Case and Verbal Agreement as Argument Numbering

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1. Preliminaries

   This is a paper about the relationship between verbs and NPs. I wish to suggest that when a head takes an argument, two things happen: (i) a piece of a syntactic tree is built, in such a way that the head
and the argument are sisters [fn.1]; (ii) the head-argument relationship is morphologically registered on the head or the argument (or both). I will assume (i), without providing any arguments for it. I will concentrate in this paper on (ii), what I will call "argument numbering": structural case assignment, default case, and verbal agreement.

I will have to assume that the arguments of a verb are not unordered, but that they are taken in certain order (in the spirit of Categorial Grammar) depending on the theta-role of the NP, and on the language. The main point of this paper is that structural case and agreement have no other function but to show in which order the arguments were taken.

1.1. Degrees of abstractness and abstract Case

When talking about case assignment in natural language, one is often forced to adopt some level of abstractness, in order to capture generalizations. The Finnish objective case is a case in point. Traditionally, Finnish is taken to have two objective cases, partitive and accusative; accusative is used if one wishes to denote completeness:

1) Jukka soi omenan.
   NOM ate apple-ACC
   'Jukka ate (all of) an apple'

The partitive is used elsewhere, e.g. when denoting incompleteness:

2) Jukka soi omenaa.
   NOM ate apple-PART
   'Jukka was eating an apple'

Now, both cases are assigned to objects of transitive verbs, and we may wish to be able to refer to 'objective case' in Finnish, which would encompass both accusative and partitive. Such an 'objective' case would be an abstract entity in Finnish, without any morphological reflex.

On the other hand, we may wish to refrain from abstractness by studying the behavior of 'real' case, namely partitive and accusative. However, by doing this we cannot escape abstractness: the accusative case is in itself an abstract entity. There is no single morphological form that all NPs with accusative case
Therefore, the refer having unif show abstractness genitive this the pronouns: all feminine of genitive English Finnish Finnish to accusative form: accept forms only assignment, degree information the remaining "accusative" NPs. Some syntacticians (in the GB framework) have indeed taken the 'nominative object' to be an instance of nominative case, to be accounted for by the theory of nominative case assignment (Gilligan (1984), Milsark (1984), van Nes-Felius (1984) and Taraldsen (1984); see also an earlier account of Finnish 'nominative objects' by Timberlake (1975)).

If one holds this view of the accusative case in Finnish (namely that especially the 'nominative' forms of the accusative case, and presumably the 'genitive' forms as well, are separate cases), then one should accept a corresponding view for English. Consider the English accusative. It too only occurs with some pronouns: me, him, us, them. For other pronouns and all full NPs, we find either a nominative or a genitive form: all full NPs and the pronouns you and it occur in the nominative case; the pronoun her occurs in the genitive (or, alternatively, the third person singular feminine pronoun her is an accusative form, which is also used for the genitive). The only difference between Finnish and English is the role of verbal information in Finnish in deciding whether an NP should show up in nominative or genitive (while in English this is decided solely based on the characteristics of the NP).

I think it is clear that for both languages a unified concept of 'accusative' is required. Therefore, we are forced to deal with some degree of abstractness (this doesn't rule out the possibility of having an additional theory for the different forms of the accusative for both languages, as given in Vainikka (1985a) and below; cf. also Renault (1984) on Finnish).

So, when talking about case, we need to sometimes refer to abstract concepts, such as the accusative in
Finnish and English. But recall that in Finnish we may wish, for certain purposes, to get even more abstract and talk about objective case (which encompasses the accusative and the partitive). There does not seem to be a universally "right" degree of abstraction.

"Abstract Case" is a concept used in the GB theory (e.g. Chomsky (1981), Stowell (1981); cf. also fn.1). What is the degree of abstraction that is being assumed for abstract Case? It seems to me that for the purposes where Case is used (e.g. motivating NP-movement in the English passive), the highest possible degree of abstraction is the relevant one: i.e., it doesn't matter WHICH Case is being assigned; what matters is that SOME Case is assigned. Similarly, it doesn't matter (for most purposes) WHICH one of the accusative forms shows up, as long as the appropriate one does.

If abstract Case is really so abstract that individual cases don't matter, then there probably isn't any reason to even talk about case/Case. What it really means for a V to assign abstract Case is for V to take an argument (argument-taking being an abstract level based on which case assignment takes place); saying that an NP moves because it cannot get Case in a particular position is tantamount to (and no more explanatory than) saying that the V cannot have that particular argument in that particular position.

A more interesting approach to abstract Case (as opposed to just the theory of how heads take arguments) would be one where Case occupies a syntactic position, and therefore has properties similar to other abstract elements with syntactic positions (i.e. empty categories); such an approach has been advocated by LaMontagne and Travis (1986, 1987) (cf. also Yim (1984)). But even in this type of theory, if the particular syntactic positions or cases are not significant, then it is not clear that we really should be talking about case/Case, but rather about some closely related concept (such as the head-argument relation).

Different degrees of abstractness are relevant for talking about different processes. It is crucial, though, that the degree of abstractness is kept constant throughout a chain of argumentation. Belletti (1988) argues, based on the "real" partitive case in Finnish, for the existence of an abstract partitive in Italian, English and Finnish (in order to account for
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Definiteness Effect); however, based on her final description of the abstract partitive, many non-partitive NPs in Finnish will end up being "abstractly" partitive; the degree of abstractness is not kept constant for the definition of 'partitive' (see Vainikka (1988) for a more detailed reply to Belletti).

In this paper, I will propose a theory of case which has to do with Levels I and II in the following rough scale:

LEVEL IV (highest level of abstraction):

case assignment important, but actual syntactic positions or cases not important (e.g. GB Case Theory)

LEVEL III:

syntactic functions important, but actual cases not important ('objective' rather than 'accusative' and 'partitive'; also 'possessive' rather than 'genitive' and 'of-PP' in English)

LEVEL II:

cases with identifiable paradigms important (e.g. accusative vs. partitive), but morphological variation within a paradigm not important

LEVEL I:

morphological variation important within a particular case (e.g. different forms of 'accusative')

1.2. Different kinds of case

I assume that each occurrence of a case/P (=preposition or postposition) falls into one of the following three categories: semantic, lexical, and syntactic. Apart from this section, this paper will deal almost exclusively with syntactic case. By semantic case I mean the following:
3) SEMANTIC CASE:

- the meaning of the (case-marked) NP/PP is predictable based on the overt case/P; the NP/PP can be interpreted in isolation, without a V

- theta-role is assigned internally (say, by the case morpheme or P) rather than by V; V does not assign case to these NP/PPs

- examples: locatives (on the street, in my briefcase); with/without phrases (with her friend, without money)

There are some instances of NPs which may meet the criteria in (3) for ‘semantic case’, but which I will nevertheless assume to be syntactically assigned case. For example, ‘ergative’ and ‘nominative’ cases seem to have some sort of a relationship to the theta-role ‘agent’; I will nevertheless assume that ‘ergative’ and ‘nominative’ are structurally assigned, as their relationship to a particular theta-role is not one-to-one (or probably not even one-to-many: ‘nominative’ NPs don’t have to be ‘agents’, and ‘agents’ don’t have to be nominatives). I take the relationship between a structural case and a particular theta-role to be one of a prototypical theta-role for a particular case; we shall see how this relationship figures in building an argument-numbering system.

By lexical case I mean the following:

4) LEXICAL CASE (also known as ‘inherent case’)

- the case form is not predictable, and has to be specified in the lexicon

- the meaning of the NP/PP is not predictable; in order to know what the NP/PP means, V is required

- V assigns theta-role to the NP/PP

- examples: rely on, substitute for, agree with

With semantic case, V assigns neither theta-role nor case to the NP, and with lexical case, V assigns only a theta-role.
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In addition to clearly lexical and clearly semantic cases, we have a category (pretheoretically) that seems to fall somewhere in between lexical and semantic case. This category basically consists of datives (or 'goals', 'recipients', 'sources'). These NPs differ from ones with semantic case in that the meaning of NP/PP is not entirely predictable; they differ from ones with lexical case in that the semantics is not unpredictable either. With these type of NPs, the V and the case/P morpheme seem to be assigning a theta-role jointly. We might term this category 'semi-semantic' case.

