

*The Analysis of Passive and Raising Constructions in Head-Driven Phrase Structure*

*Grammar and Arc Pair Grammar*

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## Introduction

The present study is intended as a contribution to the development of alternatives to the mainstream of generative grammar, that is, to the strand of research which consists of the so-called Standard Theory of Chomsky (1965) and its successors down to and including the Government-Binding (GB) framework set out in Chomsky (1981) and developed further in much subsequent work. Apart from any specific weaknesses which GB theory may have- obviously there is room for disagreement here- the search for such alternatives is amply motivated, in my view, by the fact that GB and related theories represent, in spite of their dominance on the current scene, just one of many imaginable ways of fleshing out the general research programme of generative grammar. If the goal of the generative enterprise is that of developing as good a theory of the grammatical structure of natural languages as possible, it can obviously only benefit from the development of a number of plausible candidates for the title of the “best” theory. However, the ultimate goal of such a process of friendly competition among variant generative theories- and grammatical theories more generally- is neither simply a proliferation of alternatives nor the elimination of all but one of them at some future date. Rather, what I think we should strive for is a synthesis embodying as many as possible of the strengths of the grammatical frameworks which now exist or will be proposed in the future and as few as possible of their weaknesses. Such a grand synthesis of grammatical theorizing is not a realistic short term goal for now, certainly not one which could be achieved within the limits of a single study like the present one, but I think it can only be approached if those frameworks which are now available and look at all promising are further developed with a view to as many as possible of the problems ultimately to be solved. It is in this spirit that the present study develops certain elaborations of two important non-mainstream generative theories, Arc Pair Grammar (APG) and Head Driven Phrase Structure Grammar (HPSG). As their titles suggest, the first two chapters provide overviews of the two theories, whereas the next two each focus on a more specific problem area. It must be stressed that the first two chapters are not merely summaries of the standard versions of the two theories but already include several proposals of my own for modifications and extensions of the theories. Some of these proposals are motivated by the problems which are singled out for special attention in the second half of the work, but some are also motivated by other grammatical phenomena which will be mentioned in the course of the discussion but not treated in as much detail as the former. In the third and fourth chapters, the theoretical proposals developed in the first half of the work are applied to the analysis of samples from two important classes of grammatical phenomena, passive constructions and raising constructions, and further revisions are proposed in connection with the problems encountered in analysing these phenomena. Many readers will no doubt be aware that passive and raising are huge topics, both in terms of the existing proposals for their analysis and in terms of the range of facts from the world's languages which would have to be taken into account in a really comprehensive treatment. In view of this, it must be stressed that these chapters are not intended as a compendium of facts and proposed analyses in these domains, but rather as case studies exploring the potential of the two theories with respect to facts of a sort which has traditionally been in the focus of research in generative grammar. However, I would also like to stress that the selection of problems treated in what follows, although eclectic, is in no way arbitrary. Rather, I have tried to select for discussion phenomena which are representative for the larger class to which they belong, at least

to some degree, and especially in chapter four I have also tried to bring in data from certain "exotic" languages which are hardly ever considered in theoretical discussions of a more general nature, and which I suspect many linguists are unaware of (as I was not so very long ago), although they are all taken from published sources.

As I said at the very beginning, the present work is intended as a contribution to the development of alternatives to mainstream transformational grammar. However, it is definitely not intended as a conclusive demonstration of the absolute superiority of some approach or group of approaches within the overall generative paradigm. The analyses developed in the next four chapters do show certain specific strengths and weaknesses of the two theories, and in the fifth chapter I try to bring out the most salient of these and sketch the outlines of a theory which combines the strengths of APG and HPSG and avoids some of their weaknesses, but as will become clear I am far from being able to offer a fullscale synthesis of the two theories, and even farther from being able to integrate the specific insights of other generative theories into the picture that emerges. Despite these limitations, I hope that work of the kind presented here can help to overcome both the isolation of the various schools of generative grammar from each other and the antagonism that often emerges when this isolation is momentarily broken. I also hope that the data and analyses which follow will be of interest not only to generative grammarians but also to linguists working within frameworks such as Functional Grammar (cf. e.g. Dik (1991)) or Role and Reference Grammar (cf. e.g. van Valin (ed.) (1993)), and more generally to linguists who share with generative grammarians the idea that natural languages are, at an appropriate level of abstraction, to be taken as systems in the traditional structuralist sense, characterized by sets of discrete rules and principles, rather than as mere epiphenomena of communicative strategies or the like.

Let me conclude these introductory remarks with a few observations on the style of presentation I have adopted. Given the complexity of both the theories and the data discussed, it has not been possible to justify in detail all aspects of the proposals made (there is certainly room for improvement here, but developing all the ramifications of the issues raised in detail would have inflated the work beyond all practical limits). More generally, I could not help but presuppose some familiarity with the generative approach to grammar and in particular with the use of mathematical methods in grammatical analysis on the part of the reader, though I do not assume that he or she has specialist knowledge of either APG or HPSG (much less both of them). I must add immediately that what follows is not a formal piece of work in the strict sense of the term, but it presupposes the notion of a mathematical theory of grammatical structures and their interpretation, since the development of such a theory is the long term goal of both of the generative approaches examined here. This means that even relatively informal proposals must ultimately be interpretable in more strictly formal terms, in other words, informal presentation is a convenience which must not be abused to hide flaws in the argument. I hope that I will not be found guilty of such abuse, at least not on too large a scale.

## Chapter 1

### An Outline of Head-Driven Phrase Structure Grammar

#### 1. 0. Background

The approach to grammatical theory which has come to be known under the name of Head Driven Phrase Structure Grammar has its roots in Carl Pollard's Stanford Ph.D. dissertation *Generalized Phrase Structure Grammars, Head Grammars, and Natural Language* (Pollard (1984)). The first book-length presentation of the approach was Pollard and Sag. The following presentation and development of certain aspects of HPSG is to be seen mainly against the background of Pollard and Sag (1994) (originally planned as volume two of Pollard and Sag (1987)), a work which presents most aspects of the theory in considerable detail and illustrates its empirical potential in the context of various classic topics of generative grammar. In what follows, I will often refer to the theory as presented in that work as "standard HPSG" to contrast it with the version outlined in the present study and other alternatives within the same general frame of reference. HPSG can be seen as an attempt to integrate the results of various strands of research within generative grammar and formal semantics, embodying mainly ideas from Generalized Phrase Structure Grammar (Gazdar (1982), Gazdar and Pullum (1982), Gazdar, Klein, Pullum, and Sag (1985), Categorical Grammar (Bach, Oehrle, and Wheeler (eds.) (1988)), Lexical Functional Grammar (Bresnan (ed.) (1982)), Government-Binding theory (Chomsky (1981, 1986, 1986a), and Situation Semantics (Barwise and Perry (1983), Devlin (1991)), but also from Relational Grammar and Arc Pair Grammar (see the next chapter for references). The formalism of HPSG is an extension and synthesis of various developments of the last fifteen years involving so-called unification-based or constraint-based linguistic formalisms, such as Kay (1979), Kaplan and Bresnan (1982), Gazdar and Pullum (1982), and Gazdar et al. (1985); a very accessible introduction to this kind of linguistic formalism is Shieber (1986), and a full account of the formalism as assumed in Pollard and Sag (1994) can be found in Carpenter (1992). In the following survey, I will obviously not be able to treat every aspect of the theory in equal depth. In particular, I will have nothing general to say about the lexicon and the functioning of lexical rules, although I will propose certain constraints on lexical entries and templates for lexical rules and one universal ruleordering principle, the agreement principle of section 3.2. These proposals are to be seen against the background of the theory of the lexical hierarchy and lexical rules outlined in chapter 8 of Pollard and Sag (1987). I will also have nothing to say on the exact formal nature of the interaction of language particular rules, universal constraints on the wellformedness of signs, and meta-principles such as constraints on lexical rules. On the more empirical side, I will say little about binding theory and the analysis of unbounded dependencies, as these are topics treated in great detail in Pollard and Sag (1994), in chapters 4, 5, and 6, respectively. Even those aspects of the theory which I will say something about in what follows could obviously receive a far more detailed treatment, but since the present chapter is mainly intended to prepare the ground for the more empirically oriented discussion in chapters 3 and 4, this is inevitable. Note though that in spite of its brevity the following overview of HPSG does contain some suggestions of my own for extensions and revisions of the theory which I invite my readers to consider, though I

will not be able motivate them as thoroughly as would be desirable in the space available here.

I want to conclude these introductory remarks with an informal outline of the way in which the various devices of HPSG may be taken to interact in determining the wellformedness of linguistic signs. I assume that the HPSG theory of universal grammar contains at least the following components:

- A set of universal principles which the feature structures representing linguistic signs must satisfy.
- A set of principles constraining the form of language specific rules and rule sets.
- A set of principles determining the way in which universal principles and language specific rules interact in determining wellformedness.

For convenience, I will refer to those principles of UG which apply to linguistic expressions as **first order principles**, because they directly constrain the wellformedness of linguistic expressions, to those principles which apply to language specific rules or lexical entries as **second order principles**, because they apply not to structures representing expressions of some language but rather to constraints on such structures, and to the principles of the third kind as **metagrammatical principles**.<sup>1</sup> Likewise, I assume that the grammar of an individual language L contains the following components:

- A **basic lexicon**, that is, a set of lexical entries which are not derived from other lexical entries. A lexical entry is simply a description of a feature structure of sort *word*, in other words, the specification of a minimal sign.
- A set of **lexical rules**, i.e. rules which take a basic or derived lexical entry, or a pair of such entries in the case of compounding rules, as input and yield a new lexical entries as output.
- A set of parochial wellformedness conditions on feature structures, called **syntactic rules**.

For concreteness, we may assume that the full lexicon of a grammar G is simply the closure of its basic lexicon under the lexical rules, perhaps subject to universal rule-ordering principles like the Agreement Principle of chapter 3. Any pair consisting of a lexicon and a rule set and conforming to the second-order principles of UG is a legitimate grammar. A feature structure X of sort *sign* is an expression of the language L generated by a grammar G exactly if X satisfies all (first order) principles of UG and all rules of G, and in addition every minimal sign contained in X satisfies one of the lexical entries in the full lexicon of G (this means that the full lexicon can be viewed as a large, perhaps even infinite, disjunction of rules). The most important empirical feature of this view of the interaction of universal and parochial constraints is that the constraints imposed by UG and those imposed by the grammar of the specific language being considered work in a cumulative fashion, in other words, parochial rules can never override universal principles. Thus within the present framework there is no sense in which a principle of UG could have the character of a default which can be

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<sup>1</sup>Strictly speaking, of course, one would have to distinguish various layers of non-first-order principles, those which apply to individual rules or lexical entries, those which apply to sets of rules, those which apply to lexical rules, i.e. rules which produce new lexical entries, etc., but I think the idea behind the terms should be clear enough now.

overridden, even if only under special conditions, as has occasionally been suggested in other frameworks.<sup>2</sup>

## 1. 1. Formal preliminaries

The syntactic structures of expressions of natural language are modelled in HPSG as **sorted attribute-value structures** (also called feature structures). For present purposes, it is not necessary to have a maximally precise and general mathematical definition of such structures (cf. again Carpenter (1992)). Instead, I will use a definition of my own devising which embodies the essential properties of attribute-value structures as they are explained informally in chapter 1 of Pollard and Sag (1994) with a reasonable degree of precision, though it certainly will win no prize for mathematical elegance:

### 1. Definition of attribute-value structures:

An attribute-value structure is a structure  $\langle N, S, A, \preceq \rangle$ , where  $N$  is a set of atomic objects called **nodes**,  $S$  a set of subsets of  $N$ , the **sorts**,  $A$  a set of functions in  $N$ , the **attributes**, and  $\preceq$  a binary relation in  $N$ , satisfying the following conditions:

1. There is a unique **root**, where a root is a node  $x$  such that for all nodes  $y$  distinct from  $x$ ,  $x$  **precedes**<sup>3</sup>  $y$ , i.e. there is a sequence of nodes  $\langle z_1, \dots, z_n \rangle$  such that  $z_1 = x$ ,  $z_n = y$ , and for all  $i$  greater than 1 and less than or equal to  $n$ , either there is some  $A \in A$  such that  $Z_i = A(Z_{i-1})$ , or else  $Z_{i-1} \preceq Z_i$
2. No node precedes itself
3. For each node  $X$ , there is an element  $S$  of  $S$  such that  $X \in S$

To distinguish them from ordinary English words, attribute names are given in CAPITALS and sort names in *lower case italics* (in some cases a short and a long form of the same attribute or sort name will be used interchangeably, but I have seen to it that no ambiguities arise from this). Mathematically scrupulous readers should note that the relation  $\preceq$  is of course not the inverse of the primitive relation of set or class membership but merely its counterpart within our graph-theoretic formalism, but no harm will come from failing to make this distinction. It should also be noted that in a more formal presentation of HPSG, in which a systematic distinction would be made between the language of the theory and its model theoretic interpretation,  $S$  would be treated as a family of subsets of  $N$  whose index set would be the sort names, and likewise for the attributes. In descriptions of feature structures, we will often make use of the notion of a **path** in a structure. The set of the paths in a structure  $S$  is simply the closure of the set of non-empty attributes in  $S$  under the operation of function composition; thus a path of length one is simply an attribute, while a path of length two or more is the composition of two or more attributes; in the interest of readability we will write the attributes in a path in the inverse of the order they would have in the

<sup>2</sup> An example of a universal default which can be overridden by language-specific rules is the Head Feature Convention of GPSG, one of the predecessors of HPSG, which will be discussed briefly in section 1.4.2.

<sup>3</sup> This graph-theoretic notion of precedence is distinct from the notion of precedence between linguistic expressions (signs) which will be introduced in section 1.3., but since only the latter will be explicitly appealed to in the rest of the text, this terminological clash should be harmless.

standard notation for function composition, separated by vertical strokes, and the value of a path  $A_1|...|A_n$  at a node  $X$  is written  $(X)A_1|...|A_n$ , reversing the usual order of function and argument. Where necessary, we will use  $A, A', A_s$  as variables over attributes in paths and  $W, W', W_i$  as variables over sequences of attributes. If the shortest path ending in a particular attribute is unambiguously determined in a particular context, that attribute can be used to refer to the whole path. For instance, assuming the structure of signs to be outlined in the next section **HEAD** can be used as a shorthand for the path **SYNSEM|LOC|CAT|HEAD**. The value of an attribute  $A$  at a node  $X$  can be written as  $A(X)$  or, viewing  $A$  as a path of length one,  $(X)A$ . When I speak of the value of an attribute or a path  $A$  in a structure  $S$ , this should be taken as meaning the value of  $A$  at the root node of  $S$ . Likewise, I will sometimes say that a structure  $S$  is of sort  $s$ , meaning that the root node of  $S$  is in the extension of  $s$ . This terminological looseness is justified by the fact that every node in a feature structure  $F$  is the root of exactly one maximal substructure of  $F$  and vice versa. A crucial property of HPSG feature structures is that the values of two or more distinct attributes or paths may be identical (not merely identically structured); in such a situation, we speak of **structure sharing** or of **token identity** of the values. The value of a path is **atomic** exactly if it is of an atomic sort and hence no attributes are defined for it; atomic values are thus terminal nodes of the structure in which they appear. In addition to constraints requiring structure sharing, we will also encounter ones which require path values to stand in some other specified relation, set membership or list concatenation for instance. Because the relation  $\varepsilon$  is not a function and hence technically not an attribute, it can not appear in a path. However, the value of a path may be a node which is in the domain of  $\varepsilon$ , and as might be expected we will use such structures to model sets of ordinary feature structures.

