Gallmann states correctly that dative₁ and dative₂ are indistinguishable from a morphological point of view (147).

A second improvement of Wunderlich's approach seems necessary: Wunderlich/Fabri (1995: 255) suppose that the mental lexicon offers the possibility of paradigmatic storage. They assume default inheritance trees:

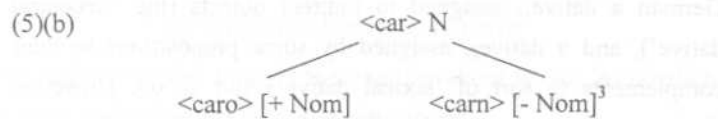
(i) The base is the underlying representation of the lexical item.
[...]

(ii) Each additional, not generally predictable form constitutes a

subpath of the tree. The subnodes are maximally underspecified and the information added at the nodes gets preference, so that it either enlarges or substitutes the information of the dominating node [...]. All other information in the base is inherited by the subnodes; compare the mental representation of Latin *carō* 'meat', adapted to the theory of Wunderlich/Fabri by Gallmann (1998: 166f.):



In this inheritance tree the positions marked <...> are not stored in the lexicon. They can only be reconstructed indirectly on the basis of the nominative form and genitive form in the morphological component. This type of storage is undoubtedly more redundant than the inheritance tree Gallmann suggests (5)(b):



Indeed languages with rich stem inflection support this view. There are no words in different case positions that are bare stems. Even the nominative case has an inflectional ending. Thus the point of reference for all case forms is the stem and not a special form of a word.

Another important item of Minimalist morphology concerns the phenomenon of syncretism. In this case we agree exactly with Wunderlich's description (1995: 107):

³ The other case forms can be generated from the oblique stem <carn> by morphological rules: *carnis* (genitive), *carnem* (accusative) etc.

“If genitive and dative coincide morphologically, the feature value of the respective word forms is [hr, + α] with α ranging over [lr, nominal], and if accusative and genitive coincide morphologically, [...] the feature value is [+ hr, (+ nominal)]. If nominative and accusative coincide, the respective word forms are simply unmarked and are thus licensed in all syntactic contexts that either require [+ hr] or [], given that there is no other specific form available from the morphology.”

According to Wunderlich (1996: 275f.), “it is worthwhile to note that syncretism is not a failure of the morphological system, even if it may produce indeterminacies in the syntax: rather, it is an expected phenomenon from the perspective that the number of phonological distinct affixes should be small.”

Turning now to the morphology of Old Indian, Hittite and Greek we want to look at number, gender and case. Starting with case we have to deal with the problem of how to integrate other cases than nominative, accusative, genitive and dative into the morphological description according to Minimalist morphology.

In this respect Jakobson's approach “Beitrag zur allgemeinen Kasuslehre” first published in 1936 and translated into English as “General meanings of the Russian Cases” (1984b) is still very useful.

Comparing the nominative with the accusative Jakobson has a different view on this relation from Kiparsky and Wunderlich. But the result is the same. The accusative has one more feature than the nominative: “The actual contrast between the A and the N consists merely in the fact that the A denotes the entity at which an action is directed, whereas the N by itself specifies neither the presence nor the absence of any directedness of an action. The statement of the existence of directedness [Bezug] is therefore the

mark of the A as opposed to the N.” Thus, Jakobson treats the A as the marked member of a directional correlation [Bezugskorrelation] and the N as the unmarked member (67)⁴. The following statement is especially compatible with the theory of underspecification: “The general meaning of one case focuses upon the presence of a certain mark (α) of objective reality [gegenständliche Begebenheit], while the general meaning of the other case is that neither the presence nor the absence of this mark is affirmed. In reference to the first we speak of a marked category; in reference to the second, of an unmarked category.” (70)⁴. With respect to comparison of the genitive with the nominative and accusative Jakobson points out that “the G always indicates the limit of the referent’s involvement in the content of the utterance. We can thus speak of the contrast between the G, which indicates the scope of involvement of its referent, and the other cases (N, A) which do not indicate this, as a scope correlation [Umfangskorrelation].” In spite of the variety of the genitive functions, it is important to notice that Jakobson combines all of them under one conception; for example, both the partitive-object genitive and the adnominal use of the genitive signify “that its referent is outside the content of the utterance or is only partially represented in it” (75)⁴. But since “the adnominal use displays most fully and clearly the semantic peculiarity of the G,” Jakobson regards this use of the G as the “typical expression of this case” (75)⁴. Though other cases, i.e. the dative and instrumental, have special relationships too, “neither the instrumental nor the dative indicate scope-relationships [Umfangsverhältnisse]. These cases stand in a correlative