As an illustration of the distinction between the three types of case discussed so far, consider the PP from the Linguistics Department in the following sentences:

5a) She walked home from the Linguistics Department.

b) She received a book from the Linguistics Department.

c) The Psychology Department differs from the Linguistics Department.

The PP is an instance of semantic case in (5a), semi-semantic case in (5b), and lexical case in (5c).

Any instance of case/P that does not fall into the above categories, is an instance of syntactic (or structural) case. I am assuming two types of syntactic case: structurally assigned case, and structural default case. If a case is assigned by a particular case assigner, then we have structurally assigned case; if the case is not assigned by a case assigner (but is associated with a particular syntactic position, for example), then it is structural default case. This distinction has consequences for word order: at the time of case assignment in the derivation of a sentence, the case assigner and the case assignee have to be sisters, while there is no such constraint on structural default case. The adjacency requirement also limits the number of cases a particular case assigner may assign, while a structural default case is not numerically restricted (e.g. in Japanese [fn.2], the ACC -o is assigned by the adjacent V, while -ga could be analyzed as a structural default case that does not need to be adjacent to the V; -o can only be assigned to one NP by the V, but more than one -ga is possible).
Structurally assigned case basically consists of the traditional class of 'grammatical' cases. It roughly corresponds to Fillmore's (1968) idea of "pure relations" that have lost their "label" (i.e. they have lost their one-to-one correspondence with a semantic case). Structural default case, semantic case, and lexical are typically 'oblique' cases. Semantic case is similar to Fillmore's notion of "labeled relation" (although he includes 'agent' and 'objective' in this class).

The basic property of syntactic/structural case (both assigned and default) is that there isn't a one-to-one correspondence between a particular theta-role and the case/P. The system outlined in this paper provides a mapping between theta-roles and structural case.

An important characteristic of structurally assigned case is its intimate connection to verbal agreement. I will take verbal agreement (with NPs) to be an instance of the same process as structural case assignment (in the spirit of Nichols (1986)).

2. Dyirbal is not "split ergative"

Dyirbal has been analyzed as a morphologically "split ergative" language (Dixon (1972), Silverstein (1976) and B. Levin (1983){fn.3}). In the system developed here, the "split" in Dyirbal is due to differences in the morphological paradigms for different types of NPs (recall the "split" in the Finnish and English 'accusative': different forms for different types of NPs), rather than to a difference in case assignment to different types of NPs--which is what has been traditionally assumed. In the present system, only one set of case assignment rules is needed, not two.

The split in Dyirbal can be described as follows: pronouns in Dyirbal exhibit a nominative/accusative pattern, while full NPs follow an ergative/absolutive pattern (Dixon, however, states that "there is a great deal of syntactic evidence for the view that both nouns and pronouns follow an underlying nominative-ergative pattern" (1972; p.50)). The following table gives the distribution of these cases, assuming two case systems: ABS/ERG for full NPs and NOM/ACC for pronouns (adapted from Levin (1983; p.233):

https://scholarworks.umass.edu/umop/vol13/iss1/11
<table>
<thead>
<tr>
<th>Number of arguments</th>
<th>Argument</th>
<th>Case if full NP</th>
<th>Case if pronoun</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>single</td>
<td>ABS</td>
<td>NOM</td>
</tr>
<tr>
<td>2</td>
<td>agent</td>
<td>ERG</td>
<td>NOM</td>
</tr>
<tr>
<td>2</td>
<td>patient</td>
<td>ABS</td>
<td>ACC</td>
</tr>
</tbody>
</table>

Single arguments of intransitive verbs show up in the nominative if the NP is a pronoun, and in the absolutive if the NP is not a pronoun. Typical agent-patient transitive verbs have a pronominal agent in the nominative, but a full NP agent in the ergative. Patients show up either in the accusative (pronouns) or absolutive (full NPs).

Levin shows that syntactic processes, apart from case marking (and, to certain extent, word order—see Dixon p.291 #3 and #4) do not distinguish between full NPs and pronouns. I will propose a case marking system which does not distinguish pronouns and full NPs from each other either (and although there seems to be a word order difference between the pronominal and the nominal systems, this follows from the (superficial) difference in the case paradigm).

Let me first review Dixon’s (1972) case assignment system, and then show how my system differs from his. Consider (7) (Dixon p.152):

7) CASE MARKING

(i) the leftmost NP immediately dominated by [S] (i.e. the topic NP) is in nominative case;

(ii) all other NPs are in ergative case.

For Dixon, ‘nominative’ covers NOMinative, ABSolute and ACCusative in (6) above. That is, the non-ergative form of the full NPs is called nominative, as well as BOTH forms of the pronouns. To get a distinction between the two pronominal forms (NOM and ACC), Dixon suggests the following (p.200; modified):
8) REALISATION [sic] RULES

if the NP has features: its pronominal head has the form:

[1] [nominative] [+actor] ngaja [NOM]
[2] [ergative] [+actor] ngaja [NOM]
[3] [nominative] [-actor] ngayguna [ACC]

Basically, [+actor] gives the NOM form, and [-actor] the ACC form (NOM and ACC are my terms here).

I will assume, following Jakobson (1936; for Russian and other languages) and Andrews (1982; for Icelandic), that nominative case is not really a case, but a 0-marked form of a lexical item (in languages where 'nominative' does not have an overt affix--the Japanese nominative -ga is a different creature). In Dyirbal, both 'nominative' and 'absolutive' are 0-marked, and I will assume that there is no nominative/absolutive distinction. Unlike Dixon, I maintain a case distinction between the two pronominal forms (ACC vs. 0-marked).

I will need to assume the following about building trees and argument-taking: a V takes its arguments one by one, cyclically (in the spirit of Categorial Grammar; see Schmerling (1979) and O'Grady (1987) [fn.4]). While taking its arguments, the V builds 'argument trees'--syntactic trees which only contain the V and its arguments (other material, such as adjectives and adverbs, is added later). Structural case assignment and verbal agreement occur as a by-product of argument-taking. The arguments of a verb are ordered, based on their theta-roles; I will return to this.

Consider now the proposal for case assignment in Dyirbal (there is no verbal agreement in Dyirbal):

9) DYIRBAL ARGUMENT NUMBERING:

(i) ARGUMENT1: V[+2ARG] assigns ACC to NP
(ii) ARGUMENT2: V assigns ERG to NP
(iii) ARGUMENT3: V assigns INSTR to NP

In (i), I need to be able to refer to whether the verb is transitive or not; this is what is meant by V[+2ARG]. I will try to justify this feature shortly.
As mentioned earlier, I am assuming that the arguments of a verb are ordered based on their theta-roles. Roughly speaking, an 'affected' argument (or, possibly, the most affected argument) is taken as ARGUMENT1--I will return to a discussion of affectedness in Section 2. An 'agent' (or, perhaps, the most agentive argument) is taken as ARGUMENT2. ARGUMENT3 in Dyirbal seems not to be associated with a specific theta-role--in effect, any 'left-over' argument could be marked as ARGUMENT3. In this paper, my purpose is primarily to show what case assignment systems would look like if constructed along these lines, leaving open the precise definitions of the theta-roles involved. If the present case assignment systems are on the right track, they can provide feedback on how the ever-so-slippery theta-roles should be defined.

As far as I can tell based on the available literature, the system in (9) will take care of syntactic case in Dyirbal, given the following principle independently needed e.g. for English (as we shall see):

10) THE ZERO-FORM PRINCIPLE

If an NP does not receive case during its cycle, it will show up in the 0-form (its lexical entry).

(10) implies that the Case Filter (Chomsky (1981)) does not operate at this low level of abstraction (but rather, the Case Filter has to do with a higher level of abstraction; cf. Section 1.1. and fn. 1).