## 1.2. The linguistic ontology

### 1.2.1. The sortal hierarchy

The sorts in HPSG feature structures classify the structures modelling linguistic objects into ontological categories like word, phrase, syntactic category, valency specification, etc.. This classification is not "flat" but rather takes the form of a taxonomy, that is to say, two sorts  $s$  and  $s'$  are either disjoint or one is a subsort of the other. We call such a taxonomy a **sortal hierarchy**. A sortal hierarchy is specified by a set of partitions, that is, specifications to the effect that a particular sort has certain immediate subsorts. A **maximal** sort in a sortal hierarchy is one which has no subsorts defined by that hierarchy (thus maximality is to be understood in the sense of maximal specificity, not maximal extension); analogously, the **minimal sort** in a hierarchy is that which has no supersorts and hence forms the top of the hierarchy. These assumptions are codified in the following two axioms:

#### 2. The Inheritance Principle

If  $X$  belongs to sort  $s$ , then  $X$  belongs to all supersorts of  $s$

#### 3. The Exclusiveness Principle

If  $X$  is of sort  $s$ , then  $X$  belongs to at most one subsort of  $s$



Given the inheritance principle, whenever I speak of **the** sort of a feature structure *f* in what follows, what is meant is the maximal (most specific) sort to which *f* belongs. It should be noted that Pollard and Sag (1994) assume a stronger condition in place of our Exclusiveness Principle, namely one which says in essence that if *X* belongs to sort *S*, it belongs to exactly one subsort of *S* unless *S* itself is maximal, which means that all (feature structures modelling) linguistic objects are of a maximally specific sort. The reason why I do not adopt this stronger assumption is that as noted in P&S94 (4.6.1.), it leads to problems in the analysis of coordinate structures.<sup>4</sup> It is well known by now that conjuncts need not be of the same syntactic category, but that some notion of categorial compatibility is still relevant. Thus we can have examples like the following:

4.     *the Pope is a catholic and proud of it*

But not examples like the following:

5.     *\*a catholic and proud of it entered the cathedral*

The standard explanation for this contrast, proposed in Sag et al. (1985), hinges on the assumption that, ignoring certain complications not relevant in the present context, the category of a coordinate structure is such that the category of each conjunct is an extension of that of the mother. In cases of potential feature conflict, this requirement can only be met if the mother category is unspecified with respect to potentially offending features. Thus, in the case of the coordinate phrase *a catholic and proud of it*, we get a category which is undefined for the part of speech feature *V*, because the specifications of the conjuncts for these features are incompatible, the first being [-*V*] and the second [+*V*]. Such a category is appropriate as a complement of the copula, because the latter merely requires its complement to be predicative but does not fully determine its part of speech, but it is not appropriate for a subject, because subjects, at least in English and with verbs like *enter*, must be nouns, i.e. [+*N*, -*V*]. Obviously, an explanation along these lines is not possible in a framework which disallows underspecified categories.

A fully developed theory of HPSG Universal Grammar will include the specification of the universal hierarchy of linguistic sorts. However, at the present stage of development of the theory, it would not make sense to actually propose such a universal sortal hierarchy, because many aspects of such a proposal would necessarily be arbitrary in the absence of a sufficient number of in-depth studies of languages of various types. To be sure, those sortal distinctions which are introduced without further comment in what follows are intended as tentative universals, but in all likelihood they form only a small part of those which will ultimately turn out to be necessary.

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<sup>4</sup>Because not every object must belong to a maximal sort, sortal hierarchies of the kind assumed here are not quite like the familiar taxonomies in biology and its subdisciplines, where every lifeform must belong to a maximal sort, i.e. a species or even a subspecies and there can be no such thing as a whale which belongs to the genus *balaenoptera* (the genus of the rorquals, i.e. the blue whale, the fin whale, and their smaller relatives) but to no species, not even a newly discovered one, within that genus. The underspecified feature structures which arise in coordinate structures are somewhat like our hypothetical unspecific rorqual, a rather implausible concept, which may be the reason why Pollard and Sag do not want to admit such structures.

### 1. 2. 2. Sorts and attributes

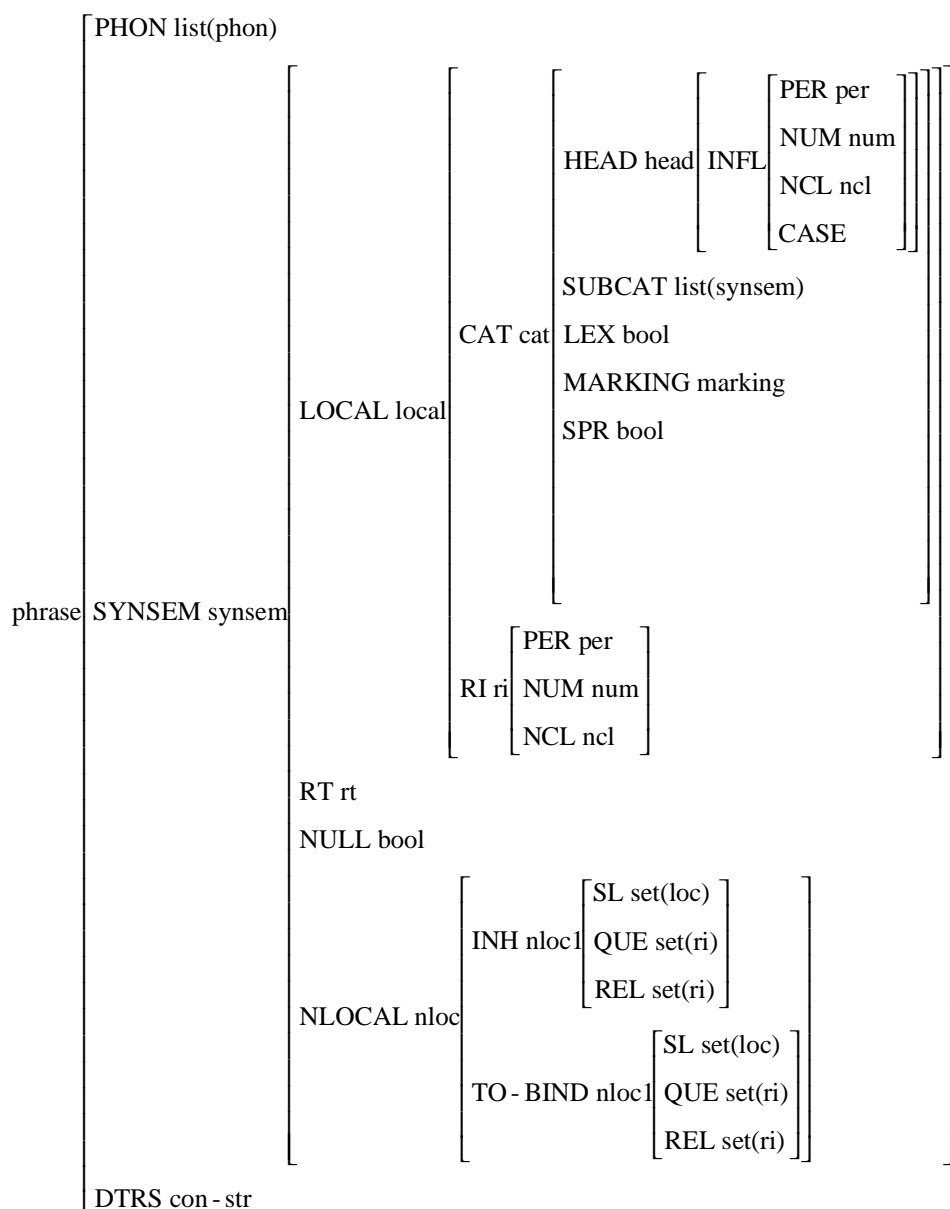
As is implicit in what has been said so far, each attribute is defined only for feature structures of specific sorts and yields feature structures of specific sorts as values. As in the case of the sortal hierarchy, a full specification of the restrictions governing the cooccurrence of features and attributes is beyond the scope of the present inquiry, though I will informally outline the basic featural architecture of signs in the next section. Here I merely want to draw attention to certain distinctions between different types of features which may be unfamiliar to the reader.

We have already seen that attributes may take either atomic or non-atomic feature structures as values. Among attributes of the latter kind, there are those which take ordinary non-atomic feature structures as values, but also others whose values are **sets** or even **sequences** (lists) of non-atomic feature structures. Technically, such attributes are accommodated by defining, for every ordinary nonatomic sort  $s$ , the sorts  $set(s)$  and  $list(s)$ , which represent sets and lists of objects of sort  $s$ . Attributes which take values of sort  $set(s)$  will be called **set-valued attributes**, those which take values of sort  $list(s)$ , obviously, **list-valued attributes**. Each sort  $list(s)$  has two subsorts,  $elist(s)$  and  $nelist(s)$ . As might be expected, the former, which represents empty lists, has no attributes. The latter subsort, which represents non-empty lists, has two attributes, **FIRST**, whose value is of sort  $s$ , and **REST**, whose value is of sort  $list(s)$ , i.e. either an empty or a non-empty list. Lists of arbitrary finite length can be built simply by exploiting recursion through the **REST** feature, a list of length  $n$  being simply one where the path  $REST|...|REST\ elist(s)$  has length  $n$ . For convenience, we will not represent the recursive structure of lists graphically and instead simply notate them between angled brackets like sequences in the standard mathematical sense. As for the sorts of the form  $set(s)$ , these have two subsorts as well, called  $eset(s)$  and  $neset(s)$  in analogy with those of the list sorts. While  $eset$  is an ordinary atomic sort,  $neset$  is a bit of a misfit because it has no attributes, but the nodes belonging to this sort are nevertheless not terminal nodes, viewed graph-theoretically, but rather have outgoing arcs labelled by the improper attribute  $\exists$ .

### 1. 2. 3. The basic architecture of signs

Expressions of natural language are modelled in HPSG by feature structures of sort *sign*. This sort has two subsorts, *word* and *phrase*. The former has the attributes **PHON** and **SYNSEM**, the latter has the attribute **DTRS** (daughters) in addition. Hence a word is simply a minimal sign, a sign which does not contain other signs. The basic architecture of phrasal signs which I will assume in what follows is shown in the following attribute-value diagram (the structure of non-phrasal signs (words) is exactly the same except that they lack the attribute **DTRS**):

6.



This architecture is largely identical to that assumed by Pollard and Sag (1994). The value of the attribute PHON represents the input to the phonological component of the grammar, whereas the value of the attribute DTRS is a feature structure with attributes whose values represent the immediate constituents of the sign, its daughters. Obviously, the PHON value of a sign is related to the PHON values of its daughters, as will be discussed in section 1.3 below. The value of the attribute SYNSEM represents all morphosyntactic properties of a sign except phonological form and constituent structure. Crucially, the information embodied in the value of SYNSEM is also that which is accessible to subcategorization. The information within the value of SYNSEM|LOCAL is that which is shared between filler and trace in unbounded dependency constructions; the latter being encoded in the values of the various attributes within the values of SYNSEM|NLOC|INH (inherited) and SYNSEM|NLOC|TO-BIND. The elements of the values of the INHERITED attributes represent properties of traces and similar elements which the sign in question contains; the value of each TO-BIND attribute contains that subset of the corresponding value

of the corresponding INHERITED which consists of the elements which are bound off at the point where the specifications occur, as we will see in more detail in section 1.7. below. The value of SYNSEM|RT encodes the referential type of the sign, i.e. its behaviour with respect to the binding theory (cf. Pollard and Sag (1994: ch. 4), and the value of SYNSEM|NULL is + if the PHON value of the sign is  $\langle \rangle$  (the empty list) and - otherwise, thus making the overtiness of a sign, though not more specific aspects of its phonological form, a property which can be subcategorized.<sup>5</sup> Turning to the values LOCAL, in standard HPSG these have the attributes CATEGORY, CONTENT, and CONTEXT. The values CONTENT and CONTEXT are structures destined to serve as the basis for a situation-theoretic semantic interpretation. Since, as pointed out in the introduction, I take a somewhat agnostic position with respect to the proper semantic interpretation of HPSG grammars, I do not use these features or any others whose values could be taken as something like the logical form of a sign. However, I do assume that certain morphosyntactic features of signs are visible for semantic interpretation, no matter how the latter is ultimately fleshed out. In particular, this holds for the already mentioned attribute RT, but also for the information encoded in the values of RI (referential index). I assume that at least those anaphoric relations which are plausibly analysed semantically in terms of variable binding are expressed by token-identity of RI values. Since the agreement properties of signs are encoded within RI values, it is automatically guaranteed that binding entails agreement (agreement properties are also encoded within the value of INFL for reasons that will be explained further below). Following Gazdar et al. (1985) and Miller (1991), among others, I also assume that morphosyntactic features like tense or mood are semantically interpreted, as will be explained more fully in section 1.8. below. Note that in standard HPSG not only the information which is encoded in the value of RI but also that encoded by RT in the present system is within the value of CONTENT and hence within that of LOCAL. The reason why RT is placed outside the value of LOCAL here is that I do not want the referential type of the antecedent and the trace to be shared in unbounded dependency constructions because this would mean that the trace of a pronominal is itself a pronominal, which is inconsistent with certain facts about modern Irish which will be discussed in section 1.5. below.<sup>6</sup> Turning now to the attributes of the value of CAT, HEAD takes as its value those properties of a sign which, as the name suggests, are shared between the sign and its head daughter. The value of the attribute INFL within that of HEAD registers the properties involved in morphosyntactic agreement or concord (There are of course other attributes of HEAD values, but only INFL is appropriate for HEAD values of all subsorts). The part of speech of a sign is indicated by the subsort of its HEAD value. I assume that the sort *head* is universally subdivided into the subsorts *substantive* and *functional*, that *substantive* universally has the subsorts *nominal* and *verbal*, and that *functional* has the universal subsorts *specifier* and *marker*. I also assume that individual grammars may further subdivide these sorts,

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<sup>5</sup>Obviously, we need to exclude absurdities like a head subcategorizing for a complement whose phonological representation includes a high back unrounded vowel. The feature NULL achieves this by serving as a bottleneck for phonological information which lets pass only as much of the latter as is needed into SYNSEM values.

<sup>6</sup>Pollard and Sag (1994: 257) point out that their system immediately accounts for the distribution of strong crossover effects, i.e. the ungrammaticality of sentences like *\*John<sub>i</sub>, he<sub>i</sub> thinks we should invite t<sub>i</sub>* as opposed to the grammaticality of *Himself<sub>i</sub>, John<sub>i</sub> admires t<sub>i</sub>*, because since "John" is a nonpronominal NP subject to principle C of their binding theory, its trace is also a nonpronominal and hence cannot be bound by *he*, whereas the trace of *himself* in the second example is an anaphor because its antecedent is and hence can be bound. This advantage is lost in the present system, and at the moment I do not see how this could best be compensated.

a point which will be taken up again in the last paragraph of this section. The value of SUBCAT is a list of *synsem* structures which represent the valency of the sign, i.e. the SYNSEM values of the arguments it combines with. The value of the attribute LEX encodes a property of signs which is roughly analogous to bar level in more familiar systems, LEX|+ signs corresponding approximately to  $X^0$  categories and LEX| ones to  $X'$  and XP categories. The value of MARKING registers the presence and identity of so-called markers, elements like complementizers which are not heads of the phrases in which they appear but are nevertheless visible "from outside". Finally, the value of SPR registers whether or not a sign contains a specifier. In what follows, we will discuss several principles of HPSG Universal Grammar which constrain the values of the attributes just enumerated (as well as those of others still to be introduced) in various ways.

Before proceeding, it may be helpful to discuss briefly how the feature structure formalism of HPSG relates to more familiar ways of presenting grammatical information involving some sort of annotated constituent structure trees. Actually, the differences between the two modes of presentation are not very great. Essentially, a diagram representing an HPSG sign can be converted into something like a more standard constituent structure tree by labelling the root of the latter with the value of SYNSEM, attaching the values of the attributes within DTRS as daughters of the root in the order in which their PHON values appear in that of the mother, labelling the daughter nodes with the appropriate SYNSEM values, and repeating this procedure until there are no embedded phrasal signs left. As for the correspondence between familiar syntactic categories like NP or VP with elements of the present formalism, let me note that what is called an NP in approaches such as GB theory roughly corresponds to a sign with HEAD value of sort *nominal*, SUBCAT value  $\langle \rangle$ , LEX value -, and SPR value +, i.e. a saturated non-lexical nominal sign with a specifier. Likewise, a VP is essentially a nonlexical verbal sign with a SUBCAT value of length one, and a clause is a saturated verbal sign.