⁴Jakobson, Roman 1936: “Beitrag zur allgemeinen Kasuslehre. Gesamtbedeutungen der russischen Kasus.” Translated into English in: Waugh, Linda R./Moris Halle (eds.) 1984: *Russian and Slavic Grammar. Studies 1931-1981*. Berlin/New York/Amsterdam: Mouton (Janua linguarum. Series Maior 106).

relationship not with the G, but with the N and A. Like the A, the D also indicates that its referent is involved in an action" (77)⁴, it "specifies only the addressee, signifying the mere directedness of the action without affecting the object" (83)⁴, thus, "the D denotes the existence of its referent as independent of the action" (84)⁴. Comparing the functions of the dative and instrumental, Jakobson follows Šaxmatov, who argues that the instrumental "designates a concept which is independent of the verb and is not subject to the effects of the marked feature of the verb, but, to the contrary, designates a concept which aids in the unfolding of the marked feature ..." (77f)⁴. To distinguish instrumental and dative on the one hand and nominative and accusative on the other hand, Jakobson uses a dichotomy, full case vs. peripheral case. This means: "A peripheral case indicates that its referent occupies a peripheral status in the overall semantic content of the utterance, while a full case indicates nothing about such a status" (78)⁴. Or: since a periphery presupposes a center, "a peripheral case presupposes the presence of a central point in the content of the utterance, which the peripheral case helps determine" (78)⁴. Returning to the function of the instrumental, Jakobson states that this case, like the N, says "nothing about whether its referent itself exerts an action or participates in an action." (77)⁴. Thus the instrumental "occupies the same position among the peripheral cases that the N does among the full cases: that of the unmarked category" (82)⁴. Let us next consider the locative. Jakobson assumes that in this case "as in the G and in opposition to the D and A, the opposition of directedness is irrelevant" (S. 88). The locative is a peripheral case, but whereas the instrumental and dative "indicate peripheral status in contrast to the dominant category ... the entity which is in the locative is not represented in the utterance to its full extent; thus the L is, like the G, a scope case [Umfangskasus]. It differs, of course, from the G in that it

only defines the extension" (89f.)⁴. By adding the ablative, the function of which Jakobson (1984d) describes elsewhere, we have to consider this case peripheral as well. It "signalizes direction away from the object, as distinct from the A and D, which signalize direction toward the object" (1984c: 126). To sum up Jakobson's case : we have directional cases (A, D, Abl) [Bezugskasus], cases of scope (G, L) [Umfangskasus], and peripheral cases (L, D, I, Abl) [Randkasus].

Now the question is which distinctions can we use for the characterization of the nominal feature systems in the earliest Indo-European languages. Firstly, though Jakobson describes the Russian case system (where the instrumental plays an important role) as predicative instrumental, he is surely right in stating that peripherally marked cases tend to become adverbs diachronically (83)⁴. Compare Old High German *hiu tagu* > Middle High German *hiute* 'today'. If an instrumental exists, i.e. in Old Aryan, it is rather a peripheral case, i.e. a case with a peripheral status in comparison to the full cases nominative or accusative, as mentioned above. Therefore, we will adopt Jakobson's definition of the instrumental as a peripheral case (with the feature [+ with]). Another important item concerns the statement that cases have a general meaning. We fully agree with Jakobson's point of view, which is the same as Gallmann's (Gallmann 1998: 147): "general meanings of cases belong to morphology while ... particular meanings belong to syntax." Only for the accusative do we state a second function "to," if this case also answers the question "where to" and if there exists an opposite case answering the question "where from". Because this accusative functions as an accusative-of-direction we call this case "directive," which from a synchronic view happens to be a homophone of the accusative-as-an-object. The reason for assuming such a directive lies in case symmetry: in Old Aryan the result of the Indo-European *o*-stems has a special

ablative ending in the singular whose main function can be described as “where-from-direction”. In all the other paradigms of the singular the ablative is identical with the genitive. Remembering that Jakobson characterizes the genitive as a primarily adnominal case, we will also make a distinction between verbal and nominal cases. There is still one case remaining, i.e. the vocative. It is said that this case exists outside of the sentence; but the vocative is often identical with the nominative. Thus we define the vocative as a full case⁵ and provide a feature dichotomy, inside vs. outside the sentence, if the vocative differs from the nominative. Respecting the mentioned case features, also those of Kiparsky and Wunderlich, we acquire quite a few dichotomies:

We have to take into account the division into full case vs. peripheral case ([] vs. [+ periph]), which partially overlaps with the traditional division into direct/indirect object vs. adverbial cases. The feature [+ hr] we will confine to cases that function as objects, i.e. the accusative and the dative. Furthermore, we need the feature “adverbial” to distinguish cases like locative [+ place] and instrumental [+ with] from the dative within the peripheral cases ([] vs. [+ adv]). Because of the coincidence of dative and ablative in the plural and the coincidence of genitive and locative and of dative, ablative and instrumental in the dual, we need further features which discriminate these functions. The dative and the ablative denote the person or thing concerned by some action. The most general conception of genitive and locative is that of localization, and common to dative, instrumental and ablative is that these cases express a relation of one object to another. Therefore, we shall call these features [] vs. [+ concerned], [] vs. [+ localized] and [] vs. [+ relational]. Thus we suggest the following features for a possible morphological

⁵ Cf. the distinction between “strong cases” and “weak cases” in the Vedic noun inflection.

representation:

- (6) [] stem
 [] vs. [+ outside the sentence] (= o)
 [] vs. [+ peripheral case] (= p)
 [] vs. [+ hr] (= hr)
 [] vs. [+ concern] (= c)
 [] vs. [+ nominal] (= n)
 [] vs. [+ adverbial] (= a)
 [] vs. [+ localized] (= l)
 [] vs. [+ relational] (= r)
 [] vs. [+ with] (= wi)
 [] vs. [+ place] (= pl)
 [] vs. [+ direction] (= d)
 [] vs. [+ to-direction] (= to)
 [] vs. [+ wh-direction] (= wh)

Sg.

| | +o | +p | +n | +hr | +a | +wi | +pl | +d | +to | +wh |
|-------|----|----|----|-----|----|-----|-----|----|-----|-----|
| Nom | - | - | - | - | - | - | - | - | - | - |
| Voc | + | - | - | - | - | - | - | - | - | - |
| Acc | - | - | - | + | - | - | - | - | - | - |
| Dat | - | + | - | + | - | - | - | - | - | - |
| Instr | - | + | - | - | + | + | - | - | - | - |
| Loc | - | + | - | - | + | - | + | - | - | - |
| Abl | - | + | - | - | + | - | - | + | - | + |
| Dir | - | + | - | - | + | - | - | + | + | - |
| Gen | - | + | + | - | - | - | - | - | - | - |

Pl.

| | +p | +n | +hr | +c | +a | +wi | +pl |
|---------|----|----|-----|----|----|-----|-----|
| Nom/Voc | - | - | - | - | - | - | - |
| Acc | - | - | + | - | - | - | - |
| Dat/Abl | + | - | - | + | - | - | - |
| Instr | + | - | - | - | + | + | - |
| Loc | + | - | - | - | + | - | + |
| Gen | + | + | - | - | - | - | - |

| | | | |
|---------------|----|----|----|
| Du. | | | |
| | +p | +r | +l |
| Nom/Acc/Voc | - | - | - |
| Dat/Abl/Instr | + | + | - |
| Loc/Gen | + | - | + |

While these features refer to case, others relate to number and gender.

For all these features, one has to take into account the order of information. The information contained in a morphological object (stem and affix of an inflected word form) is ordered according to the hierarchy of functional categories (Wunderlich 1996: 270). The observation that the order of affixes must conform to the hierarchy of functional categories was first made from a typological perspective by Bybee (1985). Unfortunately she did not investigate nouns, but if we try to sort out the nominal features, i.e. case, number and gender, we find that gender is semantically based; it characterizes properties of individuals, whereas number characterizes properties of a collection of individuals. Thus one can claim that number must be ranked above gender for semantic reasons. On the contrary, case is a syntactically based feature. The hierarchy of functional categories, which holds for nouns is therefore: Case > Number > Gender (> noun). This hierarchy must be observed in the case of fusion:

Only categories which are adjacent in the hierarchy can be fused into one affix (So, for instance, case and number may amalgamate) (Wunderlich/Fabry 1995: 249).