During cycle (i), the V 'tries' to assign ACC to all (patient) NPs--however, only the pronouns have an ACC form in their paradigm, and they will therefore show up in ACC--see (11d) below. Full NPs do not have an ACC paradigm, and they will, by the Zero Form Principle of (10), show up in the 0-form (i.e. 'absolutive')--(11c) below. The V also tries to assign case to the single arguments of intransitive verbs; these will also show up in the 0-form, since the V does not have the feature [+2ARG], and therefore cannot assign ACC to the NP. This gives us the result of pronouns showing up in 'nominative'--(11a)--and full NPs in 'absolutive'--(11b)--in intransitive constructions; although the V in this case cannot assign case to the NP, it will still take the NP as its
argument. Consider now examples of single-argument constructions (examples from Dixon (1972); orthography Levin’s; payi and palan are noun-markers):

11a) Ngaja paninyu.
  0   NFUT
  I   come 'I’m coming' [Dixon, ex(28)]

b) Payi yara paninyu.
  0   0   NFUT
  man come 'A/the man is coming' [24]

c) Palan jukumpil palkan.
  0   0   NFUT [+2ARG]
  woman hit 'A/the woman is being hit' [95]

d) Njayguna palkan.
  ACC   NFUT [+2ARG]
  I   hit 'I am being hit' [96]

(11c) and (11d) show that the second argument is optional for transitive verbs. A pronominal single argument of a two-argument verb shows up in ACC--(11d), while a full NP shows up in the 0-form--(11c). The difference between (11a) and (11d) is that in (11d) the V is [+2ARG], and is therefore able to assign ACC, while in (11d) the V is [-2ARG], and cannot assign ACC.

(9i) above takes care of assigning ACC to pronouns (1st and 2nd person pronouns; Dyirbal has no 3rd person pronouns) when they occur as patients of 2-argument (transitive) verbs—as in (11d). One might object to the possibility of referring to the transitivity of the verb during the first cycle (when, presumably, it is not known during the first cycle how many arguments the verb will end up with). Dyirbal seems to be a special case in that 90% of the transitive verbs are marked as such (they belong to the same conjugational class, marked by the suffix -l; Dixon (1972)). The very fact that the overwhelming majority of the Dyirbal verbs is marked for transitivity suggests to me that this marking should play a role somewhere. I submit, then, that although normally we would not expect to be able to refer to the final number of arguments of the verb at an early cycle, in Dyirbal some of this information is encoded in the morphology of the verb, and the information is available during all cycles.
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(alternatively, we might say that at cycle (i) the suffix -1, rather than the verb itself, assigns ACC to ARGUMENT1).

During cycle (ii), the second argument is being dealt with (typically agent). The verb, again, tries to assign ERGative to all second arguments. Only the full NPs (or, 3rd person forms) have an ERG form in their paradigm; pronouns do not (see the pronoun paradigm in Dixon (1972; p.50)). By the Zero Form Principle, pronouns will show up in the 0-form ('nominative'). Examples of transitive constructions are given in (12):

12a) Ngaja nginuna palkan.
   0 ACC NFUT
   I you hit 'I'm hitting you' [30]

12b) Palan jukumpil pangkul yarangku palkan.
   0 0 ERG ERG NFUT
   woman man hit

'A/the man is hitting a/the woman' [26]
[palan and pangkul are noun markers]

In (12a), nginuna (the patient) gets ACC during cycle (i); ngaja (the agent) ends up in its 0-form during cycle (ii), since it doesn’t have an ERG form in its paradigm. In a reverse manner, palan jukumpil (the patient) ends up in its 0-form during cycle (i), while pangkul yarangku (the agent) gets ERG during cycle (ii).

Note the word order in these sentences (according to Dixon (p.291 #3, 4, and 5) this is the basic word order, although word order in general is free (Dixon p.107)). In each case, the NP that has actually been assigned a case by the verb ends up adjacent to the verb, while the NP that shows up in its 0-form ends up away from the verb. In order to allow for ARGUMENT2 to end up "inside" of ARGUMENT1 (i.e. closer to the verb) for some of the sentences--e.g. (12b)--we might need to exploit a mechanism used in Categorial Grammar: "Right Wrap" (Bach (1979)), or possibly the ideas of Tree Adjoining Grammars (Kroch and Joshi 1985). I will leave open the exact mechanism used for getting ARGUMENT2 between the verb and ARGUMENT1.

What happens in transitive sentences, when one NP is a pronoun, and the other one is a full NP? Consider (13):
13a) Ngaja payi yara palkan.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>NFUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>man</td>
<td>hit</td>
<td>'I am hitting a/the man' [32]</td>
</tr>
</tbody>
</table>

b) Ngaykuna pangkul yarangku palkan.

<table>
<thead>
<tr>
<th>ACC</th>
<th>ERG</th>
<th>ERG</th>
<th>NFUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>man</td>
<td>hit</td>
<td></td>
</tr>
</tbody>
</table>

'A/the man is hitting me' [33]

In (13a), payi yara (the patient) gets 0-marking during cycle (i) (since it doesn’t have an ACC form); ngaja (the agent) also gets 0-marked, but during cycle (ii) (since it doesn’t have an ERG form). The word order is the unproblematic one: the ARGUMENT1 occurs next to the verb, since no actual case is assigned to a later argument.

In (13b), ngaykuna (the patient) gets ACC during cycle (i), starting off its life adjacent to its case assigner. However, at cycle (ii), its gets "bumped off" away from the verb by the agent NP (via e.g. Right Wrap), which also gets assigned actual case by the V. Note that the word order works just the same way as with the sentence with two full NP arguments (cf. (12b) above)--the ERG argument ends up next to the verb, since it has been assigned case last.

Levin (p.275) also provides an account of the word order preferences based on case assignment. In her system, ERG (her "accusative") shows up adjacent to the verb due to Stowell’s (1981) Adjacency Requirement on Case Assignment (cf. fn.1). However, her system, as far as I can tell, does not explain the word order facts when pronouns are involved—-as in (12a) and (13). She does not discuss word order with pronouns.

In the system outlined in (9), we have ARGUMENT3 in addition to ARGUMENT1 and ARGUMENT2. That is, I am suggesting that there is a third cycle in Dyirbal, during which an element is marked 'instrumental'. However, 'instrumental' is morphologically identical to ERGative, and the two may just be one case. If there is really no instrumental case, then ARGUMENT3 and ARGUMENT2 would both be getting ERGative case, and they might really constitute just one case assignment rule, and cycles (ii) and (iii) might be collapsed.

Why would we want to treat 'instrumental' as a grammatical/structural case, rather than a semantic...
In Dyirbal, there is a fact about word order which groups 'instrumental' together with the clear grammatical cases (ACC, ERG and 0): together with ACCusative, ERGative and 0-marked NPs, instrumental NPs tend to precede the verb, while dative NPs and locative NPs tend to follow the verb (Dixon, p.291). In fact, in a typical example an instrumental NP immediately precedes the verb:

14) palan jukumpil pangkul yarangku
    0  0    ERG   ERG
      woman  man

    pangku yukungku palkan.
    INSTR  INSTR   NFUT
    stick    hit

'A/the man hit a/the woman with a stick' [242]

In (14), 'woman' gets 0-marked during cycle (i), and 'man' gets ERG during cycle (ii). It seems that I have to say that the NP pangku yukungku is an argument of the verb, otherwise I would not expect it to show up between the verb and another argument. It then is taken as ARGUMENT3, marked with INSTR (=ERG). In (14), ARGUMENT1 is furthest away from the verb, and ARGUMENT3 is closest to the verb. We can now state the following generalization in Dyirbal: in the unmarked order, arguments precede the verb and non-arguments follow the verb.

Assuming that cycle (iii) exists in Dyirbal makes some sense of the argument structure possibilities of the verb wuka-l 'give'. According to Dixon (1972; p.300; also Levin (1983; p.287)) there are three possible ways of case marking the arguments of this verb (adapted from Dixon and Levin):

15)      AGENT  PATIENT  GOAL
    a)    ERG  INSTR   ABS
    b)    ERG   ABS   DAT
    c)    ERG   ABS   GEN

According to Dixon, (b) is the rarest possibility, and (c) the most common. The (full NP) patient in both (b) and (c) gets 0-marked as usual, during cycle (i); the agent gets marked ERG during cycle (ii), as expected. The third, 'goal', argument would have semi-semantic case in both (b) and (c). The rarity of (b) suggests that DATive is giving up its semi-semantic function as
a marker for recipients, and GENitive is taking its place; I have nothing interesting to say about this change.