In order to complete this sketch of the ontology of HPSG, something must be said about the possible language particular elaborations of the universal ontology just sketched. As already hinted at in connection with HEAD values, I assume that individual grammars may subdivide universally specified sorts (unless these are explicitly specified as maximal) and may also specify appropriate attributes and sorts of values for such parochial sorts. In addition, they may also specify further attributes for sorts given in UG and they may more narrowly constrain the values of existing ones. However, what individual grammars cannot do is override ontological specifications which are part of UG. In other words, every sort of feature structure specified in a particular grammar must be a subsort of some universally specified sort and as such inherits all the properties ascribed to the latter by UG. This opens up an interesting perspective on the question of the universality of specific syntactic or morphosyntactic categories. I will illustrate this only with respect to the subsorts of *head*, but analogous remarks could be made concerning other aspects of the universal ontology. As stated above, sortal distinctions within *head* represent part of speech or major category distinctions. Since individual grammars may elaborate the universal ontology, syntactic categories may in a sense be both parochial and universal. For instance, it stands to reason that English has a syntactic category traditionally labelled Verb, hence an HPSG grammar for English will specify a sort *verb* to represent this. Now in accordance with what has been said so far, the English sort *verb* must be a subsort of some universal sort, and under the intended interpretation the only candidate is *verbal*, which is a

subsort of *substantive*, which is in turn a subsort of *head*. Hence although *verb* is, in a sense, an English specific category, being a subsort of *head* of these universal sorts it inherits all properties specified for the latter, for instance, it obeys the Head Feature Principle, and it has the attributes MOD and INFL. Just to illustrate this train of thought a little further, an HPSG grammar of French might contain a subsort *verbe* of the universal sort *verbal*; being a subsort of the latter, this feature would inherit the same universal properties as its English counterpart although the two are by assumption distinct. Viewed in such a way, the question "are there universal syntactic categories" becomes meaningless, being replaced by "how finely grained are the categorial distinctions of UG". While it is beyond the scope of this study to pursue this idea further, it seems to me that the typological implications of the HPSG view of linguistic ontology definitely merit further study.

### 1. 3. Constituent structures

#### 1. 3. 1. The relation between constituent structure and phonetic form

As mentioned already, the constituent structure of a phrasal HPSG sign is encoded by the value of the attribute DTRS. We say that a sign X **immediately dominates** a sign Y iff Y is either the value or a member of the value of a path of the form DTRS|A in X, where  $A \in \{\text{HEAD-DTR, FILLER-DTR, MARKER-DTR, SPEC-DTR, ARG-DTRS, MOD-DTRS}\}$ , and we say that X **dominates** Y exactly if X and Y stand in the transitive closure of the immediate dominance relation. When X immediately dominates Y, we also say that X is the **mother** of Y or Y is a **daughter** of X, and two signs X and Y are said to be **sisters** exactly if there is some node Z which is the mother of both X and Y. The following principle guarantees that each embedded sign has exactly one mother:

#### 7. The Single Mother Principle

Let A and A' be distinct ID-attributes, X a node of sort *phrase*; Y the value of DTRS|A in X and Z the value of DTRS|A' in X; then if Y and Z are both of sort *sign*, they are distinct, if both are of sort *list(sign)*, they are disjoint, and if Y is of sort *sign* and Z of sort *list(sign)*, then Y is not a member of Z

It is important to realize that the Single Mother Principle is an empirical principle which prevents the use of structure sharing to model constituent structure "trees" in which a node has more than one mother. There would be nothing logically wrong with a variant of HPSG which would allow such structures, it would simply not accord with the standard view of constituent structure.<sup>7</sup> The next principle guarantees that the

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<sup>7</sup>An interesting investigation of the possible advantages of non-standard views of constituent structure can be found in Blevins (1990). Note also that APG adopts only a weakened version of the standard view. In that framework, the surface graph of a Pair Network X, i.e. the set of all unerased arcs in X, must correspond to an ordinary constituent structure tree, but the Relational Graph of X as a whole need not. Analogous assumptions can be made in interpreting RG work, although the latter framework contains no formal reconstruction of the notion of surface structure. Note also that while LFG does assume the standard view of constituent structure, in this framework many grammatical phenomena are accounted for in Functional Structure, where the equivalent of multiple motherhood is permitted.

PHON-value of a phrasal sign is obtained by concatenating rather than interleaving the PHON-values of its daughters. It is formulated (rather informally) as follows:

## 8. The PHON-Principle

The PHON-value of a sign of sort *word* is a singleton or empty list of objects of sort *phon*; the PHON-value of a sign of sort *phrase* is identical to that of its daughter if there is only one daughter, otherwise it is obtained by (recursively) concatenating the PHON-values of its daughters in some order<sup>8</sup>

The choice of concatenation rather than some other operation on lists again represents an empirical choice, because the Single Mother Principle and the PHON-Principle as given together guarantee that a fairly transparent relation obtains between the phonetic form of a sign and its constituent structure, because there can be no interleaving of constituents. Before proceeding, it must be pointed out that PHON-values are not themselves phonetic forms, but structures on which the postlexical phonological rules operate. I assume that whatever the phonological rules do, they preserve the linear order of the elements of PHON-lists. Hence we can say from now on that a sign *X* **precedes** a sign *Y* iff there is some sign *Z* which dominates both *X* and *Y* and the sublist of PHON(*Z*) which corresponds to PHON(*X*) precedes that which corresponds to PHON(*Y*). Note that the PHON-Principle does not say in which order the PHON-values of the daughters are to be concatenated. This is left to parochial linear precedence rules, which may make reference both to categorial properties and to grammatical relations. For instance, a grammar of English will have to contain a linear precedence rule stating that *X*<sup>o</sup> categories, i.e. in our terms signs with LEX value +, precede their sisters and that complements are linearized in order of increasing obliqueness (see section 1.5. for explanation of these notions). It should also be pointed out that the only "empty" constituents in our framework are words which have the PHON-value  $\langle \rangle$  and phrases dominating exclusively empty words. The objects of sort *phon* which make up the lists which function as non-empty PHON-values are of course themselves structured. One might imagine them as feature structures modelling either strings of phonological feature matrices of the kind familiar from classical generative phonology or as more complex feature structures modelling some kind of autosegmental view of phonological structure. However, actually specifying their structure would involve us in matters of phonology which are outside the scope of the present study, so we will just use ordinary orthographic representations of words instead of real *phon*-objects, and often we will write lists of *phon*-objects just as strings of orthographic words separated by spaces rather than in the standard list notation.

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<sup>8</sup>The concatenation of two lists *L* and *L'* (in this order) can be defined within our formalism in terms of the ancillary notion "nth member of a list". The latter can be defined semi-formally as follows:

Given an arbitrary list *L* and a natural number *n*, the *n*-th member of *L* is the value (if defined) of the path (L)W|FIRST, with *W* representing *n*-1 occurrences of the attribute REST

Given this ancillary definition, we can define the concatenation of two lists *L* and *L'* of length *m* and *n*, respectively, as the list *L''* such that for all *i* equal to or greater than 1 and less than or equal to *m*, the *i*-th member of *L''* is identical to the *i*-th member of *L*, and for all *i* greater than *m* and less than or equal to *m+n*, the *i*-th member of *L''* is identical to the *i*-minus-*m*-th member of *L'*.

### 1. 3. 2. Types of constituent structures

The universally available types of constituent structures correspond one-to-one with sorts of DTRS values. To be able to talk less long-windedly about phrasal signs with DTRS values of particular sorts, I propose the following terminology: A **headed structure** is a sign whose DTRS value is of sort *head-struc*; a **coordinate structure** is a sign with a DTRS value of sort *con-struc*. Feature structures of this sort have a single attribute, **CONJUNCTS**, which takes a sequence of signs as its value. Among the headed structures, we distinguish **head-argument-modifier structures**, with DTRS values of sort *head-arg-mod-struc*, **head-marker structures**, with DTRS values of sort *head-mkr-struc*, **head-specifier structures**, with DTRS values of sort *head-spec-str*, and **head-filler structures**, with DTRS values of sort *head-filler-struc*. Head-argument-modifier structures have three attributes, **HD-DTR**, **ARG-DTRS**, and **MOD-DTRS**, the first taking a sign as value, the last two sequences of signs. Unsurprisingly, objects of sort *head-marker structure* have the sign-valued attribute **MARKER-DTR** in addition to **HEAD-DTR**, while DTRS values of sort *head-spec-structure* have the attributes **HEAD-DTR** and **SPEC-DTR**, the latter also taking a single sign as its value, and objects of sort *head-filler-structure* have the sign-valued attributes **HEAD-DTR** and **FILLER-DTR**.<sup>9</sup> A **conjunct daughter** (or simply a conjunct) is an element of the DTRS value of a coordinate structure, while a **head daughter** (or simply a head) is the value of the path **DTRS|HD-DTR** in a headed structure; the definitions for non-head daughter, argument daughter, etc., are exactly analogous. As a final terminological point, note that a sign *X* is **aprojection** of a sign *Y* iff *Y* is the head of *X*, the head of the head of *X*, etc.. In the last case we also say that *Y* is the head *X*, introducing a (hopefully harmless) ambiguity into the use of the word *head*, though the longer term *head daughter* will continue to be reserved for values of **DTRS|HD-DTR**, i.e. what could be called immediate heads. The present array of constituent structures is almost the same as that assumed in Pollard and Sag (1994), the only differences being that I posit a single type of head-argument-modifier structures where they have two, which they call **head-complement structures** and **head-modifier structures**, and that I posit an additional sort of head-specifier structures. My reason for postulating head-argument-modifier structures is that I want to allow arguments and modifiers to appear at the same level of embedding. This allows a simpler account of structures in which a modifier intervenes between a head and its complement, which can only be analysed as involving the equivalent of movement in standard HPSG. Such flat structures may occur even in otherwise configurational languages, for instance in those of the Romance family, where both modifiers of nouns and complements of nouns can or even have to appear postnominally and the former may precede the latter, as in the following French example:

9.     *la découverte récente d'une espèce de primate jusqu'ici inconnue en Chine*  
          the discovery recent   of-a   species of primate until now unknown in China  
          "the recent discovery of a hitherto unknown primate species in China"

The local constituent structures associated with the different kinds of phrasal signs are in part determined by the feature declarations for the subsorts of *con-struc*, but there

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<sup>9</sup> Thus I assume that if there are languages with multiple wh -fronting, these will stack the fillers rather than attaching them at the same level of constituent structure. For some discussion of these issues, see Rudin (1988).



are some additional constraints that need to be imposed. The first such constraint is one which requires coordinate structures to have at least two conjunct daughters. This is necessary because otherwise each phrase would have a spurious analysis as a coordinate structure in languages where conjuncts need not be overtly marked, and I am unable to prove that no harmful consequences follow from this. I thus propose the following principle:

#### 10.     **The Proper Coordination Principle**

The DTRS value in a coordinate structure has at least two members

In a more elegant formalization of HPSG, this principle could perhaps be made to follow from the architecture of the feature system, but since my main goal in the present study is not formal elegance, I will not pursue this possibility. The next principle specifies the function of the attribute LEX within SYNS|LOC|CAT. Intuitively, the value of this attribute distinguishes phrases, that is,  $X'$  and  $X''$  constituents in more familiar versions of X-Bar Theory, from  $X^\circ$  categories; the latter have + (more precisely and somewhat pedantically, a node of the atomic sort +) as the value of the path SYNS|LOC|CAT|LEX, the others have the value - in the same place. The need for a principle referencing an attribute like LEX might be questioned because we already have a sortal distinction between words and phrases. However, we cannot simply identify  $X^\circ$  constituents with words in the sense of signs having no daughters, because coordinated words seem to have much the same distribution as simple words, as shown in part by the following example:

#### 11.     *Jane reads and writes Spanish with ease*

Granting the otherwise well-motivated assumption that lexical heads precede their complements in English while phrasal heads follow them, the example shows that we need to classify coordinate heads as lexical at least for the purpose of linear ordering. It thus seems that we should identify the lexical constituents in the sense of X-Bar theory as those which have no head daughter and no non-lexical conjunct daughter. This view is embodied in the following principle of UG:

#### 12.     **The Lexicality Principle**

For any sign X, (X)SYNS|LOC|CAT|LEX is + if and only if X is either of sort *word* or else a coordinate structure such that the value of LEX is + in all daughters of X

Given this principle, a lexical constituent can be either a single word, a coordination of words, a coordination of a coordination of words, etc., but nothing else. It is of course an empirical question whether this is the right restriction to impose. Essentially, it embodies the claim that apart from coordinations of lexical heads, all constituents with  $X^\circ$  distribution are in fact words, i.e. syntactic atoms, and that whatever apparent constituents these have are in fact not independent syntactic units but reflexes of morphological processes. This holds in particular for verbclitic combinations, but also for things like German verbs with separable prefixes. While I cannot defend this claim in detail here, I would like to point out that a substantial body of recent research, especially within the Extended Phrase Structure paradigm, tends to support it (cf.

especially Miller (1991) and the literature cited there). Another empirical question is whether Bar-Level distinctions within the class of non-lexical elements are necessary; this question is discussed in Bader (1995). For the purposes of the present study, I will not posit further principles of UG relating to constituent structure, but will take all restrictions beyond those imposed by the Single Mother Principle, the PHON-Principle, the Proper Coordination Principle, and the Lexicality Principle, to be parochial. Hence word order constraints in particular, but also restrictions forcing, for instance, the least oblique argument (the subject, in other words) of predicates of certain categories to be located on a higher level of constituent structure than the rest, are taken to be parochial. However, parochial does not mean random; as many authors at least since Greenberg (1963) have pointed out, certain combinations of parochial choices in these domains are much more likely to be taken than others. For instance, languages tend to serialize heads of different categories uniformly, languages with neither agreement nor case tend to be verb medial, etc.. However, I am inclined to think that such regularities are not universals in the strict sense (though they could be given the status of Grammar Laws in the present or similar frameworks if that should turn out to be desirable), but rather have functional explanations relating to the need to be able to identify grammatical functions by some combinations of overt phenomena such as word order (possibly correlated with constituent structure), case or adpositional marking, or agreement, as discussed recently in Gerdtz (1990) and, from a somewhat different perspective, in Hawkins (1990). Again I cannot defend my position on this question in detail here, but one obvious reason for assuming functional explanations in this domain is that the correlations just hinted at are normally not absolute, though still significant, although the observation in Gerdtz (1990) that there are no verb-peripheral or free word order languages with neither agreement nor case marking might well turn out to be genuine universal. Even in this case, however, a functional explanation could perhaps be maintained, because a language of this type would have no direct means to make grammatical relations visible and would therefore be too inefficient to ever evolve or remain stable under real world conditions even if it were formally a possible natural language.

## **1. 4. The Head-Feature Principle and the Coordination Principle**

### **1. 4. 1. Preliminary remarks**

As is implicit in the ontology of HPSG as set out so far, we assume that non-coordinate structures always have a unique head. The intuition that non-coordinate constructions are in some sense projections of a head is shared by many syntactic approaches, though there are many areas of disagreement when it comes to identifying the heads of particular constructions, and also the idea that a unique element can be identified as the head in all relevant cases has not gone unchallenged.<sup>10</sup> We need not go into these controversies here, as the analyses to be developed do not depend on controversial assignments of head status, at least if one assumes that the head of a construction should in principle be an element with phonetic content. As many readers will know, the latter assumption is not made in recent versions of the GB-approach, where content words like nouns or verbs are embedded within whole cascades of

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<sup>10</sup>A good recent source on the topic is Corbett, Fraser, and McGlashan (eds.) (1993), which contains contributions of various theoretical orientations.

empty projections.<sup>11</sup> This is not the place to discuss the general merits of this recent trend within GB, though the fact that I will not need to appeal to abstract heads to analyse the constructions which this study is focussed on constitutes implicit argument against it. It should be pointed out that the architecture of HPSG does not forbid the postulation of empty heads, because as we have seen words may have empty PHON-values; if such an empty word has a syntactic valency, we get something which is at least partly analogous to an empty head of the GB-sort. However, no principle of HPSG Universal Grammar makes reference to empty heads, and the resources of the theory are such that appeal to empty heads in rules of individual grammars is necessary in only a small proportion of the cases where empty heads would be posited in GB-type analyses. As a consequence of this, HPSG analyses will in general be much simpler in terms of constituent structure than GB-analyses of the same phenomena, but they will be more complex in other respects, as we will see. At present, the trade-off between the two kinds of complexity is difficult to judge because this would presuppose the existence of a pair of proposals for a theory of UG, one of the HPSG kind, the other of the GB kind, which are comparable both in terms of formal explicitness and in terms of empirical scope, and to the best of my knowledge such a pair does not exist.