When we establish a feature hierarchy consisting of the three genders, masculine, feminine, and neuter, the three numbers, singular, dual, plural, and the given nine cases, we have the Old Indian paradigm in mind. We take this language as an example for

the purpose of testing the devices of Minimalist Morphology, because Old Indian has more cases, numbers and genders than any other old Indo-European language. Another important reason is the following. In establishing paradigms, the Old Indian grammarians used procedures that resemble those of Minimalist Morphology: identical case forms are never separated from each other. Compare the co-occurrence of the homophonic genitive and the ablative singular or the co-occurrence of the homophonic dative and ablative plural. This very old tradition⁶ has the same motivation as the Minimalist Morphology analysis: the purposes of the learner of the paradigms are respected.

We will confine ourselves to masculine and neuter *a*-stems and the feminine *ā*-stems, the most frequent stems in this language. First we want to check which of the features have a morphological representation and which do not. Here the phenomenon of syncretism is relevant. Our second question is: which affixes are really unpredictable in the paradigms? These forms have great deal of to be considered as cornerstones defining a paradigm. Third, since there are many analogies, why do they work the way they do? What kind of mental lexicon lies behind all these represented features? It will be shown that the three functional categories of the noun, case, number and gender, behave in different ways with respect to underspecification.

II.

1. The Old Indian paradigm of the *a*- and *ā*-stems

1.a. Inheritance-trees

Compare now the declension of the *a*-stems in the masculine. The

⁶ Wackernagel/Debrunner 1929/1930: 11.

example is *devá-* ‘god’:

(7)

Masculine

| | Singular | Dual | Plural |
|-------|----------|-----------|--------------------|
| Nom | deváh | deváu | deváh |
| Acc | devám | deváu | deván |
| Instr | devéna | devábhyām | deváiḥ |
| Dat | deváya | devábhyām | devébhyaḥ |
| Abl | devát | devábhyām | devébhyaḥ |
| Gen | devásya | deváyoh | devánām |
| Loc | devé | deváyoh | devésu |
| Voc | déva | deváu | dévāḥ ⁷ |
| Dir | devám | | |

1.b. Case, Number

Let us start with case and number. Remember that the morphological features have only [+] and [-] values. As mentioned above, we follow Gallmann in representing stems that can only be reconstructed indirectly on the basis of real case forms. Therefore, in stem-based inflection, the [+] values can represent stem forms or real case forms denoting structural or semantic case relations for each number. Like real case forms, stems are learned through minimal pairwise contrasts. Each node inherits the [+] values of its mother node. It cannot have the [+] values of the daughter nodes (Wunderlich 1997: 48). But it may carry the [+] value of a sister node, if there is recursion. Recursion is to be assumed if more than one case form is generated from the same oblique stem. After the fundamental division into full cases (nominative, accusative, vocative) and peripheral cases (dative, genitive,

⁷ This paradigm is different from the paradigm in relevant grammars in so far as all forms are listed, following the Paradigm Principles (Wunderlich 1995: 99)

a. Completeness: Every cell of a paradigm must be occupied.

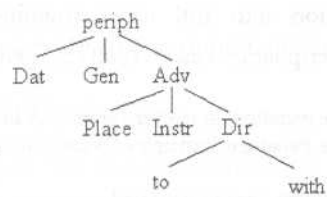
b. Uniqueness: Every cell of a paradigm is uniquely occupied.

instrumental etc.) a structural or semantic case relation at a stem node is added if stem alternation occurs.

In accordance with the statements of Minimalist Morphology (compare above), we assume that the grammatical features are ordered in binary oppositions (Blevins 1995)⁸. For the singular we suggest the following inheritance tree:



⁸ In opposition to this principle, there are tree-branchings like



But compare Wunderlich 1997: 50, who assumes disjunctive specifications.

(8)(a)