The interesting possibility is (15a). Here, the goal argument (rather than the usual patient) is ARGUMENT1, and gets 0-marked during cycle (i). As expected, the agent gets marked ERG during cycle (ii). The patient argument does not bear any lexical or semantic case, and is therefore taken as ARGUMENT3 during cycle (iii), showing up in INSTR (=ERG).

Until now, the ARGUMENT1s we've seen have been either (affected) patients of agent/patient verbs, or single arguments of intransitive verbs. With the verb 'give' in Dyirbal, it seems that there is a possibility of having the goal-argument as ARGUMENT1. What may be at play here is the notion of 'affectedness', in the sense of e.g. M.Anderson (1979), Rozwadowska (1988), Lebeaux (1988), Jackendoff (1987); cf. also the traditional notion of an "affectum" object (Jespersen (1924)). An affected argument of the verb would then show up as ARGUMENT1 (while an agentive argument shows up as ARGUMENT2). Thus, we would expect that for the case marking possibility (15a), the goal-NP is somehow affected (maybe more affected than the patient NP); I do not know if this is true in Dyirbal.

One final comment on the Dyirbal system: the system in (9) does not explain why pronouns and full NPs end up looking different. There may be semantic reasons for the difference in the two systems, as argued in detail in Silverstein (1976); he uses a hierarchy of NPs to explain and predict splits. The point I have tried to make is that we do not use the hierarchy every time we assign case in a sentence; the split has been grammaticized, and has in a sense disappeared. Nowhere in the grammar of case assignment do we have to say (or are able to say) that pronouns have accusative case in their paradigm because they are higher in the NP-hierarchy than full NPs--just as for English, we probably do not want say that the grammar of case assignment tells us that most of the pronouns have an accusative form, while full NPs do not.

3. Case and agreement are interesting in English, too

I will now show how structural case and verbal agreement work in English. There are certainly many other ways in which case assignment in English might
work, given its relative simplicity. The point of dealing with the English facts is to show that English can be handled by the system, in a manner similar to languages with superficially more complicated argument numbering systems. Consider (16), then:

16) ENGLISH ARGUMENT NUMBERING (to be revised):

(i) ARGUMENT1: V assigns ACC to NP

(ii) ARGUMENT2: V[+TNS] agrees with NP

The rule for ARGUMENT1 is practically identical to that of Dyirbal (the difference being that the English transitive verb does not bear the feature [+2ARG]). The rule for ARGUMENT2 differs in the two languages, as in Dyirbal a case (ERG) is assigned, rather than agreement. (I will return to the question of ARGUMENT3).

In addition to the argument numbering systems, English and Dyirbal differ in deciding exactly which elements are taken as ARGUMENT1: in both languages, 'affected' arguments are taken as ARGUMENT1, but the languages differ in what I take to be borderline instances: single arguments of intransitive verbs. The two languages represent two extreme positions (we will see that Finnish and Icelandic fall in between the two extremes). In Dyirbal, the single argument of almost all (if not all) single-argument verbs is treated as ARGUMENT1, while in English almost all (if not all) such arguments are not taken as ARGUMENT1 (they then end up, 'automatically', as ARGUMENT2--i.e., the single NP of an intransitive verb agrees with the verb). Dyirbal treats the single argument of an intransitive verb as 'affected', while English treats such an argument as being 'non-affected'--at least as far as the case assignment system goes. This difference gives us the traditional distinction between 'ergative' and 'accusative' languages, although this distinction may only be relevant for the extreme case (such as English and Dyirbal).

In order to make (16) work, we need to resort to the Zero-Form Principle, repeated here:

10) THE ZERO-FORM PRINCIPLE:

If an NP does not receive case during its cycle, it will appear in the 0-form (its lexical entry)
During cycle (i), the English V tries to assign ACC to its first argument (the 'direct object' [fn.5]). The NPs that have in their paradigm a special ACC form, will show up in this form: the pronouns me, him, us, and them (and her, if we assume that this is really an ACC form, and not just GEN--cf. Vainikka (1985a) for more details). All other NPs (i.e. the pronouns you and it, and all full NPs) will show up in their 0-form, their lexical entry (by Principle (10)). As in Dyirbal, the case assigner and the assignee are adjacent. Presumably cycle (i) builds the VP-portion of an argument tree, both in English and in Dyirbal.

During cycle (ii), the tensed V (I will return to the status of INFL) takes its second argument; in English, ARGUMENT2 is equivalent to 'nominative subject' (cf. fn.5). Let us first consider the form of the NP: the NP shows up in the 0-form due to Principle (10), simply because no case is assigned to the NP during this cycle.

What is the nature of verbal agreement in this system? Nichols (1986) discusses the dependency relation between a head and its arguments (or 'dependents'). A dependency relation can be marked on the head (which, for verbs, means verbal agreement) or on the dependent (case marking on NPs). She points out, based on a broad typological study, that the head-marked pattern is favored crosslinguistically (although modern grammatical theory is strongly biased toward dependent-marking, or case-marking, which happens to be the dominant possibility in European languages). Head-marking vs. dependent-marking can be visualized as follows:

17a) NPv V [dependent-marking, i.e. case-marking]

b) NP Vnp [head-marking, i.e. agreement]

Dyirbal uses dependent-marking throughout; English uses dependent-marking for cycle (i) ('objects') and head-marking for cycle (ii) ('subjects'). Using Nichols terminology, we can now restate (16) as (16'):

16') English argument numbering ("retermed":

   to be revised):

   (i) ARGUMENT1: V dependent-marks NP with ACC
ARGUMENT2: V[+TNS] head-marks itself with NP

I am assuming that both in head-marking and in dependent-marking, the head is 'responsible' for the marking, although nothing crucial rides on this assumption; hence, the phrase "head-marks itself" in (16'b).

Note that at least in English we need something comparable to the Zero-Form Principle for verbal agreement, just as we did for case marking. I am assuming that only the third person singular marking on a present tense verb constitutes agreement in English, and all other verb forms are comparable to the zero-forms in the NP-domain. That is, the V tries to head-mark itself during cycle (ii), but only succeeds in doing this if the verb in question has a special agreement form in its paradigm (e.g. 'runs' agreeing with 'he' in 'he runs'); otherwise the V shows up in zero-form, without an overt agreement marker (e.g. 'run' trying to agree with 'I' in 'I run').

What is the relationship between head-marking, inflectional endings and the argument tree in English? If there were no inflectional endings in English, we might expect a V to mark one NP to its right ('object'), and another NP to its left ('subject'). Based on longitudinal data from several English-speaking children, I argued in Vainikka (1985c) that this is exactly what children are doing when they use 'my' and 'me' subjects. Their cycle (ii) rule would involve dependent-marking, rather than head-marking. The resulting argument tree might look as follows (the actual labels on the mother nodes are not crucial):

18) (VP)
   /   
  NP (V')
   /|
  (ARG2) /  
   V NP
  (ARG1)

Connell (1986) suggests that the single most difficult problem that children with language (English) learning difficulties have is acquiring the 'subject' properties, i.e. acquiring the nominative subject and acquiring all of the inflectional (INFL) material (agreement, tense, do-support), and he shows in his experiments that the acquisition of nominative subjects and the acquisition of INFL material are clearly
connected [fn.6]. Using my criteria for when the nominative subject has been acquired (I occurs sentence-medially; cf. Vainikka (1985c) for a more detailed discussion), the acquisition of INFL material and nominative subjects are connected in the acquisition of English by 'normal' children as well (and they are acquired quite late).