#### 1. 4. 2. The Head Feature Principle

The Head Feature Principle is the formal expression of the intuition that headed phrases share certain crucial morphosyntactic properties with their head. It thus plays the same role within HPSG as the Head Feature Convention in GPSG, and principles with a similar effect are assumed if not explicitly spelled out in all theories of syntax which assume a context-free phrase structure skeleton for at least one level of representation, that is, at least in GB and related approaches and in LFG, though not RG/APG. The principle essentially requires that the a phrase and its head daughter are identical with respect to a certain subset of their properties, those encoded by the value of the attribute HEAD. The following formulation of the principle, a slightly more formal version of that given in Pollard and Sag (1994, 34), will be assumed for the rest of the present study:

#### 13. The Head Feature Principle (HFP)

For any headed structure X, (X)SYNS|LOC|CAT|HEAD = (X)DTRS|HD-DTR|SYNSEM|LOC|CAT|HEAD

The HFP as stated here forces strict identity of mother and head daughter in terms of head features. In this respect it contrasts with its immediate ancestor, the Head Feature Convention (HFC) of GKPS, which is a default principle. Motivation for a default version of the HFP could come from two sources, multiply headed structures and single-headed structures in which the obvious candidate for head status has properties which are incompatible with a strict HFP. Structures of the former kind are simply not possible within the present ontology, because the value of HEAD-DTR is a sign rather than a set or sequence of signs, but if we were to change this and treat coordinate structures, for instance, as multiply headed, we would quickly run into the kind of

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<sup>11</sup> Apparently this development was initiated by the proposal in Pollock (1989) to split the abstract head of the clause INFL by two abstract heads Tense and (Subject) Agreement.

problem sketched in connection with examples (4) and (5) above and would be forced to retreat either to a relativized version of the HFP or to an analysis of coordination involving deletion or ellipsis. Since deriving all instances of non-clausal coordination by deletion or ellipsis is undesirable for various well known reasons, I will not pursue this possibility and instead briefly discuss that of weakening the HFP. Potential evidence for a weakened HFP comes from the nominal gerund construction in English, which is illustrated in the following example taken from Pullum (1991, 764):

14. *I disregarded his insulting his opponent*

In this construction, we have a clause-like constituent *-his insulting his opponent* in the present example - which has a "subject" in the form of a possessive phrase and a "predicate" containing the gerund and what appears to be a direct object NP. We thus seem to have nominal syntax at the upper level of the structure and verbal syntax at the lower level, and Pullum (1991) shows in detail that this impression is indeed correct. The problem is that if we do not want to posit an empty head, the head of a nominal gerund must be the predicate phrase containing the verb and the direct object, so that we have an NP whose head is not an N' but a VP. Pullum argues that under the GKPS-assumptions about the transmission of head features this presents no problem because feature specifications explicitly mentioned in the Immediate Dominance rule (ID-rule) which sanctions a construction are exempt from the Head Feature Convention.<sup>12</sup> This allows him to account for the nominal gerund with a single additional ID-rule expanding NPs, which reads as follows (Pullum (1991, 779):

15.  $N[\text{BAR: } 2] \rightarrow (N[\text{BAR: } 2, \text{POSS: } +]), H[\text{VFORM: prp}]$

This rule says simply that an NP can consist of an optional possessive NP and a head (marked H) which has the head feature identifying present participles and their projections. Because a constituent specified for VFORM is necessarily a verbal projection, i.e. [N: -, V: +] in the GKPS system, the rule just given effectively stipulates that the head of the NP is verbal, so that the HFC cannot apply to "copy" the categorial features of the mother onto the head daughter as would if the ID-rule said nothing about the part of speech of the head daughter.

It is clear that Pullum's analysis of the nominal gerund cannot be reconstructed within the present version of HPSG because of the strictness of the HFP, and it seems to me that it is an almost optimally simple and elegant analysis. However, relaxing the HFP to allow analyses of this kind has its price. First of all, in a system like Pullum's almost any kind of divergence between mother and head daughter with respect to head feature specifications could be sanctioned by an appropriate ID-rule. For instance, it would be possible to write a mirror-image of Pullum's nominal gerund rule which would introduce an ordinary noun as the lexical head of a present participle VP, so that each ordinary possessed NP would have a spurious analysis with a VP sandwiched between the NP level and the N° level. In fact, this analysis might be not merely spurious but actually harmful, because it would make it possible to modify apparent N' constituents, which would in fact be VPs, with adverbials, so that an example like the

<sup>12</sup>For present purposes, we can view ID-rules simply as context-free phrase structure rules whose right-hand side is a set rather than a string of categories. Readers interested in the technical details of the GKPS-system should consult that reference or Hukari and Levine (1986).

following would falsely be predicted to be grammatical just like its nominal gerund counterpart:

16.     \**Bill's stubbornly denial of the fact that pigs can fly*

17.     *Bill's stubbornly denying the fact that pigs can fly*

While the second example is perhaps less than fully natural (as Pullum notes, the nominal gerund quite generally has a somewhat bookish flavour), the former is thoroughly ungrammatical, although it could be generated by a grammar containing a rule expanding VP as N and PP[PFORM: of]. It may of course be that such examples are ungrammatical for independent, possibly semantic, reasons, but there is no way to be sure that all the bad structures potentially generable by assuming ID-rules overriding the provisions of the HFC will be filtered out by some conspiracy of independent factors. Therefore, very strict limits on the amount of stipulation which ID-rules (or some analogous device) can introduce would be called for. More generally, there are at least two important problems with theories in which constraints like the HFC are defaults which can be overridden. The first is that the statements which can override the defaults need themselves to be constrained heavily. The second problem is that the interpretation of grammars involving default statements becomes more complicated, because it is no longer possible to decide whether a structure satisfies a particular constraint by looking at those two entities and nothing else. Because of these considerations, I stick to the strict HFP in the present study, and more generally I continue to assume that neither UG nor any individual grammar contains default rules or principles.

### 1. 4. 3. The Coordination Principle

Having decided to stick to the HFP as first formulated and not wanting to appeal to ellipsis to account for coordination of unlike categories, we are forced to treat coordinate structures as unheaded. Nevertheless, it is clear that the feature composition of coordinate phrases is not independent of that of the conjuncts, and I have already suggested informally that a condition requiring compatibility rather than identity of certain substructures of the conjuncts and the mother seems to be called for. The following principle formalizes the notion of compatibility I have in mind:

#### 18.     **The Coordination Principle**

In a coordinate structure, the CAT and NLOC value of each conjunct is an extension of that of the mother

This is essentially the weak version of the Coordination Principle proposed in P&S94, p. 203, but in the present theory it has official status because we have not excluded underspecified feature structures. The formulation of the principle relies crucially on the notion of one feature structure extending another. The extension relation is defined as follows:

19. A feature structure  $F'$  **extends** a feature structure  $F$  iff for every path  $W$  which has a value  $V$  in  $F$ , the value  $V'$  of the corresponding path in  $F'$  satisfies one of the following conditions
1.  $V$  and  $V'$  are atomic and the sort of  $V'$  is identical to or a subsort of that of  $V$
  2.  $V$  and  $V'$  are neither atomic nor sets and  $V'$  extends  $V$
  3.  $V$  and  $V'$  are sets and there is a one to one correspondence  $f$  between  $V$  and  $V'$  such that for each element  $X$  in  $V$ ,  $f(X)$  extends  $X$

This definition may be less than optimally transparent at first glance, but what it says is simply that a feature structure  $F'$  extends another feature structure  $F$  if and only if  $F'$  contains all the information contained in  $F$  and no information which is in conflict with that in  $F$ .

### 1. 5. Subcategorization and grammatical relations

It is a very basic assumption of HPSG that the valency of an expression is encoded directly in its syntactic category. In this respect, HPSG differs crucially from GPSG. In the latter theory, subcategorization is handled by a diacritic feature SUBCAT. Each ID-rule which introduces a head of bar-level 0 specifies the SUBCAT value of the head. Since lexical entries also specify a SUBCAT value, the lexicon is partitioned into disjoint subsets corresponding to the different local contexts into which lexical items can be inserted. As an example for this mechanism, consider the following ID-rule:

20.  $V[\text{BAR: 2, SUBJ: -}] \rightarrow H[\text{BAR: 0, SUBCAT: 2}], N[\text{BAR: 2}]$

This rule sanctions transitive VPs, i.e. VPs consisting of a head and a single NP (obviously, this is not a sufficiently general characterization of transitivity, but this is not important for the present purpose). Note that the heads of the VPs sanctioned by this rule will be verbs, because the rule does not specify the category of the head, which is thus determined by the HFC. Because the rule specifies that the head is of subcategory 2, only items with this subcat specification can appear as heads of transitive VPs, in other words, the class of simple transitive verbs can be identified as  $V[\text{SUBCAT: 2}]$ . The disadvantage of this mechanism is that the SUBCAT feature is unstructured. Thus there is no simple way to pick out natural classes of lexemes based on partial similarity of subcategorization, for instance the class of all verbs which take a direct object regardless of what other complements they require. It is also not possible in this system to relate the subcategorization of an item directly to its semantic type, or to state correspondences between subcategorization and case-marking or agreement directly. For reasons like these, HPSG has adopted an approach to subcategorization which is inspired by Categorical Grammar, in which the subcategorization, or as we will also say the (syntactic) valency, of an expression is represented by a structure which contains substructures which must be matched against the corresponding substructures of its arguments (if any). This general idea can be implemented in a number of ways. The implementation adopted in the main part of Pollard and Sag (1994) involves the feature SUBCAT, whose value is a list of *synsem* objects. Each of the latter must be structure-shared with the SYNSEM value of one of the arguments, and the grammatical relation of each argument is simply identified with the position of its SYNSEM value in the SUBCAT value of the head. Whenever an argument  $A$  in a structure  $X$  with head daughter  $H$  satisfies the  $n$ -th element of the SUBCAT value of

H, A is said to be the **n-th argument in X** or the **n-th argument of H**. The traditional grammatical relations such as subject or direct object are simply identified with argument positions in this approach, a subject being a first argument, a direct object a second argument, an indirect object a third argument, and an oblique fourth or later argument. An argument A is said to be **more prominent** or **less oblique** than another argument A' of the same head if the SYNSEM value of A is earlier on the SUBCAT list of the head than that of A'. Henceforth, I will call the ordering of the arguments of a head relative to each other the **Obliqueness Hierarchy**, following Pollard and Sag (1987) and (1994). We can see that the subcategorization mechanism just outlined provides both a theory of grammatical relations and a hierarchical ordering of the latter in one go. Unfortunately, it is not in all cases quite sufficient to distinguish grammatical relations as finely as apparently required. The reason for this is that grammatical relations are not only ordered but in fact defined by their place in the ordering induced by the SUBCAT list. Hence, if a head has two arguments, one of them is by definition the subject and the other the direct object, if it has three arguments, they are automatically identified as subject, direct object, and indirect object, and if there is only one it is automatically the subject. This leads to problems for instance in the case of verbs which take two arguments none of which is a direct object, such as English *talk* and many others. This means that morphosyntactic rules sensitive to grammatical relations cannot rely on the grammatical relations defined by the obliqueness hierarchy alone, but must instead refer either to additional morphosyntactic properties of arguments such as case, adpositional marking, agreement, or linear order and constituent structure, or else to semantic notions like Agent or Patient. The problem with the former kind of criteria is that they are not universally applicable, as has time and again been pointed out by authors working within Relational Grammar and similar frameworks, so that universal properties of language involving relational distinctions which are finer than those provided by the Obliqueness Hierarchy cannot be stated within such a framework. One such property which will be dealt with again in the present study is the fact that matrix clauses in raising to subject constructions are always intransitive. The standard HPSG theory of subcategorization and grammatical relations is ill equipped to deal with this because raising to subject predicates have two arguments, the raised subject and the raising host (i.e. the clause or clause-like constituent to which the raised subject semantically belongs), which means that a sentence like *John seems to be happy* should be transitive and the infinitival phrase should be its direct object, which is contrary both to intuition and to the available evidence (see chapter 4., sect. 1 below). This shows that the notions of transitivity and direct objecthood cannot be defined solely on the basis of the obliqueness hierarchy. The question is whether a more adequate theory of grammatical relations can be constructed using independently required primitives, or whether new primitives must be introduced. One possibility which might be considered would involve an appeal to semantics. More precisely, it might be proposed that a second argument is a direct object only if the first argument (i.e. the subject) is a semantic argument of the head, which is precisely not the case in raising to subject constructions. There are at least two arguments against such a solution. The first is that it mixes semantic and syntactic notions in a manner which some might find objectionable. This is of course primarily an aesthetic or metatheoretical argument, but there is also an empirical problem: the proposed solution still does not provide a cross-linguistically valid notion of direct objecthood, although it suffices to express the generalization concerning the intransitivity of raising to subject constructions. For instance, K'ekchi Mayan has an

antipassive construction in which a semantically transitive predicate takes two unmarked arguments, as in the following example from Berinstein (1985: 218):

21.    *ma x-Ø-lok'-o-c            cua        laj Lu'*  
          Q tns-B3-buy-Ap-Asp tortillas Ncl Lu'  
          "Did Pedro buy Tortillas?"

Crucially, both the notional subject "Pedro" and the notional direct object "tortillas" are unmarked, as they would be in a transitive clause (the element preceding the former is a nominal classifier), and in addition their position relative to each other is that which would be expected if the former were the direct object and the latter the subject. That the clause is not transitive is shown by the fact that only the subject is cross referenced by series B, i.e. absolutive, agreement (whose exponence is zero in the third person). In addition, various syntactic tests show that the apparent direct object is something else, for instance it cannot be extracted by movement of the *wh*-type, whereas direct objects can. Thus there is good evidence that the clauses of the kind just illustrated in K'ekchi are not transitive and that the apparent direct object bears some more oblique (final) grammatical relation instead (in Berinstein's RG analysis, it is an initial direct object and a final *chômeur*), but crucially there is nothing about the nominals themselves to indicate this, and it is also clear that an appeal to the notion of semantic argumenthood will not help this time. Thus it appears that the HPSG theory of subcategorization and grammatical relations must be augmented in some way. The simplest solution would be to introduce a binary feature marking the transitivity of verbs, as proposed in an earlier phrase structure framework by Gazdar (1982) (inspired in part by Amritavalli (1979)). A direct object could then be defined as the second argument of a transitive verb, and there could be verbs which have two arguments but are not transitive. This seems to be sufficient to account for the phenomena to be treated in the present study, and I will therefore adopt Gazdar's idea. Technically, this means that I introduce a boolean head feature TRNS, which I assume is appropriate for HEAD values of sort *verbal*. Since there is obviously some connection between transitivity and the number of arguments a head takes, I propose the following principle in addition:

22.    **The Transitivity Principle**

If a sign X is transitive, i.e. the value of the path  
 SYNSEM|LOC|CAT|HEAD|TRNS is +, then the SUBCAT value of X is a list  
 of length  $\geq 2$

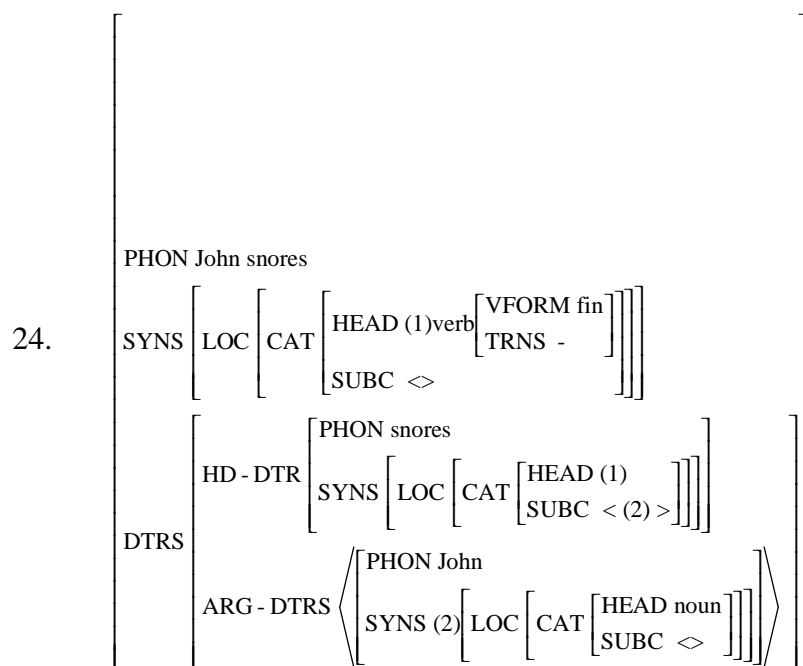
With this done, we can proceed to state the principle which regulates the way in which the valencies encoded in SUBCAT lists are discharged:

23.    **The Subcategorization Principle**

In a headed structure X, if <A> is the SUBCAT value of the head daughter, <B> is the SUBCAT value of X itself, and <C> is the sequence obtained by concatenating the SYNSEM values of the argument daughters in the order in which they appear in the value of DTRS|ARG-DTRS in X, then <A> is equal to <B,C>



Intuitively, then, elements of SUBCAT values which match SYNSEM values of sisters are "cancelled", that is, not passed up to the mother. To illustrate the functioning of the Subcategorization principle, I give a partial description of a simple phrasal sign which satisfies it:



The numerical tags in this diagram indicate structure sharing (i.e. tokenidentity of the values of different paths). The structure sharing indicated by the tag (1) is forced by the head feature principle, while that indicated by the tag (2) is forced by the Subcategorization Principle (note that the value of ARG-DTRS is a list of length one).

Let us now return to the question of how grammatical relations are represented in HPSG. For arguments, i.e. members of values of ARG-DTRS, the answer is closely tied to the mechanism of subcategorization just outlined. By the Subcategorization Principle, the SYNSEM value of each argument must be token identical to a member of the SUBCAT value of the head, and since the value of SUBCAT is a list, we can identify an argument as the first, second, last, etc., depending on the position of its SYNSEM value in the head's SUBCAT list. This ordering of the arguments in a headed structure defines what Pollard and Sag call the **obliqueness hierarchy**. In standard HPSG, grammatical relations are simply identified with positions in the obliqueness hierarchy, the subject in particular being defined as the least oblique argument and the direct object as the second-least oblique argument, but we have already seen that this is not quite sufficient. Hence our revised characterization of grammatical relations appeals both to the obliqueness hierarchy and to the specification of the subcategorizing head for the feature TRNS. Specifically, we identify the subject as the first argument, regardless of transitivity, and the direct object as the second argument of a transitive head. The revised definition of grammatical relations has an advantage not only with respect to the way in which it identifies direct objects, but it also, unlike the standard definition, correctly identifies subjects as ergative or absolutive: an absolutive is simply the least oblique argument of an intransitive head or the second-least oblique argument of a transitive head. However, neither the standard

HPSG characterization of grammatical relations the present one yield a universal notion of **indirect object** as opposed to the more general notion of an oblique argument. This is no problem as far as the issues which form the focus of this study are concerned, but in a broader perspective it certainly is a potential disadvantage of the present system. However, it is no great problem to augment the present theory of subcategorization in such a way that the identification of grammatical relations becomes independent of the obliqueness hierarchy. One technical way of doing this would be to introduce a new sort of feature structure, call it *subcat*, which has the attributes GR and SO (mnemonic for "Grammatical Relation" and "Subcategorized Object", respectively), and to let the value of SUBCAT be a sequence of such objects. The SYNSEM value of an argument would then have to be identified not directly with a SUBCAT element, but rather with the value of SO within some SUBCAT element whose GR value would identify the grammatical relation borne by that argument. The ordering of the elements of SUBCAT values would no longer help do identify grammatical relations, but would itself be determined by the now primitive grammatical relations as encoded in the GR values of *subcat* objects. Such a theory would assimilate HPSG to RG/APG and Lexical Functional Grammar by making grammatical relations primitives of the theory (obviously this would make the transitivity feature superfluous), and it would leave its machinery almost intact (only a slight reformulation of the Subcategorization Principle would be required). I will not adopt a revision of HPSG along the lines just sketched in the present study, but it should be borne in mind that everything I will propose in what follows would carry over with minimal adjustments into such a revised version of the theory.<sup>13</sup> Turning now to the realization of grammatical relations in constituent structure, it must be pointed out that when all arguments of a head appear at the same level of constituent structure, the position of each argument on the ARG-DTRS list is the same as the position of its SYNSEM value on the SUBCAT list of the head, but that this does not hold in structures in which the arguments are distributed over two or more layers of constituent structure. In the latter case, the Subcategorization Principle guarantees that more oblique arguments appear lower in the structure than less oblique ones, so that grammatical relations can be correlated with phrase structure positions in much the same way as in GB, although they are not defined in these terms. As far as the grammatical relations of non-arguments are concerned, we content ourselves, at least for the time being, with the distinctions provided directly by the structure of DTRS values, hence distinguishing heads, modifiers, conjuncts, fillers, and markers.

The HPSG theory of subcategorization brings with it not only the benefit of a definition of grammatical relations which is independent of constituent structure, but also allows agreement and case marking to be handled by the same mechanism as subcategorization. As far as agreement is concerned, the standard HPSG view,

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<sup>13</sup>Other kinds of revisions of the standard HPSG theory of subcategorization have also been proposed. In particular, Robert Borsley has proposed in recent work that SUBCAT should be replaced by three distinct valency features taking values of sort *list(synsem)*, SUBJ, SPEC, and SUBCAT (cf. Borsley (1989) and (1995)). In his system, subjects (in the pretheoretical sense) are represented sometimes as first members of SUBCAT values, with the SUBJ value being empty, and sometimes as unique members of the value of SUBJ; among other things, this allows him to capture the fact that finite verbs in Welsh agree with the subject (in the pretheoretical sense) while non-finite verbs agree with their direct object by assuming that finite verbs have an empty SUBJ value and the notional subject is linked to the first SUBCAT position whereas the notional subject of non-finite verbs corresponds to the unique member of the value of SUBJ. While I believe there to be some merit in this proposal, the full range of its implications has not been determined yet, and with respect to the identification of direct objects in particular it runs into the same kinds of problems as standard HPSG.

articulated in chapter 2 of Pollard and Sag (1994), takes agreement information to be located within semantic representations. Since the latter are values of the path SYNS|LOC|CONT, and hence contained within SYNS values, the agreement properties of an argument are present within the SUBCAT value of the head whose argument it is. While I do not assume an articulated semantic representation to be part of the structure of signs, the values of the attribute RI of the present system nevertheless represent the information necessary to handle agreement of heads with their arguments via the SUBCAT feature. For instance, lexical rules which produce agreeing verb forms, simply have to be formulated in such a way as to simultaneously modify the PHON value of their input and the agreement information contained within the RI value of that member of the SUBCAT list with which the verb is to be specified as agreeing, i.e. the first one in the case of what is traditionally called subject agreement.<sup>14</sup> As far as case is concerned, I adopt the approach proposed in Sag, Karttunen, and Goldberg (1992). Discussing straight and quirky cases in Icelandic, they introduce two attributes of HEAD values, CASE and DCASE. The value of CASE represents the actual morphological case of a sign, whereas that of DCASE specifies the default case it receives in the syntactic context in which it appears. Their CASE can simply be identified with the feature CASE of the present system, bearing in mind that the latter is not an attribute of the value of HEAD but rather one of the value of INFL within HEAD. As for DCASE, I tentatively propose to make this an attribute of HEAD, appropriate for HEAD values of sort *substantive* with MOD value *none*. This expresses the intuition that case on specifiers and modifiers is always due to concord. Sag and colleagues propose that the lexical entries for predicates which do not assign idiosyncratic cases simply identify the CASE and DCASE values of their arguments except in those cases where an argument is interpreted as raised, a point to which I will return. If a predicate assigns an idiosyncratic case to some argument, its lexical entry will not require token-identity of CASE and DCASE for that argument, but will instead specify a particular value for CASE. The DCASE value of a phonetically realized sign is determined on the basis of its grammatical relation, whereas phonetically empty signs receive no default case. While the analysis just outlined was developed for Icelandic, it naturally generalizes to other languages with morphological case, though there will naturally be some parameters of variation. I propose that one such parameter concerns whether or not two distinct case features are used, because there probably are languages which have no irregular cases. Obviously, the set of available cases will also vary from language to language, down to the limiting case of languages with only one CASE value. Finally, the rules for assigning default cases are obviously not universal even among languages that have case. As is well known, many languages assign the same default case to subjects of transitive and intransitive clauses, yielding what is usually called a nominative-accusative case marking system, whereas others have ergative default case marking, using one default case, usually called absolutive, for absolutives, i.e. intransitive subjects and direct objects, and another, usually called ergative, for subjects of transitive predicates, and the two systems may even coexist within one language, yielding a so called split ergative system.<sup>15</sup>

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<sup>14</sup>As we will see in the next section, agreement can also be mediated by sharing of INFL values.

However, I assume that head-argument agreement always involves the agreement features encoded in the value of RI, crucially differing in this respect from modifier-head and specifier-head agreement.

<sup>15</sup>Often the distinction relevant for the split is that between pronominals and full NPs, with the former following a nominative-accusative pattern and the latter an ergative one. For information on and discussion of ergative phenomena in the morphosyntax of natural languages, the most

Before closing this section, I want to comment briefly on two possible kinds of SUBCAT-mediated selection which are not often discussed under that heading but are nevertheless of some potential relevance, namely selection for what I want to call **referential status** and selection for NULL and RT values. Referential status (not to be confused with referential type, the classification of expressions as pronominal, anaphoric, etc.) concerns the classification of arguments as semantically contentful or expletive. I assume that there are universally two referential statuses, which are represented by subsorts of the sort *ti*, namely *referential* and *expletive*, and that signs with expletive RI values always have *pronominal* as their RT value. In languages which have more than one kind of expletive element, the sort *expletive* is divided into subsorts. In English, for instance, we seem to need at least two such subsorts, which we may call *it* and *there* in accordance with the elements which instantiate them. We may assume that each lexical entry for a subcategorizing element, i.e. word with a non-empty SUBCAT value, specifies for each element of the latter what the sort of its RI value is. Moreover, it seems reasonable to assume that SUBCAT elements which do not correspond to raised arguments are specified as expletive exactly if the corresponding argument is not assigned a semantic role and as referential otherwise. As for what it means to say that an argument position is assigned a semantic role, I will make some suggestions in section 1.8. below. Turning to subcategorization for NULL values and RT values, the potential usefulness of such a mechanism can best be demonstrated with respect to "obligatory pro-drop" phenomena of the kind found in Modern Irish (cf. McCloskey and Hale (1984) and Andrews (1990a)). Whereas in more familiar pro-drop languages such as Italian, both overt and non-overt pronominal subjects are possible with the same kinds of verb forms, Modern Irish verbal paradigms contain one so-called analytic verb form, which is unspecified for person and number, and several synthetic verb forms, which are inflected for the person and number of the subject. The synthetic verb forms are compatible with empty pronominal subjects and nothing else, the analytic form being used with overt pronominal and non-pronominal subjects and with *wh*-traces.<sup>16</sup> Surprisingly, synthetic verb forms may not even be used when the subject is the trace of a pronoun with a combination of person and number features for which there would be a synthetic form available, in other words, traces of pronouns do not count as non-overt pronouns for the purpose of determining the legitimacy of synthetic inflection. This is the reason why I have decided to place the feature RT, whose value distinguishes pronouns from other NPs, outside the value of LOCAL, thus preventing its value in the antecedent from being identified with that of the trace.<sup>17</sup> The number of synthetic forms available varies with tense and mood and also from dialect to dialect, but there are no paradigms which consist exclusively of synthetic forms, and hence no verb allows subject pro-drop for all person-number combinations. This curious situation would seem to call for an analysis in which the lexical entries for particular verb forms can specify their subject as a non overt pronoun, and within the present feature system precisely this would be achieved if the

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comprehensive recent source is Dixon (1994), which also contains a whole chapter on split ergative systems.

<sup>16</sup> In Irish the form of the complementizer indicates whether an unbounded dependency involves a trace or a resumptive pronoun (cf. McCloskey (1979, 1990)). Crucially, McCloskey and Hale show that this diagnostic confirms the pronominal status of the subjects of synthetic verb forms, i.e. these subjects can be non-overt resumptive pronouns (resumptive *pro*) in GB terminology) but not traces.

<sup>17</sup> It is of course possible that pronominals should be distinguished from ordinary NPs not only by the value of RT but also by some other feature specification, but I must defer investigating the implications of this possibility to another occasion.

lexical rules which produce synthetic verb forms specify for the first item on their SUBCAT list that its SYNSEM|NULL value is + and its value for SYNSEM|RT is *pronominal*. A full account of pro-drop within the present framework remains to be developed, but in view of what has been said it seems plausible to assume that the feature NULL will have some role to play in this area of grammar.

## 1. 6. The licensing of modifiers, specifiers, and markers

It is clear that something akin to subcategorization is also relevant for determining the distribution of modifiers and specifiers; we will from now on occasionally use the term selection for this slightly broader notion reserving the term subcategorization for selection mediated by the SUBCAT attribute. Turning first to modifiers, we need to ask ourselves whether their distribution should be controlled by the same mechanism as that of arguments or not. In the former case, they would essentially be optional arguments of the heads they modify, and we would need lexical rules to produce lexical entries with additional argument places for modifiers. Such an approach is technically feasible, but intuitively not very satisfying, because it denies that there is a principled difference between modifiers and arguments. It also leads to empirical difficulties because modifiers often show a morphosyntactic behaviour quite different from that of arguments, and while some such differences could perhaps be explained by the assumption that the optional SUBCAT slots for modifiers are always more oblique than those for the obligatory arguments of the relevant head, such an explanation is not always plausible. One case where this is particularly clear is again that of adnominal modifiers. In many Indo-European languages, adjectival modifiers agree in number, gender, and case with their heads, whereas such agreement is to the best of my knowledge unattested for arguments of nouns. If agreement of modifiers were triggered by the modified head, as it would have to be under the assumption that they are in fact optional arguments, we would expect it to affect less oblique arguments before more oblique ones. In addition, in the uncontroversial cases of head-argument configurations, it is always the head which agrees with the argument rather than vice versa, and such agreement is indeed attested within the NP in the form of possessor-head agreement in many languages.<sup>18</sup> Incidentally, the fact that we cannot always predict whether an element standing in a particular semantic relation to a noun will be a modifier or an argument does not invalidate the present argument, because all that matters is that we have apparently at least two kinds of non-heads with quite distinct morphosyntactic properties within NPs. In view of these considerations, it seems that we need a different mechanism to handle the subcategorization of modifiers, and such a mechanism is proposed by Pollard and Sag (1994). It relies crucially on the HEAD feature MOD, which is appropriate for HEAD values of sort *substantive*. The value of MOD is an object of sort *mod-synsem*. This sort has two subsorts, *none*, which is atomic, and *synsem*. In the case of phrases which can function as modifiers, the value of MOD is of sort *syms* and is structure-shared with the SYNS value of the head sister of the modifying phrase. This is stated formally as follows:

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<sup>18</sup> Examples include the Mayan languages, Quechua, Turkish, Finnish, Hungarian, and Chamorro (a Western Austronesian Language), to name just a few.

## 25. The Modification Principle

If a sign *X* has a MOD value of sort *synsem*, it is a member of the value of MOD-DTRS in some head-argument-modifier structure, and in each head-argument-modifier structure *Y*, the SYNS value of the head daughter is identical to the SYNS|LOC|CAT|HEAD|MOD value of each modifier daughter (i.e. of each member of the list which is the value of DTRS|MOD-DTRS)

The mechanism just specified thus allows and in fact requires modifiers to select the sign they modify. Whether or not a particular word can be the head of a modifier phrase depends on whether its lexical entry specifies a substantial MOD value, i.e. one of sort *syns*, or merely the dummy value *none*. Agreement of modifiers with their heads, including case agreement, can be easily accommodated by positing lexical rules which introduce the relevant morphology on the head of the modifier phrase and at the same time introduce the relevant agreement specifications into its MOD value.