I suggested that the reason that learning the 'subject' properties in English is so difficult is that providing a structure which includes INFL and a nominative subject involves positing more hierarchy than in the tree in (18); in effect, a new position needs to be created:

\[
\begin{align*}
19) & \quad \begin{array}{c}
(\text{S}) \\
\text{NP} & \quad \text{(VP)} \\
(\text{ARG2}) & \quad \text{INFL} & \quad (V') \\
\quad \text{V} & \quad \text{NP} & \quad (\text{ARG1})
\end{array}
\end{align*}
\]

In (19), INFL is occupying the position that corresponds to the 'subject' position of the tree in (18); I am suggesting that acquiring 'nominative case' actually means building a new position for ARGUMENT2, and the old position is this argument is taken over by the inflectional features of the verb (or an abstract representation of them). This course of events explains the co-occurrence of 'subject properties' and inflectional material in acquisition.

Recently, it has been suggested by various people working within the GB-theory that English subjects originate in the VP (Kitagawa (1986), Koopman and Sportiche (1988) and Fukui (1986)). Adult D-Structures would then look something like the pre-nominative stage of acquisition (where the subject-NP is located inside the VP--(18)).

In the present system, then, the 'pre-nominative' children would be dependent-marking (or case-marking) ARGUMENT2. We might say that this is also happening in the adult grammar for non-finite verbs (where the non-finite verb is arguably giving case to its 'subject', e.g. 'I watched his running'). In the adult system, head-marking would be taking place when the verb is finite, presumably when INFL exists:
Let us briefly consider the number of cycles that languages have in their argument numbering system. It may seem, a priori, that all languages should ideally have the same number of cycles, as this information could then be innately coded in UG. I suggested that Dyirbal had three argument cycles, while it seems that English only has two (or, I just haven’t figured out what the third one is!). I will assume (non-crucially) that the information on the number of cycles is not included in UG, but that the language learner will posit as many cycles as s/he can find evidence for. In Dyirbal, if the generalizations on word order that I assumed hold, the word order suggests that the instrumental NPs are also arguments, thus providing evidence for cycle (iii).

4. Grammatical cases in Finnish

Superficially, the case system of Finnish may seem very different from English, given that Finnish has a rich case system with about 15 morphological cases. Most of the cases, however, are ‘oblique’ ones comparable to English prepositions. The ‘grammatical’ cases, on the other hand, are quite similar to the English cases. The main difference is that the rule for dependent-marking ARGUMENT1 is more complex in Finnish than in English. In (20), I have given a system in which the different possibilities of marking the ‘object’ in Finnish are disjunctively ordered (cf. Kiparsky (1973) and S.R.Anderson (1986)):

20) FINNISH ARGUMENT NUMBERING

(i) ARGUMENT1:

(a) V [+COMPLETED]:
   (aa) dependent-marks NP with ACC
   (ab) V [+PERS] dependent-marks NP
        with GEN

(b) V dependent-marks NP with PART

(ii) ARGUMENT2: INFL head-marks itself with NP
Cycle (ii) in Finnish is identical to that of English; there is only the superficial difference that Finnish verbs have a separate form for each person/number, while English verbs end up with the 0-form (except for the 3rd p. singular). Finnish, like English, does not seem to have cycle (iii).

In marking ARGUMENT1, a basic distinction is made between verbs that involve a 'completed' or 'resultative' action--[+COMPLETED]--and all other verbs; objects of [+COMPLETED] verbs are marked ACCusative, while other objects are marked PARTitive (I will return to this distinction).

Consider the examples of passive sentences in (21) to see how cycle (i) works--the single argument of the Finnish passive verb is taken as ARGUMENT1 (as opposed to English, where the obligatory argument is ARGUMENT2), and the verb form is an impersonal one that does not agree with any NP:

21a) Hanet viedet kotiin.  
    ACC PASS[+COMPLETED]  
    him was-taken home  
    'He was taken home'

b) Pekka viedet kotiin.  
    0 PASS[+C]  
    'Pekka was taken home'

In (21a), the single NP shows up in ACC case, and in (b), the NP is 0-marked. hanet gets ACC case by the first line--(aa)--in the rule for cycle (i); as in English, only certain pronouns in Finnish have a special ACC form (min un 'me', sin un 'thee', hanet 'him/her', meidat 'us', teidat 'you (pl)', and heidat 'them'; see 'it', as in English, does not have an ACC form). All other NPs (i.e. all full NPs and the inanimate pronouns) show up 0-marked--(21b)--following the Zero-Form Principle (unless one of the other rules of cycle (i) applies).

If the verb is [+COMPLETED], and also [+PERS] (has a complete person/number agreement paradigm), then the NP (that doesn't have an ACC form) gets assigned GENitive--as indicated by (ab) in cycle (i). The passive verb in (21) does not have the [+PERS] feature, and therefore the single NP in (21b) cannot get GEN case. In addition to the impersonal passive forms, active impersonal verbs (e.g. taytyy 'must' which
doesn't agree with any NP in Standard Finnish) and imperatives have the [-PERS] feature, never taking a GEN object.

(22) gives an example of a verb with [+PERS] feature:

22a) Jukka vei hanet kotiin.
    0 3p.sg.[+C,+PERS] ACC
    took him home

   'Jukka took him home'

b) Jukka vei Pekan kotiin.
    0 3p.sg.[+C,+PERS] GEN home

   'Jukka took Pekka home'

Again, the pronoun in (22a) shows up in ACC, by (20iaa), since the NP has an ACC in its paradigm. The full NP in (22b) does not have an ACC form, and in this case the NP shows up in GEN case since the verb has the [+PERS] feature.

In colloquial Finnish, one of the forms of the Standard Finnish verbal paradigm is replaced with a new form, the passive form:

23a) Me veimme Jukan/*Jukka kotiin.
    0 lp.pl. GEN 0
    we took home

   'We took Jukka home'

b) Me vietiin Jukka/*Jukan kotiin.
    0 (PASS) 0 GEN

   'We took Jukka home'

In (23a), the verb is [+PERS], and the object ends up in GEN (since the NP does not have an ACC form), by (20iab). We see, on the other hand, that in (23b), the object cannot show up in the GEN form, but it has to occur in the 0-form. (23b) provides evidence that at cycle (i), it is really the morphological form of the verb that determines whether rule (ab) can be used for the object. Since the form of the verb in (23b) is that of a [-PERS] verb, it behaves as a [-PERS] verb with respect to cycle (i). The information that in the sentence (23b) this form of the verb is really acting as the first person plural form (rather than passive) doesn't seem to be available at cycle (i) -- which is a desirable result, given the idea of the argument cycle (recall that Dyirbal seemed to violate cyclicity, but
that if we took the morphology of the transitive verb into account, the problem was solved).

What about cycle (ii) for sentences such as (23b)? I will have to assume that (23b), just like (23a), has an INFL, and that the INFL is head-marking itself during cycle (ii). We might say that the passive suffix is construed as the person marker for the purposes of cycle (ii). This would force us to say that the 1st person plural "passive" forms behave as [-PERS] at cycle (i), and as [+PERS] at cycle (ii). Rather than committing ourselves to such a view, we can simply assume that INFL is head-marking the verb 'invisibly', i.e. since the verb does not have any person forms in its paradigm, it is realized as 0-marked at cycle (ii).

All of the above happens when the verb has the feature [+COMPLETED]. If the verb does not have this feature, the object will show up in the PARTitive case (and all NPs have a special PART form):

24a) Jukka vei Pekkaa/hanta kotiin.
   0 3p.sg.[-COMPLETED] PART PART took him home
   'Jukka was taking Pekka/him home'

b) Pekkaa/hanta vietiin kotiin.
   PART PART PASS [-C] 
   him was-taken home
   'Pekka/he was being taken home'

Regardless of the other features of the verb, the object of [-COMPLETED] verb shows up in PART: both with and active verb (24a), and with a passive verb (24b). The partitive case seems to be a 'default case' for the object position (or ARGUMENT1) in Finnish, as I have argued in Vainikka (1985a) and (1988). This is reflected in the rule(s) for cycle (i), given in (20), in that the PART rule is the last one of the case assignment rules for ARGUMENT1.