Let us now turn to the principles governing the distribution of specifiers and markers:

## 26. The Specification Principle

In a head-specifier structure *X*, the SYNSEM value of the head daughter is token-identical to the SPEC value of the specifier daughter, the SPR value of *X* is +, the SPR value of the head daughter is *none*, and the MARKING value of the head daughter is *unmarked*

## 27. The Marking Principle

In a head-marker structure *X*, the SYNSEM value of the head daughter is token-identical to the SPEC value of the marker daughter, the MARKING value of *X* is identical to the MARKING value of the marker daughter, and the MARKING value of the head daughter is *unmarked*

These principles guarantee that specifiers and markers select their head sister by means of the SPEC attribute and ensure that information about the presence of specifiers and markers is visible at the mother node (more precisely, in its SYNSEM value). They also guarantee that the head in a head-marker structure cannot itself be a head-marker structure and likewise for specifiers, and that a head-specifier structure cannot contain a head marker structure as head (although head-specifier structures contained within head-marker structures are allowed). Elements treated as markers within HPSG include complementizers, coordinating conjunctions, and case-marking particles as found in agglutinating languages such as Turkish, Japanese, or Quechua. These are all elements which are not heads of their phrases by most criteria, but which are unlike other kinds of non-heads in systematically transmitting some of their features to the mother. A good example of this is provided by volitive verbs such *assouhaïter* "wish" in French, which require the main verb of their complement clause to be in the subjunctive mood, as is illustrated in the following example:

28. *je souhaite que vous soyez heureuse*  
 I wish that you be happy-Fem:Sg  
 "I want you to be happy"

If the complementizer in such examples were a head and the string following it its complement, as in the CP-IP-VP analysis of clause structure that has become standard (though not undisputed, cf. e.g. Haider (1993)) in GB since the publication of Chomsky (1986), the higher verb should not be able to determine the mood of the verb of the complement clause; on the other hand, if the verb were the head of the clause and the complementizer simply an adjunct, the form of the complementizer should be independent of the main verb, which is not the case. In contrast, under present assumptions the complement clause will be specified as both as SYNSEM|LOCAL|CAT|HEAD|VFORM|*finite* in virtue of the form of its head verb and the Head Feature Principle and as SYNSEM|LOCAL|CAT|MARKING|*que* as a function of the choice of complementizer and the Marking Principle. There are also arguments apart from those relating to the locality of subcategorization which indicate that complementizers and similar elements are neither heads nor adjuncts. For instance, if they were heads one would expect them to sanction extraction of their complement, but examples like the following are thoroughly ungrammatical in English under the intended interpretation:<sup>19</sup>

29. \**Bill likes shortbread, I didn't know that*

It is important to realize that the claim that there are elements best analysed as markers in the present technical sense does not entail that semantically or functionally equivalent elements will have the same syntax across languages. For instance, Turkish has an element *ki* which seems to correspond roughly to the English complementizer *that*, but apparently does not form a constituent with the clause it introduces (cf. Lewis (1967, ch.VIII, section 14). Turning to specifiers, they are like markers in that the presence of a specifier is visible at the phrasal level, at least in the case of nominal signs, i.e. nominals with specifiers do not have the same distribution as nominals without specifiers. However, specifiers differ from markers insofar as only the presence or absence of a specifier appears to be syntactically relevant, whereas subcategorization for particular specifiers appears not to be attested. In the present system, this putative fact is reflected in the choice of *boolean* as the sort for values of SPR. In addition, whereas markers are single words or at most coordinations of single words, specifiers may have considerable internal structure, as is apparent in examples like English [*more than twenty six, but definitely not more than a hundred*] *duck-billed dinosaurs*. Obviously, much more could be said about the syntax of specifiers, but in the present context my primary aim is to formulate principles which take care of morphosyntactic agreement between specifiers and their heads and determine in which cases the morphosyntactic agreement features of a sign and those associated with its referential index can diverge. Since these principles apply equally to specifiers and to modifiers, they will remain relevant even if the present view of the syntax of specifiers should turn out to be untenable.

<sup>19</sup>This string is of course grammatical, but not under the intended interpretation with *that* a stranded complementizer but only under a reading where it consists of two separate clauses, i.e. what would be rendered conventionally as *Bill likes shortbread? I didn't know that!*

30. **The First INFL-Sharing Principle (ISP1)**

If a sign X has a SPEC value or a MOD value of sort *synsem*, the value of LOC|CAT|HEAD|INFL within that value is identical to the value of SYNSEM|LOC|CAT|HEAD|INFL in X

31. **The Second INFL-Sharing Principle (ISP2)**

If the value Y of INFL in a sign X is not structure-shared with the INFL value of the SPEC or SYNSEM value of X, then the values of PERS, NUM, and NCL in Y are identical to the values of the same attributes in the value of SYNSEM|LOCAL|RI in X

The functioning of these principles and the necessity for postulating two distinct places for agreement features within the architecture of signs can be illustrated very well in the case of possessive determiners in German. The form of possessive determiners in this language reflects both the INFL features of the head noun and the agreement features associated with their own referential index, as is partially illustrated by the following set of examples:<sup>20</sup>

32. *mein Haus*  
my House

33. *meine Häuser*  
my Houses

34. *unser Haus*  
our House

35. *unsere Häuser*  
our Houses

As the examples show, both the number of the referential index of the possessive determiner and the number of the head noun are registered on the former, the first by suppletion (*mein-* vs. *uns-*, as in English), the second by inflection<sup>21</sup> Note that whereas the number of the referential index and the number of the INFL value may diverge in the determiner, this is not so in the case of the head noun, which is unambiguously singular in the first and third example and plural in the second and fourth. This is exactly as predicted by ISP2: because the INFL of the head noun is not structure shared with that of a relevant SPEC or MOD value (being of a major

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<sup>20</sup> Balari Ravera (1992) makes a similar argument using possessive determiners in Spanish, and the argument could also be reproduced in many other languages having NP-internal concord of the Indo-European type.

<sup>21</sup> Although I have not investigated the matter, I venture to guess that morphosyntactic agreement is never expressed by morphology which is closer to the stem than that expressing index agreement. However, it is clear that there are morphological processes which cannot be reduced to concatenation, and for such kinds of morphology the notion of closeness to the stem obviously makes no sense. As a matter of fact, it even seems that there are morphological processes which are neither concatenative nor additive in the broader sense made available by the use of autosegmental representations. The kind of essentially process-oriented approach to morphology which this entails is defended in detail in Anderson (1992) and Aronoff (1994).



category, the head noun cannot have a SPEC value, and being the head of its phrase it cannot have a MOD value other than *none*). I find it difficult to imagine how facts such as these could be accounted for if agreement properties were represented only within referential indices, as is the case in standard HPSG.

## 1. 7. Unbounded Dependencies

Unbounded dependencies, i.e. those constructions which involve wh-movement in transformational terms, are handled in HPSG much as in GPSG by a class of features whose values encode the local syntactic properties of the gap position and transmit it to the position of the binder. It is convenient for the purposes of presentation to distinguish three parts in an unbounded dependency, a bottom part (the gap and its local context), a middle part (the structure across which the information about the gap is transmitted), and the top, where the filler for the gap is introduced. The bottom of an unbounded dependency is a trace, a wh-element, or a resumptive pronoun. Intuitively, a trace is simply a kind of phonologically empty placeholder for the "dislocated" constituent. Technically, a trace is just a word which conforms to the following schematic lexical entry:

### 36. Universal Template for Traces (to be revised):

$$\text{word} \left[ \begin{array}{c} \text{PHON} \langle \rangle \\ \text{SYNS} \left[ \begin{array}{c} \text{LOC (1)} \\ \text{RT nonpro} \\ \text{NULL +} \\ \text{NLOC} \left[ \text{INH} \left[ \begin{array}{c} \text{SL \{(1)\}} \\ \text{QUE \{ \}} \\ \text{REL \{ \}} \end{array} \right] \end{array} \right] \end{array} \right] \end{array} \right]$$

The values of the NLOC|TO-BIND features, which are not shown in the template, are all empty. For simplicity, I assume that the translation of a trace is simply a variable of type  $\langle s, a \rangle$ , with a the type corresponding to its SYNSEM value by the type assignment principles which will be outlined in the next section. This assumption accounts for the cases we will be concerned with, but needs to be modified to account for the binding of pronouns and in particular reflexive pronouns which are contained in dislocated constituents, as in *Pictures of myself, I usually find slightly embarrassing*.<sup>22</sup> As for resumptive pronouns, I assume that they have structures conforming to the following template:

<sup>22</sup>These problems are discussed very thoroughly in Engdahl (1986).

### 37. Universal Template for Resumptive Pronouns (to be revised):

$$\left[ \begin{array}{c} \text{PHON } \alpha \\ \\ \text{SYNSEM} \left[ \begin{array}{c} \text{LOC} \left[ \begin{array}{c} \text{CAT } \beta \\ \text{RI (1)} [ ] \end{array} \right] \\ \text{RT pers - pron} \\ \text{NULL bool} \\ \text{NLOC} \left[ \text{INH} \left[ \begin{array}{c} \text{SL } \{(1)\} \\ \text{QUE } \{ \} \\ \text{REL } \{ \} \end{array} \right] \right] \end{array} \right] \end{array} \right]$$

As in the case of traces, the values of the TO-BIND features are to be taken as empty. As the diagram shows, resumptive pronouns differ from traces in two respects: Their PHON value is not necessarily null (hence their NULL value may be either + or -), and only the index of the value of INH|SL is identified with the index of the resumptive pronoun itself, whereas in the case of traces the whole LOCAL values are identified. As for the semantics of resumptive pronouns, I assume that they receive the same kind of translation as traces, though in doing so I am again steering clear of several thorny issues (cf. Sells (1984) and Doron (1982) for some discussion). Turning finally to wh-pronouns, i.e. question words, relative pronouns, and whatever other species will turn out to be needed, I assume that they are syntactically and semantically just like resumptive pronouns except that the unbounded dependency feature for which they specify a singleton value is not SLASH but QUE, REL, etc., as the case may be. Note that the present system differs from that of standard HPSG insofar as information about the referential type of the bound element is never transmitted in unbounded dependencies, in particular, a resumptive pronoun is a pronoun even if its antecedent is not and a trace is not a pronoun even if its antecedent is. Information about syntactic category, including subcategorization and the various morphosyntactic features encoded in HEAD values, is transmitted in unbounded dependencies involving traces, though not with wh-words and resumptive pronouns. With the latter, only the referential index and the associated agreement properties are transmitted. The intuition behind the HPSG treatment of unbounded dependencies, which is closely modelled on that of GPSG, is that the information specified in the relevant inherited value of the bound element is transmitted upward in the tree until it meets, as it were, a corresponding TO-BIND value. More technically, an **unbounded dependency feature specification** (an UDF specification for short), that is, a feature structure F of sort *local* or *ri* which is in the value of some path of the form INH|A in a sign X, with  $A \in \{\text{SLASH}, \text{QUE}, \text{REL}, \dots\}$ , is **bound** in X if and only if F is also an element of the value of the corresponding path TO-BIND|A in X, and **free** otherwise.<sup>23</sup> Given these terms, we can state the principle which governs the percolation of nonlocal feature values as follows (A again ranges over the set of unbounded dependency features, i.e. {SLASH, QUE, REL, ...}):

<sup>23</sup>By way of extension, I will also say of the trace or other element which is at the bottom of the unbounded dependency represented by F that it is bound. The present notion of binding is technically distinct from binding in the sense of index sharing (though it entails the latter), but since the intuition is the same in both cases, I decided to accept this terminological clash.

38.     **The Nonlocal Feature Principle:**

For each sign  $X$  and each path  $P$  of the form  $INH|A$ , the value of  $P$  in  $X$  is the union of the free elements of the values of  $P$  in the daughters of  $X$

This principle accounts for the distribution of inherited values of unbounded dependency features, but does not sufficiently constrain the distribution of TO-BIND values. The idea is that the TO-BIND $|A$  values in a sign  $X$  contain only elements which are bound in  $X$ , in the sense just explained. This can be guaranteed either by an additional clause of the Nonlocal Feature Principle or, less compactly but perhaps more perspicuously, by a separate principle like the following:

39.     **The TO-BIND Feature Principle**

For each sign  $X$  and path  $P$  of the form TO-BIND $|A$ , a structure  $F$  is a member of the value of  $P$  in  $X$  only if  $F$  is a member of the value of the path  $INH|A$  in  $X$

The next principle, the last one to be formulated in this section, guarantees that a filler does indeed bind a gap:

40.     **The Filler Licensing Principle**

In a head-filler structure, the SYNS $|LOC$  value of the filler daughter is token identical to an element of the value of some path of the form TO-BIND $|A$  in the head daughter

Note that the Filler Licensing Principle requires every filler to bind a gap, as might be expected, but does not require every gap to have a corresponding filler, because technically the binder of a gap is not a constituent but a structure within some TO-BIND $|A$  value. Since the only constraint on elements of TO-BIND $|A$  values which I have imposed is that each such element must also be an element of the corresponding INH $|A$  value, it would seem that unbounded dependencies can just disappear under the present account, because nothing requires there to be a binder for every trace or similar element. This is indeed so, but the semantics outlined in the next section will guarantee that unbounded dependencies without binders are uninterpretable unless sanctioned by a predicate which selects a bound unbounded dependency feature specification in one of its arguments.

## 1. 8. Some semantic issues

As mentioned already in the discussion of the basic architecture of signs, the present version of HPSG does not embody a particular theory of semantics. Nevertheless, there are aspects of semantic interpretation which cannot be ignored in discussing the issues that concern us here. I will try to overcome this dilemma by adopting an "informal formal" semantic approach. What this means is that I will assume that the feature structures of sort *sign* which represent expressions of natural languages are to receive a model-theoretic interpretation recursively defined on their constituent structure which supports definitions of the notions of truth (relative to a state of affairs) and of logical consequence, but will not rigorously specify such an

interpretation. Instead, I will use a familiar formal language, the typed intensional logic of Montague (1973), (henceforth called IL), as a vehicle for specifying certain aspects of semantic interpretation. Since the syntax and the model theoretic interpretation of IL are known quantities, this procedure lends a reasonable degree of precision to the discussion of semantic issues without forcing decisions about technicalities which are not relevant for the task at hand.<sup>24</sup> It should be clear that this semi-formal way of doing semantics is not an alternative but rather a preliminary to full formalization, a convenient means for specifying certain properties which any fully specified semantics for the class of grammars under consideration should preserve while leaving other choices open.<sup>25</sup>

Like many authors adopting a basically Montagovian approach to semantics, I assume that the primary mechanism of semantic composition is **intensional functional application**.<sup>26</sup> In addition, I assume that the semantic arguments of a sign are exactly those elements which it subcategorizes for, specifies, or modifies. This view can be implemented by associating a semantic type with each combination of HEAD and SPR values and defining the type of a sign as a function of its SYNSEM value, more precisely as a (curried) function from the intensional variants of the types associated with the SYNSEM values of its arguments (as encoded in its SUBCAT value) into the type associated with its HEAD and SPR values.<sup>27</sup> For present purposes, I will assume that HEAD values of sort *functional* are associated with types of the form  $\langle\langle s, a \rangle, b \rangle$ , where  $a$  is the type associated with the CAT value of the value of SPEC and  $b$  is  $\langle\langle e, t \rangle, t \rangle$ , the type of generalized quantifiers, if  $a$  is  $\langle e, t \rangle$ , and  $b = a$  otherwise.<sup>28</sup> Head values with MOD values of sort *synsem* have types of the form  $\langle\langle s, a \rangle, a \rangle$ , where  $a$  is the type associated with the category of the MOD value. Finally, the type of HEAD values of sort *substantive* with MOD value *none*, that is, those characterizing non-modifying major categories, is  $t$  for the subsort *verbal*,  $\langle e, t \rangle$  for the subsort *nominal* if the SPR value is  $-$ , and  $\langle\langle e, t \rangle, t \rangle$ , again the type of generalized quantifiers, if the SPR value is  $+$ . If a sign  $X$  has an empty SUBCAT value, the semantic type of  $X$  is just the type associated with its HEAD and SPR value, and if its SUBCAT value is non-empty, its semantic type is of the form  $\langle a_i, \langle \dots \langle a_i, b \rangle \rangle \rangle$ , where for any  $i$ ,  $1 \leq i \leq n$ ,  $a_i$  is the intensional type corresponding to the type of its  $i$ th argument (in the sense defined in section 1.5. above), and  $b$  is the type associated with the HEAD and SPR values of  $X$ . As a concrete example of the application of these principles, consider an

<sup>24</sup>Of course, it is also possible to use interpreted formal languages like IL to give a complete model theoretic interpretation of a (fragment of a) natural language. In order to do this, one has to specify an algorithm TR which mechanically assigns a translation to each expression of the language to be interpreted, stipulating that the model theoretic interpretation of an expression  $E$  is identical to that of its translation  $TR(E)$  (This is the way IL is used in Montague (1973)).

<sup>25</sup>A good recent source of information in the kind of model-theoretic linguistic semantics assumed here is von Stechow and Wunderlich (1991), which is also a rich source of bibliographical information. Introductions to the formal semantics of natural language include Dowty, Wall, and Peters (1981), Chierchia and McConnell-Ginet (1990), and Cann (1993). Lyons (1977) is still an excellent introduction to linguistic semantics from a somewhat broader perspective.

<sup>26</sup>When I speak of functional application in what follows, what is meant is intensional functional application unless something else is explicitly stated.

<sup>27</sup>An analogous procedure could of course be followed if each kind of HEAD value were associated with a whole set of types rather than just a single one. For discussion of some of the possible uses of multiple type assignments, see Partee and Rooth (1983).

<sup>28</sup>For the moment, we may assume that determiners are simply specifiers of the first kind, though it may ultimately be necessary to posit a special subsort of the head sort (and part of speech) *specifier* to distinguish them from degree phrases and similar elements.

English ditransitive verb like *give*. The following is a simplified lexical entry for this verb (the double object variant):

$$41. \left[ \begin{array}{c} \text{PHON } \textit{give} \\ \text{SYNS } \left[ \begin{array}{c} \text{LOC } \left[ \begin{array}{c} \text{CAT } \left[ \begin{array}{c} \text{HEAD } \textit{verb} [\text{VFORM } \textit{base}] \\ \text{SUBCAT } \left\langle \left[ \begin{array}{c} \text{HEAD } \textit{noun} \left[ \begin{array}{c} \text{INFL } [\text{CASE } (1)] \\ \text{DCASE } (1) \end{array} \right] \right] \text{NP, NP} \end{array} \right\rangle \right] \right] \end{array} \right] \end{array} \right] \end{array} \right], \textit{give}' \end{array} \right]$$

The two occurrences of the symbol NP in the SUBCAT value are to be taken as abbreviations for structures with a CAT value like that shown in the first SUBCAT position, i.e. the verb subcategorizes for three structurally case-marked saturated nominal arguments. The crucial question in the present context concerns the semantic type of the translation *give'*. Given the principles stated above, the answer is clear: The HEAD value of the verb is of sort *verb*, a subsort of *verbal*, hence the type associated with it is *t*. The SUBCAT value contains three NPs, each of type  $\langle\langle e, t \rangle, t \rangle$ . Since the other valency features (which are not shown in the diagram) have empty values, this is all that is relevant. Abbreviating the typename  $\langle\langle e, t \rangle, t \rangle$  as Q (for "quantifier") for perspicuity, the type of *give'* is  $\langle\langle s, Q \rangle, \langle\langle s, Q \rangle, \langle\langle s, Q \rangle, t \rangle \rangle \rangle$ , i.e. the type of functions from generalized quantifier intensions to functions from generalized quantifier intensions to functions from generalized quantifier intensions to truth values. The type assignment principles just illustrated still have to be refined to take into account semantically potent feature specifications, but before turning to that topic I want to say a word about the treatment of dummies implicit in the semantic approach adopted here.

A crucial feature of the present semantic approach is that all syntactic arguments of a word, i.e. all elements specified in its SUBCAT and SPEC or MOD values, are also semantic arguments of it. This means that dummies such as *it* in *it rains* or in *it bothers me that pigs can't fly* are also semantic arguments although they are generally taken to be semantically empty.<sup>29</sup> Accepting this, we might propose that the semantic argument positions which correspond to dummy arguments are in a sense empty. What this means can be explained as follows: If a predicate P takes *n* arguments, its *i*-th argument position is empty if and only if for any two sequences of arguments  $S = \langle A_1 \dots A_i \dots A_n \rangle$  and  $S' = \langle A'_1 \dots A'_i \dots A'_n \rangle$ , the result of applying P to S is logically equivalent to that of applying P to S' if S and S' differ at most with respect to their *i*-th member. A particularly simple way of ensuring that a particular argument position of a predicate is empty is to give the predicate a complex translation in which the relevant argument position is created by vacuous lambda abstraction. For instance, the extraposing variant of the English verb *bother* which appears in *it bothers John that nobody will read his thesis* might receive a translation of the form  $\lambda p \lambda X \lambda Y [\textit{bother}'(p)(X)]$ , in which the last argument position, i.e. that corresponding to the subject, is created by vacuous abstraction on the variable Y (here and in what follows, capital letters from the end of the alphabet represent variables of type  $\langle s, \langle\langle e, t \rangle, t \rangle \rangle$ , i.e. variables over generalized quantifier intensions, and p, q, r, with

<sup>29</sup>This is not a completely uncontroversial position. For instance, Bolinger (1973) has argued that *it* has semantic content in all its uses. Yet even if the notion of semantic emptiness should have to be replaced by something more specific, it seems clear that dummies must be semantically distinguished from ordinary referring expressions in some way.

primes or indices as needed, represent variables of type  $\langle s, t \rangle$ , i.e. variables over propositions). However, the same effect could also be achieved with the help of meaning postulates or constraints on admissible interpretations formulated in the metalanguage. It should be noted that this approach to the interpretation of dummies perhaps allows us to dispense with specifications of referential status in the SUBCAT values of predicates. One way of doing this would be to assume that pronominals like English *it* which have both deictic and anaphoric and also dummy uses are always interpreted as ordinary pronominals. When such an element appears in a dummy position, its semantic value, no matter what it is, will simply fail to contribute anything significant to that of the larger constituent. For elements like English *there*, which function only as dummies, we might assume a contradictory translation like  $\lambda P[\exists x[P(x) \wedge \neg P(x)]]$ , which would ensure that sentences containing such an element in a function corresponding to non-empty semantic argument position come out necessarily false.<sup>30</sup> In such an approach, sentences containing a dummy in the wrong place, such as English *there is trying to write a thesis* would not be structurally illformed, but simply unacceptable because semantically pointless.

Having outlined the main principles of type assignment and semantic composition, I want to say a few words about the situations in which the basic principle that the translation of a headed constituent is computed simply by applying the translation of the head to the intensionalized translations of the arguments is overridden. One such case involves **semantically potent feature specifications** in the sense of Gazdar et al. (1985: ch. 10). They propose that not only are constituents semantically interpreted, but in addition certain morphosyntactic features, tense for instance, have a semantic effect at the highest node in constituent structure on which they appear. Without going into details, we may note that this essentially means that if a head is combined with an argument which bears such a semantically potent feature specification, the translation of the head is not applied to the intension of the translation of the argument, but rather to the intension of the result of applying the translation associated with the feature specification to that of the argument. Another case for which the simple mechanism of functional application must be augmented is that of quantified NPs which take wider scope than they should have according to their structural position. Following in essence Cooper (1975, 1983), I assume that translations of non-pronominal NPs may be stored, a pronoun translation being used instead as the semantic argument of the predicate, and be retrieved at some higher node, where they are applied to the lambda-abstract formed by abstracting on the variable contained in the pronoun translation. For concreteness, I take the translations of nonresumptive pronouns to be of the form  $\lambda P[P(x)]$ ; this is adequate for bound variable uses of pronouns and also, at least as a first approximation, for deictic uses, but there remain problems concerning "donkey sentences" and similar phenomena which I cannot discuss here.<sup>31</sup> Moreover, I assume a general convention, call it the **Variable Convention**, which requires that if two sings in a larger structure both receive a translation containing a free variable, their translations contain the same free variable if and only if they are **coindexed**, i.e. their RI values are structure shared.<sup>32</sup>

<sup>30</sup>Of course the item *there* has non-dummy uses as an adverb, but as an NP it apparently can only be used as a dummy.

<sup>31</sup>Cf. for instance the discussion in Chierchia (1992) and the references given there.

<sup>32</sup>Unlike all other HPSG principles and rules mentioned in this study, the Variable Convention is global in nature, i.e. whether it is satisfied by a structure or not can not be determined by looking at the local subtrees one by one, but only by looking at the whole sign. Concerning the relation of coindexing, note that in the present formalism, unlike for instance that of Gazdar et al. (1985), two

Structure sharing of RT values is taken to be constrained by binding conditions of the kind presented in Pollard and Sag (1994: ch. 6). In addition, I assume that a the translation of a non-pronominal NP which is coindexed with some other element is obligatorily stored. These assumptions jointly entail that binding in the sense of index-sharing semantically translates as variable binding, and they ensure in addition that binding involves agreement.<sup>33</sup>

To conclude this brief discussion of aspects of semantic interpretation, I want to say something about a special kind of semantically potent feature specifications which will be of some importance in what follows, namely bound unbounded dependency feature specifications in the sense specified in the preceding section. There are two cases to consider here. The first is that of bound UDF specifications which appear on the head daughter in a head-filler structure, in accordance with the Filler Licensing Principle. Such structures are semantically interpreted by applying taking the translation of the head daughter, abstracting on the variable which corresponds to the index of the bound UD feature, and applying the result to the translation of the filler daughter. The second case is that of bound UDF specifications which appear on an argument in a head-argument-modifier structure. In this latter case, the translation of the predicate is applied not to the translation of the argument as usual, but again to the result of abstracting on the variable corresponding to the bound UDF specification. Since lambda abstraction shifts the type of the argument, this will work out only if the predicate is of the appropriate semantic type. This means that the type assignment principles outlined above have to be supplemented by a condition to the effect that if a predicate selects a semantically potent feature specification, in particular a bound UDF specification, on some argument, its semantic type with respect to that argument is shifted in such a way as to match the type-shift effected by the selected feature specification.<sup>34</sup>

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feature structures can be isomorphic without being identical. Given a feature structure  $F$ , it is always possible to construct an "alphabetic variant"  $F'$  by changing the identity of some node or nodes in  $F$  while preserving the structure. Since RI values are feature structures, two RI values which involve the same specifications for person, number, etc., need nevertheless not be strictly identical, although if they are strictly identical they are of course identical with respect to the values of all of their attributes.

<sup>33</sup>The approach to binding sketched in the text is essentially a combination of Pollard and Sag's binding theory with some ideas from Chierchia (1988). For more general discussion of the issues involved in the analysis of anaphora, cf. Reinhart (1983). Bach and Partee (1980) present a binding theory which uses no indices as part of syntactic representations and instead uses storage mechanisms not only to give quantifiers wide scope but also to keep track of the variables available for binding.

<sup>34</sup>Note that not all semantically potent feature specifications shift the type of the constituents on which they do, but bound UDF specifications cannot fail to have this effect because they are semantically interpreted as lambda abstractors.

## Chapter 2

### An Outline of Arc Pair Grammar

#### 2. 0. Background

The following overview of certain aspect of the theory of Arc Pair Grammar takes as its starting point Johnson and Postal (1980) and is to be seen mainly against the background of that work, which can be seen as embodying the standard version of APG. As in the preceding chapter, I will suggest certain revisions and extensions of the theory as I go along. Some of these are inspired by developments within Relational Grammar which have occurred since APG was codified, for instance Davies and Rosen's proposal to analyse clause union constructions as multipredicate clauses. Others represent ways in which the potential of concepts specific to APG could be further exploited, for instance the proposals concerning the analysis of relative clauses and other overlay constructions in section 2.4. below. I believe in fact that APG as a theory of Universal Grammar has a potential which extends considerably beyond the areas traditionally covered in RG work (which does not mean that the potential of RG itself is exhausted, despite the skepticism voiced by authors like Comrie (1991)), a potential which has barely begun to be tapped because the theory has not succeeded in attracting a great number of active adherents. The contents of this chapter are intended in part as a demonstration of this potential, although many ramifications of the ideas advanced will have to remain unexplored for the time being.

Before proceeding, I want to say something about the interaction of universal and language-specific grammatical statements in APG. APG is like HPSG (or HPSG like APG) insofar as a structure counts as wellformed in a language L exactly if it satisfies both the clauses of UG, called **laws**, and the conditions imposed by the grammar of L, called **rules** (the contrast between laws and rules in APG is thus analogous to that between principles and rules (including lexical entries) in HPSG). This means that, as in HPSG, there is no possibility within APG for a languagespecific statement to override some universal wellformedness condition. In addition to laws and rules which apply directly to structures, APG also countenances higher order laws and rules of various kinds, for instance laws about the form of rules and the structure of the collections of rules which make up individual grammars. These topics are discussed in detail in Johnson and Postal (1980: ch. 14).

To conclude this introductory section, I want to say a few words concerning two topics which are often ignored in RG/APG work, namely linear order and the lexicon. The former receives no formal treatment at all within RG. Within APG, Johnson and Postal (1980: ch. 12) present a very elaborate formal treatment of linear precedence involving arcs with a special (nonstructural) R-sign LP. In contrast to this, Postal (1986: ch. 1) proposes to dispense with LP arcs and assume instead that those nodes which correspond to heads of surface arcs (i.e. unerased arcs) are directly ordered by an ordering relation which is represented separately from the graph theoretic formalism which is used to encode grammatical relations. More specifically, Postal assumes that non-terminal nodes are identified with natural numbers (which is obviously admissible since they have no linguistically relevant inherent properties) and that the arithmetical relation  $<$  is taken to be the linear precedence relation. This is just



a particularly simple implementation of the idea that nodes are directly ordered, and the same effect could obviously be achieved by leaving the identity of the objects representing nodes completely open and simply imposing a linear ordering on the set of those non-terminal nodes in a structure which represent heads of unerased arcs. In any event, I will not specifically deal with matters of linear order in the present study, but I will assume that the heads of unerased arcs are directly ordered, either extrinsically or on the basis of some inherent and not otherwise exploited property. Concerning the lexicon, too, I will only make the minimal assumptions necessary to make sense of what follows. As far as APG is concerned, the orthodox position is actually that the grammar of a language does not contain a separate component which could be identified as its lexicon, though for obvious reasons the grammar of every attested language will contain rules which make reference to specific lexemes. Put differently, what corresponds to the lexicon in other approaches is just that subset of the rules of the grammar of a specific language whose elements make reference to individual lexemes. Obviously, though, nothing prevents us compiling all the rules in the grammar of a language  $L$  which mention a specific lexeme  $Lex_x$  into one complex rule which we may think of as the lexical entry for  $Lex_x$ , and I will occasionally speak of lexical entries in precisely this sense.<sup>35</sup> Likewise, since nothing in the theory of APG requires that the set of rules for some language  $L$  should be specified by any particular method, we are free to assume that there may be second-order rules, i.e. rules whose terms of reference are other rules rather than the structures directly associated with expressions of the language, and we are in particular free to assume that there is a subset of such rules whose members derive new lexical entries from existing ones. I will not propose a particular notational format for representing either lexical entries or lexical rules here (see Davies and Dubinsky (1991) for some suggestions concerning the former), but I will occasionally appeal to the concepts of lexical entry and lexical rule in the sense just outlined.

## 2. 1. Some basic notions

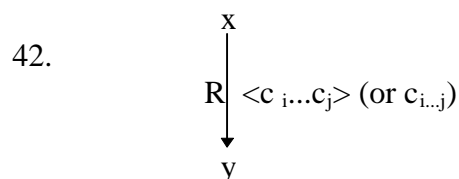
The formalism of Relational Grammar is essentially quite similar to that of HPSG. In fact, it should not be too difficult to specify a single formalism within which both theories can be embedded. This would be quite an interesting exercise, but tangential to the goals of the present study, so I will content myself with outlining a fairly standard presentation of the formal aspects of the theory.