Let us now consider the class of intransitive verbs, for which Dyirbal and English behaved differently. As in English, Finnish seems to treat the single arguments of some intransitive verbs as ARGUMENT2s; on the other hand, Finnish treats some such arguments as ARGUMENT1s, as does Dyirbal. (25) is an example of the English-type verb (all unaccusative verbs behave this way):
Examples of the Dyirbal-type verb are given in (26):

26) Minua pelottaa/janottaa/vasyttaa.
    PART 3p.sg. 3p.sg. 3p.sg.
    me scare thirst tire
    'I am scared/thirsty/tired'

The single argument of many experiencer verbs shows up in partitive case, suggesting that this argument is taken as ARGUMENT1 (as in Dyirbal). This is reminiscent of Icelandic 'quirky' ACC subjects (e.g. Andrews (1982)), which presumably are ARGUMENT1s, as well. Finnish and Icelandic, then, would fall in between English and Dyirbal in deciding exactly which of the (affected) arguments of single-argument verbs are actually treated as ARGUMENT1s.

5. Nominative objects in Icelandic

The present system offers an analysis of so-called 'nominative objects' (Andrews (1982); Zaenen, Maling and Thrainsson (1985)) that does not require anything special to be said about these elements in Icelandic.

The argument-numbering system of Icelandic is identical to that of English:

27) ICELANDIC ARGUMENT NUMBERING:

   (i) ARGUMENT1: V dependent-marks NP with ACC

   (ii) ARGUMENT2: INFL head-marks itself with NP

As in English, and unlike in Finnish, the obligatory argument of a passive sentence shows up as ARGUMENT2 in Icelandic (i.e. 'nominative'), agreeing with the verb (from Yip, Maling and Jackendoff (1987)):

28a) Hann lamdi hana.
    0    ACC
    he hit her

   b) Hun var lamin.
    0
    she was hit
In the active sentence (28a), \textit{hana} gets ACC during cycle (i), and \textit{hann} gets 0-marked during cycle (ii); the verb agrees with ARGUMENT2, \textit{hann} (i.e. INFL head-marks itself with this argument). In the passive (28b), \textit{hun} (the patient) acts as ARGUMENT2, and the passive agrees with this NP. Presumably, in English and Icelandic, passive verbs cannot take an ARGUMENT1 (this is a stipulation corresponding to the GB statement that passive morphology absorbs Case (Chomsky (1981)). For some reason, the Finnish passive verb can (and has to) take ARGUMENT1 (that shows up in an objective case).

What is interesting about the Icelandic passive is the behavior of the arguments of \textit{gefa} 'give' in the passive sentence (29c) (from Vainikka (1985b)):

\begin{verbatim}
29a) active:
    Malfr dingurinn gaf  nemandanum bokina.
    0            3p.sg. DAT        ACC
    the-linguist gave the-student the-book

b) passive1:
    Bokin        var gefin nemandanum.
    0           DAT
    the-book    was given to-the-student

c) passive2:
    Nemandanum   var gefin bokin.
    DAT      0
    to-the-student was given the-book
\end{verbatim}

In (29a), we have an ACC ARGUMENT1 \textit{bokina}, a 0-marked ARGUMENT2 \textit{malfr dingurinn}, and a recipient (semi- semantically) marked with DATive case. Either the ACC or the DAT NP can be fronted in the passive counterparts of (29a): in (29b), the (originally) ACC ARGUMENT1 acts as ARGUMENT2 (=0-marked='nominative'), agreeing with the verb (just as in English), while the semi-semantic DAT NP stays intact. (29c), however, is not so straightforward for many accounts of Icelandic case—the only accounts I know of that handle (29c) in a non-\textit{ad hoc} way are Yip, Maling and Jackendoff (1987) and Vainikka (1985b; 1986a--earlier versions of the current analysis). I will return to Yip et.al's analysis.
In (29c), the DAT NP is "passivized". There is general agreement in the literature that these dative NPs are in fact 'subjects', i.e. (29c) is not just a word order variant of (29b); cf. Zaenen, Maling and Thrainsson (1985) for a summary of the arguments. The dative NP remains in its case, being a semi-semantic case. Now, the real problem arises with the NP left behind. It shows up in 'nominative case', apparently agreeing with the passive verb (and the auxiliary verb). This seems counterintuitive, given the traditional connection between 'subject' and 'nominative case'.

In the present system, there is no problem. Since the Icelandic passive cannot take an ARGUMENT1 (stipulated, as in GB), bokin will be taken as ARGUMENT2 in both (29b) and (29c)--the DAT NP cannot be taken as ARGUMENT2, since it bears semi-semantic case. During the cycle for ARGUMENT2, INFL head-marks itself with the features of ARGUMENT2, as usual. For this case assignment system, it doesn't matter which side of the verb the NP shows up in. Actually, it is probably not a coincidence that the Icelandic passive participle also shows an agreement suffix—in effect, the stem of a passive verb is 'surrounded' by agreement material (agreement with the 0-marked NP), and it is not surprising that we would find 0-marked NPs agreeing with the verbal complex on both sides of the verb (given adjacency in case assignment/verbal agreement). In Vainikka (1986a), I suggested that the agreement suffix of the Icelandic passive participle actually occupies the object position, in effect preventing an ARGUMENT1 from showing up in the passive construction, while at the same time acting as an 'INFL' for the post-verbal passive 0-marked NPs.

Yip, Maling and Jackendoff (1987) propose an analysis of case assignment using tiers and association lines. Their system takes care of the 'nominative objects' in Icelandic (in fact, their account seems to be crucially based on this phenomenon). However, their account draws no connection between verbal agreement and 0-marking; thus, their account misses the generalizations one can draw universally based on head-marking vs. dependent-marking pointed out by Nichols (1986), such as the fact that verbs usually agree with 0-marked NPs (as languages do not usually mark both the head and the dependent). Yip et.al. also claim that their system can unify "Accusative and Ergative case systems under one simple parameter [i.e. direction of association]" (p.248). However, this claim is based on
very simple data from Greenlandic Eskimo, and split ergativity (the most common type of ergativity) is not discussed. The revisions required in their system to take care of my objections would probably make their system quite similar to mine (where "association lines" would be drawn at the level of argument structure, in deciding which argument would be taken next).

6. The double-layered system of Warlpiri

The languages discussed so far all have very simple argument numbering systems: for each argument, only one thing has been marked—either head or dependent, but not both. Warlpiri differs from Dyirbal, English, Finnish and Icelandic, in that both the head and dependent are usually marked (except for ARGUMENT1, where just the head is marked).

Warlpiri is generally considered to be a "split ergative" language (but split differently from Dyirbal; see below)—Hale (1973), Blake (1977), Dixon (1979), Jelinek (1984): the case-marking system on NPs is "ergative", while the verbal agreement system is " accusative". Case marking is "ergative" since the single arguments of intransitive verbs and the objects of transitive verbs show up in the same "case", absolutive (i.e. 0-marked). Subjects of transitive verbs show up in ergative case (with morphological content).

Recall the "split ergativity" of Dyirbal: there is a "split" between the pronominal and the full NP systems. In the system outlined for Dyirbal in Section 2, the split disappeared; the split is a result of differences in the morphological paradigms for different types of NPs (comparable to the difference in accusative case in English between pronouns and full NPs), rather than a difference in case assignment to different types of NPs. The "split" in Warlpiri is of a different sort: the head-argument relations are marked both on the head and on the dependent, and certain arguments (most notably single arguments of intransitive verbs) seem to behave in an "ergative" manner with respect to case assignment, and in an "accusative" manner with respect to agreement. In the system to be developed here, the "split" will manifest itself in the lack of dependent-marking for ARGUMENT1.

There are two series of agreement markers that are normally suffixed on the auxiliary element (which
contains tense information; I will call it INFL). Following Levin (1983), I will call the agreement markers M1 and M2 (Hale (1973) calls them 'subject' and 'object' clitics). The following table (from Levin (1983; p.161)) shows which NPs the agreement markers will agree with in the possible case arrays:

30) Case Array   M1    M2
ABS    ABS
ERG    ERG
ERG-ABS    ERG    ABS
ABS-DAT    ABS    DAT
ERG-DAT    ERG    DAT
ERG-ABS-DAT    ERG    DAT

Hale (1982; p.226 and p.228; cf. also Hale (1983)) provides the following generalizations (names for agreement markers changed):

31a) Person markers belonging to the M1 set are construed with the ergative, if there is one, otherwise the absolutive

b) Person markers belonging to the M2 set are construed with the dative, if there is one, otherwise the absolutive

Once the cases of the NPs in a sentence are known, (31) will provide the correct agreement markers (order: INFL+M1+M2), except for a couple of complications with dative NPs.[fn.7]

Let us now consider a proposal for an argument numbering system which treats the case assignment system and the agreement system as part of the same process (although 'double-layered'). I have to assume that the crucial case assigner and 'agreement assigner' in Warlpiri is INFL, not the V; i.e. INFL is the head of the sentence. Presumably INFL and V are, say, coindexed, so that INFL has the information on the argument structure of the V:

32) WARLPPIRi ARGUMENT NUMBERING:

(i) ARGUMENT1: INFL head-marks itself with NP (=M1)
(ii) ARGUMENT2: INFL head-marks itself with NP (=M1) and INFL dependent-marks NP with ERG

(iii) ARGUMENT3: INFL head-marks itself with NP (=M2; cf.fn.7) and INFL dependent-marks NP with DAT

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DEFAULT AGREEMENT (post-cyclic):
NP agrees with M2

For most single-argument verbs, M1 agrees with the single argument (ARGUMENT1), and the NP itself shows up O-marked (by the Zero-Form Principle, since no case is being assigned to the NP) (examples from Hale (1982) unless otherwise stated):

33) Ngaju ka -rna parnka-mi.
   0 INFL 1SG-M1 NONPAST
   I run
   'I am running' [Hale 1b]

Intransitive verbs with an absolutive NP, as in (33), are then examples of ARGUMENT1 being taken during cycle (i)--ka (INFL) head-marks itself with NP, by showing up with the marker from the M1 series. This takes care of the first line in the Case Array in (30).

The second line in the Case Array in (30) tells us that if the sentence contains just one ERG NP, then the M1 marker will agree with this NP. According to Hale (1982), single-argument verbs that require a 'subject' that does not show up in O-form are quite rare (p.237), and one can argue that these verbs have a deleted 'object'; compare (34a) and (b):

34a) Ngarrka-ngku ka purlapa yunpa-rni.
   ERG INFL 0 NPST
   man corroboree sing
   'The man is singing a corroboree' [29a]
Vainikka: Case and Verbal Agreement as Argument Numbering

b) Ngarrka-ngku ka yunpa-rni.
   man ERG INFL sing NPST
   'The man is singing'

In both (34a) and (b), ngarrka shows up as ARGUMENT2, in ERG case. Both M1 and M2 are realized as 0 in (34a), since the NPs are third person singular (I will return to this type shortly). In (34b), it is impossible to tell whether INFL is agreeing with a 'deleted' third person object or not, since the agreement would be 0 anyway. In (34b), then, either ARGUMENT1 is somehow 'implicit', or else the theta-role of the single argument of 'sing' has the effect of categorizing the NP with the prototypical agents (ARGUMENT2) rather than with the prototypical affected patients (ARGUMENT1).

Let us now look at a verb with two arguments:

    I ERG INFL 1SM1 2SM2 you see NPST
    'I see you'

In (35), M1 agrees with the ergative NP 'I', and M2 agrees with the absolutive NP 'you'. The problem with this sentence for any system that tries to unite case and agreement in Warlpiri, is that here M1 is agreeing with an ERG NP, while in (intransitive) sentences such as (33), M1 agrees with an absolutive (=0-marked) NP. How can we capture the fact that M1 does not always agree with an NP with the same case, assuming that we wish to try to make a connection? The solution I have adopted here is allowing M1 to be used as a head-marker more than once: M1 agrees with an absolutive NP during cycle (i), but if at cycle (ii) an ergative NP is introduced, then M1 will agree with that NP. This solution may not seem ideal (allowing head-marking at one cycle that can be 'erased' at the next cycle is clearly not desirable), but it seems to allow us to provide the simplest possible argument-numbering system for Warlpiri, while uniting the case and agreement systems.

In (35), then, 'you' (as ARGUMENT1) agrees with M1, and is itself 0-marked (since no case is being assigned) during cycle (i). During cycle (ii), ARGUMENT2 ('I') is taken, and two processes take place: M1 comes to agree with this NP, and this NP is assigned ERG case. After cycle (ii), ARGUMENT1 ends up without any agreement (or case) marking. Now, a further problem arises: how does ARGUMENT1 end up agreeing with
M2? Note that an absolutive (=O-marked) NP agrees with M2 only in this construction, in which there is an ERG NP agreeing with M1. As a solution, I am suggesting that there is a postcyclic Default Agreement rule in Warlpiri (see (32)), which is used in sentences such as (35): ARGUMENT1 ends up agreeing with M2, by default—M2 is ‘created’ for this purpose.

We have now taken care of the third line of the Case Array in (30)—admittedly at a cost, by introducing the possibility of erasing marking at a later cycle, and by introducing a postcyclic rule. It is up to the reader to judge whether these mechanisms are justified by the system as a whole, and the possibility of combining the two layers of argument marking in Warlpiri.

Given the apparent need for a Default Agreement rule, could we get out of the agreement being assigned at cycle (i), and erased at cycle (ii)? We could possibly say that no M1 is assigned at cycle (i); M1 only agrees with ERG NPs to begin with, and the single arguments of intransitive verbs (O-marked) agree with M1 because of default agreement. (36) shows that this will not work:

36) Ngaju ka -rna-ngku nyuntu-ku parda-rni.
   I INFL 1SM1 2SM2 you DAT wait NPST
   'I am waiting for you' [12g]

Given the system as proposed in (32), ngaju ‘I’ agrees with M1 at cycle (i) (the NP itself showing up O-marked); there is no ARGUMENT2 (say, since there is no agent). nyuntu ‘you’ is taken as ARGUMENT3, showing up in DAT, agreeing with M2. Assuming a correspondence between cyclicity and suffix order, M1 has to agree with the O-marked ARGUMENT1 during cycle (i), rather than postcyclically, since M2 is ‘created’ at cycle (iii), before anything postcyclic, and M1 is located between the head (INFL) and M2. If this problem can be solved, we might be able to get rid of agreement ‘erasure’ in favor of another postcyclic default rule.

ARGUMENT3 is realized as a DAT NP, agreeing with M2, as outlined in (32). This third cycle takes care of the rest of the Case Array in (30). We’ve already seen an example of the ABS-DAT pattern in (36) above; for some (presumably thematic) reason, ARGUMENT2 is skipped in this type of sentences. In (36), ARGUMENT1 gets O-marked, and agrees with M1 during cycle (i). Its agreement with M1 is preserved, since no ARGUMENT2
is taken which would erase the initial agreement. The
dative argument is taken as ARGUMENT3; ARGUMENT3s agree
with M2, rather than M1, to begin with. (37) gives an
example of the ERG-DAT pattern:

37) Karnta-ngku ka -jana kurdukurdu-ku warri-rni
     woman  ERG  INFL  3PM2 children  DAT seek  NPST
     'The woman is looking for the children'

There is no ARGUMENT1 in (37) (presumably because the
'object' is not an 'affected patient'); verbs with the
semantics of 'seek' form a class that takes dative
objects. karnta 'woman' is taken as ARGUMENT2, marked
with ERG, and agreeing with M1 (realized as zero for
the third person). kurdukurdu 'children' is ARGUMENT3;
it gets DAT and it agrees with M2.

Recall Hale's generalizations on the construal of
agreement markers, repeated here:

31a) Person markers belonging to the M1 set are
    construed with the ergative, if there is one,
    otherwise the absolutive.

b) Person markers belonging to the M2 set are
    construed with the dative, is there is one,
    otherwise the absolutive.

These generalizations are captured in the present
system as follows: ERG NPs agree with M1 during cycle
(ii)--first clause of (31a)); DAT NPs agree with M2
during cycle (iii)--first clause of (31b). The
"...otherwise the absolutive" -clause in both (38a) and
(b) is a result of two processes: (i) if there is no
ERG NP (ARGUMENT2) in the sentence, then the absolutive
(0-marked) NP retains its original agreement with M1
from cycle (i); (ii) the postcyclic Default Agreement
rule has the effect of making absolutive NPs that do
not agree with anything (whose agreement with M1 has
been erased at cycle (ii)) agree with M2.

7. Summary

7.1. Review of the five systems

ARGUMENT1 (which includes affected patients of
prototypical agentive verbs)

(a) Dyirbal: V[+2ARG] dependent-marks NP with ACC
(b) English: V dependent-marks NP with ACC

(c) Finnish: V [+COMPLETED] dependent-marks NP with ACC; otherwise
V [+COMPLETED +PERS] dependent-marks NP with GEN; otherwise
V dependent-marks NP with PART

(d) Icelandic: V dependent-marks NP with ACC

(e) Warlpiri: INFL head-marks itself with NP (=M1)

The rules for ARGUMENT1 in English and Icelandic are identical. The Dyirbal rule differs from these two in that we have to have access to information about whether the verb is a transitive one or not (for 90% of the Dyirbal verbs, this information is indicated by the suffix -l). The last option in the Finnish rule for ARGUMENT1 (the default rule within the cycle) is identical to the English and Icelandic rules. Warlpiri differs from the other four languages in two respects: (i) it marks the head rather than the dependent; (ii) INFL, rather than V, is doing the marking. There probably is no connection between these two factors (since head-marking can show up on the verb as well; cf. e.g. Quiche in Vainikka (1986b)).

ARGUMENT2 (which includes agents of prototypical agentive verbs)

(a) Dyirbal: V dependent-marks NP with ERG

(b)-(d) English, Finnish and Icelandic:
INFL head-marks itself with NP

(e) Warlpiri: INFL head-marks itself with NP (=M2)
and
INFL dependent-marks NP with ERG

The rules for ARGUMENT2 for English, Finnish and Icelandic are identical. Dyirbal differs from these three in using dependent-marking, rather than head-marking. Warlpiri has the best of both worlds: it has a dependent-marking rule practically identical to that of Dyirbal, and a head-marking rule identical to the European languages.
ARGUMENT3:

(a) Dyirbal: V dependent-marks NP with INSTR

(e) Warlpiri: INFL head-marks itself with NP (=M2) and INFL dependent-marks NP with DAT

English, Finnish and Icelandic seem not to have a rule for ARGUMENT3. The word order facts of Dyirbal and the agreement facts of Warlpiri suggest that these languages have a rule for ARGUMENT3 (these NPs behave the same way as ARGUMENT1/2, and differently from clear non-argument NPs).

In addition to the above, I suggested that Warlpiri has a postcyclic default agreement rule, whereby an NP that does not agree with any agreement marker, comes to agree with a marker.

7.2. Important assumptions

The following assumptions were made in developing this system:

(i) the head-argument relation gives rise to syntactic (argument) trees, in which the head and the argument are sisters

(ii) structurally assigned case and verbal agreement are part of the same process (dependent-marking vs. head-marking; Nichols (1986))

(iii) dependent-marking and head-marking are by-products of (i); adjacency requirement on case/agreement assignment follows from (i)

(iv) the arguments of a verb are ordered, based on the theta-roles (universally for patients (=ARGUMENT1) and agents (=ARGUMENT2) of prototypical agent-patient verbs; languages differ in 'borderline' cases in determining whether something is taken as ARGUMENT1 or as ARGUMENT2

(v) a head takes its arguments cyclically, one by one
(vi) there exists an argument-numbering rule for each cycle

(vii) Zero Form Principle: if an NP does not receive case during its cycle, it will show up in the 0-form (its lexical entry); this covers (0-marked) 'nominative subjects' and (0-marked) 'absolutive' NPs, cross-linguistically (i.e. neither nominative nor absolutive are 'real' cases in languages where these cases do not have an overt marker).

Footnotes

1) This statement is reminiscent of Stowell’s (1981) adjacency requirement on Case assignment. Stowell (and Chomsky (1981)) assumes that the Case assigner and the Case assignee have to be adjacent because of the requirement on case assignment existing in the grammar (assignment under adjacency). This view might be represented as follows:

requirement of adjacency --> trees with assigners in assignment of Case and assignees as sisters

(read --> as 'results in')

My philosophy concerning case assignment and trees can be represented as follows:

head-argument relation --> trees with assigners creates trees with (heads) and assignees (arguments) as sisters

morphological marking of head-argument relation
(morphological case and agreement)

Principles of tree-building dictate adjacency between heads and arguments (at the 'argument-tree' level; cf. text), "Abstract Case"
correspond to a head-argument relationship for me (cf. Section 1.1.).

Chomsky and Stowell assume that theta-roles are assigned to NPs with Case (theta-roles being in some sense 'secondary' to Case); in the system outlined here, theta-roles determine which argument the head will take (occurring "prior" to case marking, and even Case marking).

2) I would like to thank Koichi Tateishi for help in evaluating my ideas with respect to Japanese data; it looks promising but I will not be developing a system for Japanese in this paper.

3) I would like to acknowledge here the inspiration that Beth Levin's dissertation gave me for writing this paper, and the usefulness of her presentation of the Dyirbal and Warlpiri data in her dissertation. I would also like to thank Cindy Allen for listening to my ideas on Dyirbal, and giving useful feedback.

4) Schmerling (1979) proposes a Categorial Grammar account of Dyirbal, but she does not discuss the pronominal system of Dyirbal.

O'Grady (1987) develops an interesting account, related to Categorial Grammar, of various syntactic phenomena (although not case marking) using the following basic principles:

"(1) The Adjacency Principle (AP):
Combine adjacent elements.

(2) The Dependency Requirement:
All combinatorial operations must satisfy a dependency." (p.32)

My "head-argument relationship" can be seen as one instance of O'Grady's "dependency".

5) Throughout this paper, the term 'subject' and 'object' are used only as convenient labels, without any theoretical significance. I do not wish to equate my terms 'ARGUMENT1' and 'ARGUMENT2' with 'object' and 'subject', respectively; I would not wish to say that the Finnish (Section 4) ACC 'subjects' are really 'objects' (and similarly, for Icelandic), although they occur as 'ARGUMENT1' in my system. Nor would
I want to say that the single arguments of intransitive verbs in Dyirbal (Section 2) and Warlpiri (Section 6) are 'objects', although they too are ARGUMENT1s; or, that the Icelandic 'nominative objects' in passive (Section 5) are really 'subjects', since they end up as ARGUMENT2 in my system. The notions of 'subject' and 'object' may be necessary for other components of grammar, but they seem not to be the appropriate ones for the grammar of structural case and agreement.

6) Nominative subjects seem to be acquired slightly earlier than the INFL material; if this is indeed the case, an account of acquisition which involves INFL as being necessarily prior to nominative would not work. I suggested in Vainikka (1985c) that the language learner is forced to posit a new position for the nominative subjects because of a principle according to which there is (whenever at all possible) a one-to-one relationship between a particular case and a syntactic position. Once a new position is created for nominative subjects, the SPEC(VP) position is left open, and the INFL features will occupy this position. This sequence of development does not mean that in the adult production nominative is necessarily prior to INFL; once the INFL-nominative link has been established, it can be accessed from either direction.

7) The same set of M2 markers occurs both when M2 agrees with an ABS NP and when it occurs with a DAT NP, except for the third person singular forms. When M2 agrees with a third person singular ABS NP, the agreement is realized as 0, but when M2 agrees with a third person singular DAT NP, the suffix -rla appears. In addition, if there are two third person singular DAT NPs, then the suffix -rla-jinta appears (*-rla-rla is not possible).

In this system, -rla shows up when M2 is introduced at cycle (iii); -rla does not show up when an NP agrees with M2 at cycle (ii), or due to the default agreement rule.
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Vainikka: Case and Verbal Agreement as Argument Numbering