The basic building blocks of RG structures are called **arcs**. Slightly modifying the formulation in chapter 2 of Johnson and Postal (1980), an arc can be defined as a structure  $\langle\langle A, R, \rangle, C \rangle$ , where  $A$  is a **primitive arc**, i.e. an ordered pair of nodes,  $R$  an **R-Sign**, the name of a primitive grammatical relation, and  $C$  an ascending continuous sequence of natural numbers serving as **coordinates**. An arc  $\langle\langle\langle x, y \rangle, R \rangle, \langle c_m \dots c_n \rangle \rangle$  formally models the situation of node  $x$  bearing the primitive grammatical relation named  $R$  to node  $y$  in the strata named by the coordinates from  $c_m$  to  $c_n$ . By definition, the first node of the primitive arc of an arc is called the **tail** of the arc and the second its **head**. In accordance with this terminology, arcs will be represented graphically as arrows pointing from the tail node to the head node, with the R-Sign written normally

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<sup>35</sup>This presupposes that we can identify a structure as instantiating a particular lexeme. For concreteness, we may assume that each preterminal node is the tail of a labelling arc whose head is a terminal node which identifies the lexeme which the former represents an occurrence of.

to the left and the coordinate sequence to the right of the arrow, as in the following abstract example:



The nodes in such diagrams can of course be implicitly represented by the positions of the arrow head and the arrow tail rather than explicitly as in the example just given. I will now introduce some terminology which is useful to talk about arcs and sets of arcs. When two arcs have the same head, they are said to **overlap**, when they have the same tail, they are said to be **neighbours**, and when they have both the same head and the same tail, they are said to be **parallel**. Following a usage which has gained some currency in RG work, we will occasionally refer to the situation where the root of some constituent is the head of two or more overlapping arcs as multiattachment. We say that an Arc A **supports** an arc B iff A's head is the tail of B, the tail of an arc whose head is the tail of B, etc. (this is what Johnson and Postal (1980) call "R-support"), and stretching this terminology in a hopefully not too confusing way we will also occasionally say that an arc supports the constituent whose root is its head. Finally, an arc A **arc-commands** an arc B iff A has a neighbour which supports B (thus arc command is somewhat analogous to the c-command relation between nodes in constituent structure trees; for a formal theory of command relations, see Barker and Pullum (1990)). Arcs will often be classified according to their R-Sign; hence, whenever R is an R-Sign, an R arc is an arc whose R-Sign is R. An **anominal arc** is an arc whose R-Sign belongs to the class of nominal R-Signs; intuitively, these are the R-Signs which name grammatical relations typically holding between nominal constituents and basic clauses, such as 1 (subject), 2 (direct object), or Cho (Chômeur), but not for instance P (Predicate), Top (Topic), or Conj (Conjunct).

In RG proper, the syntactic structure of a linguistic expression is just a set of arcs satisfying certain conditions, called **arelational network**. Formally, this is equivalent to the notion **R-graph** of Arc Pair Grammar, which is defined in section 2.5. of Johnson and Postal (1980). An R-graph is a set of arcs with the structure of a particular kind of single-rooted directed graph, and it is in this respect much like an HPSG attribute-value structure. However, there are two crucial differences between the two notions. The first is that two or more neighbouring arcs, i.e. arcs with the same tail node, may in general have the same R-Sign. The second difference, which is in part related to the first, is that the arcs in an R-graph are indexed by coordinates which indicate which **strata** they belong to. The concept of an arc belonging to a stratum is sufficiently important to warrant a definition set off from the running text:

#### 43. Definition of Stratum Membership

An arc A belongs to the i-th stratum of a node b iff b is the tail of A and q is a member of the coordinate sequence of A

An **initial** arc is simply an arc which has coordinate q and hence belongs to the first stratum of its tail node; analogously, a **final** arc is an arc such that its last coordinate is

at least as great as the last coordinate of any neighbour, which means that it is in the last non-empty stratum of its tail. The set of all non-empty strata of a node  $b$  is called the **stratal family** of  $b$ . Occasionally, I will take the liberty of saying of an arc that it is a member of the stratal family of some node  $b$ ; strictly speaking, of course, this means that it is a member of a member of the stratal family of  $b$ . I will also occasionally use the term **nexus** to refer to the union of a stratal family, i.e. a maximal set of arcs with the same tail.<sup>36</sup> It will sometimes be necessary to speak of the **first** or **last** arc of a certain kind in a maximal set of neighbouring arcs. These notions are defined as follows: For any arc  $A$ , node  $b$ , and property of arcs  $P$ ,  $A$  is the first  $P$  arc of  $b$  iff  $b$  is the tail of  $A$ ,  $P$  holds of  $A$  and there is no arc  $A'$  with tail  $b$  such that  $P(A')$  and the first coordinate of  $A'$  is less than the first coordinate of  $A$ . Likewise,  $A$  is the last  $P$  arc of  $b$  iff  $b$  is the tail of  $A$ ,  $P$  holds of  $A$ , and there is no arc  $A'$  with tail  $b$  such that  $P$  holds of  $A'$  and the last coordinate of  $A'$  is greater than the last coordinate of  $A$ . Two important notions related to that of stratum membership are that of a **P-sector** and the related concept of a **P-initial** or **P-final** arc. Informally, a  $P$ -sector is that subset of a nexus which contains all and only those arcs whose coordinate sequences overlap with that of a particular predicate, which means that they are members of at least one stratum which also contains that  $P$  arc, and a  $P$ -initial arc of some kind is the first arc of its kind in some  $P$ -sector. Somewhat more formally, the two notions can be defined as follows (cf. Davies and Rosen (1988)):

#### 44. Definition of P-sector

Given a  $P$  arc  $A$  with tail  $b$  and coordinate sequence  $\langle c_1 \dots c_j \rangle$ , the  $P$ -sector of  $A$  is the set containing exactly those neighbours of  $A$  whose coordinate sequence includes  $\langle c_1 \dots c_j \rangle$

#### 45. Definition of P-initial Arc and P-final Arc

An arc  $A$  is  $P$ -initial/final relative to a neighbouring  $P$  arc  $B$  (in the  $P$ -sector of  $B$ ) if and only if its coordinate sequence includes the first/last coordinate of  $B$

We say that a predicate  $X$  **initializes** a nominal  $Y$  if and only if the first stratum in which  $Y$  heads an arc is the first stratum in which  $X$  does. In contrast, if  $Y$  is present in the first stratum in which  $X$  is present but the latter is not  $Y$ 's first stratum, we say that  $X$  **inherits**  $Y$ . Apart from the differences related to the fact that grammatical relations are relativized to strata in RG/APG, a further difference between R-graphs and feature structures is that the nodes in the former (and hence the substructures they determine) are not sorted. Instead, the formalism makes a distinction between **terminal nodes** and **nonterminal nodes**. While the function of the latter is purely structural, which is manifested in the fact that grammatical statements can only refer to them by means of variables, the former are individually named and represent roughly the kind of information represented by the sorts of atomic values in HPSG feature structures. Terminal nodes appear as heads of arcs with the R-Sign L (for "label"). The category of a constituent  $X$ , but also its case, agreement features, etc., are represented by terminal nodes appearing as the heads of labelling arcs whose tail is the root of  $X$ . In the diagrams representing relational networks, labelling arcs are usually suppressed when they are not important for the issue at hand, but it is important to realize that

<sup>36</sup> This use of the term **nexus** is borrowed from McCawley (1989); the term itself goes back to Jespersen (1924).

syntactic categories and syntactic features can be explicitly represented in RG, because people not familiar with the framework sometimes suggest that RG uses relational distinctions instead of categorial ones, which is false, although it is true that categorial distinctions play a much smaller role within RG and APG than within the Standard Theory and its direct descendants. Concerning the technical side of the representation of categorial notions within RG/APG, it should be pointed out that it would be no problem to have a whole set of non-structural grammatical relations instead of the labelling relation *L* alone. Each such relation would then be associated with a subset of the set of terminal nodes representing a particular kind of grammatical property, making the formalism of the relational theories more similar to that of HPSG and related approaches than it is now. It would even be possible to devise a version of RG or APG using the same formalism of sorted feature structures as HPSG, though I will not pursue this possibility here. Instead, I will turn next to the representation of constituent structure in RG. With respect to this aspect of the framework, too, a widespread misapprehension, namely the idea that RG has no notion of constituent structure, needs to be corrected. As a matter of fact, the definition of constituency within RG (and APG) is extremely straightforward: an R-graph *X* is a constituent of another R-graph *Y* exactly if *X* is a maximal proper subset of *Y* such that the root of *X* is the head of some arc in *Y*. What is true is that constituency, like the categorial notions, plays a less significant role within RG than within Transformational Grammar, and it is also true that the constituent structures of RG are in general "flatter" than those of other theories. In particular, the theory does not automatically impose levels of constituency intermediate between the lexical and the phrasal level. In the case of the clause, for instance, the main predicate and its arguments are all represented as sisters in the simplest analysis, and there is nothing corresponding to a VP. However, it would be no problem to posit such a constituent if it turned out to be necessary. Summing up what has been sketched so far, RG assumes as primitives terminal and non-terminal nodes, the latter representing constituents and the former properties of constituents such as syntactic categories, R-Signs representing primitive grammatical relations, and coordinates representing the strata in which relations hold.

In Arc Pair Grammar, two primitive relations between arcs, called **Sponsor** and **Erase**, are added to the primitive base of RG. Intuitively, the fact that an arc *A* sponsors an arc *A'* means that the existence of *A'* depends on that of *A*, while the fact that *A* erases *A'* means that *A'* is not part of surface structure. Given this extension, the structure of an expression within APG is a **Pair Network**. We will view Pair Networks as ordered triples  $\langle A, S, E \rangle$ , where *A* is an R-graph, *S* is the Sponsor relation in *A*, and *E* is the Erase relation in *A* (Johnson and Postal (1980) give a slightly different but essentially equivalent formulation). The syntactic representations of APG are thus not only intuitively, but in a very straightforward technical sense, extensions of RG structures (Relational Networks). Hence, any RG analysis can immediately be translated into APG terms, although the converse is not always true. The close relationship between the two theories justifies using the umbrella term Relational Grammar both for the simpler theory of RG proper and for its extension APG, and it also often makes it possible to state a grammatical constraint in terms which make sense in both frameworks. I will take advantage of these possibilities in what follows, but in some instances I will be forced to appeal to APG-specific constructs. This is because RG proper is in some respects incomplete as a theory of grammar. In particular, it has no precisely defined notion of the surface structure of an expression, i.e. that part of its structural description which is relevant for the way in which it is

phonetically realized. The Erase relation of APG is designed to overcome precisely this defect. Within APG, the notion of surface structure is formally reconstructed by the notion of an **S-graph** (for "surface graph"). If  $E$  is a pair network of the form  $\langle A, S, E \rangle$ , the S-graph of  $E$  is defined as that subset of  $A$  which contains all and only the arcs which are not erased, i.e. which are not in the co-domain of the Erase relation. The purpose of erasure is guaranteeing that S-graphs are trees, i.e. contain no overlapping arcs, although R-graphs are not necessarily trees. Various axioms of the theory guarantee that the right arcs are erased in order to satisfy the tree-condition on S-graphs. Since all of these are discussed and precisely formulated in Johnson and Postal (1980), I will content myself with introducing the more basic ones here, together with a few attendant definitions. The first of the latter concerns the notion **successor**.

#### 46. **Definition of successor**

$A$  is a successor of  $B$  iff  $B$  and  $A$  overlap and  $B$  sponsors  $A$ ; if  $A$  and  $B$  are neighbours,  $A$  is a **local successor** of  $B$ , otherwise,  $A$  is called a **foreign successor** of  $B$

The terms local and foreign will also be used to qualify relations other than the successor relation, but their interpretation is always the same: An arbitrary relation between arcs is local exactly if the arcs involved are neighbours and foreign otherwise. The notion of a predecessor can be approximately reconstructed in pure RG terms as follows:  $A$  is the successor of  $B$  if and only if  $A$  and  $B$  overlap and either  $A$  and  $B$  are neighbours and the first coordinate of  $A$  is one greater than the last coordinate of  $B$  (this is the local successor case), or  $A$  arc commands  $B$  and  $A$ 's first coordinate is greater than 1. Whenever an arc  $A$  has a successor  $B$ , the constituent at the head of both (strictly speaking, the constituent whose root is the common head of the predecessor and the successor) in a sense assumes a new grammatical relation, that represented by the successor arc, either in the same or another nexus. Next, we define the notion of a **replacer**:

#### 47. **Definition of replacer**

$A$  replaces  $B$  iff  $A$  and  $B$  are neighbours and have the same R-Sign,  $B$  sponsors  $A$ , and there is an arc  $C$  distinct from  $A$  and  $B$  which sponsors  $A$

In many important cases, the two sponsors of a replacer will be overlapping arcs, either a predecessor-successor pair or a pair of parallel initial arcs. For these cases, an approximate RG reconstruction can again be given:  $A$  replaces  $B$  iff  $A$  and  $B$  are neighbours with the same R-Sign,  $A$ 's first coordinate is one greater than  $B$ 's last coordinate, and there is an arc  $C$  distinct from  $A$  and  $B$  with which  $B$  overlaps. Given the notions of successor and replacer, we can state the most basic erase laws of APG as follows:

#### 48. **The Replacer Erase Law**

If  $A$  replaces  $B$ ,  $A$  erases  $B$

49.     **The Successor Erase Law**

If A is the successor of B and B has no replacer, A erases B

50.     **The Unique Eraser Law**

An arc has at most one eraser

It should be noted that while the Replacer Erase Law and the Unique Eraser Law have never, to my knowledge, been challenged in the RG/APG literature, revisions of the Successor Erase Law have been countenanced, for instance by Aissen (1987) and Postal (1990). Having pointed this out, I will continue to assume the Successor Erase Law in the form just given until further notice. Before turning my attention to the Sponsor relation, I want to introduce a few more laws which help to further cut down on the range of universally allowed erasures. The first of these is Johnson and Postal's PN-law 9, which introduces the relation of **assassination**, which holds between two arcs A and B if and only if A erases B and A and B are distinct.<sup>37</sup>

51.     **The Multiple Assassin Law**

If A, B, and C are pairwise distinct arcs and A erases both B and C, A overlaps with C

This law guarantees that an arc can assassinate at most one arc with a distinct head. This is important because this kind of assassination, called **zeroing** by Johnson and Postal, can lead to the "deletion" of material, whereas those cases where an arc assassinates an overlapping arc, for instance its predecessor, normally do not, because the structure rooted in the node which is the head of the erased arc continues to be attached to the S-graph via the erasing arc, except in those cases where the arcs overlapping in some node x erase each other. Legal occurrences of the latter situation can only involve successor chains, as guaranteed by the following law, an adaptation of Johnson and Postal's PN-law 92:

52.     **The Survivor Law**

If X is a maximal set of overlapping arcs and the common head of the members of X is explicit, there is a member of X which is not assassinated

Arcs which are not assassinated are called **survivors** (somewhat counter-intuitively, because they can be self-erasing), hence the name Survivor Law, and maximal sets of overlapping arcs are called **clans**; since the members of a clan have the same head by definition, we can speak of the head of a clan, meaning the node which is the head of all its members. The restriction to clans with explicit heads in the antecedent of the Survivor Law is designed to exempt clans headed by so called **inexplicit** nominals such as UN or ON from the law. The latter elements are rough analogues of the arbitrary PRO sometimes appealed to in GB-type approaches and function in particular as notional subjects in agentless passives, as will be explained more fully in section 3.3. in

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<sup>37</sup> I apologize for the somewhat violent terminology, which is not my invention. I keep it because it has gained a certain currency and also because it is suggestive of the intended meaning.

the next chapter.<sup>38</sup> In contrast to the Survivor Law, Johnson and Postal's PN-law 92 contains an antecedent clause restricting its applicability to clans containing at least one self-sponsoring arc (in the present system, this would be an unsponsored arc), but the cases for which this is relevant admit an alternative analysis. The next law to be introduced, Johnson and Postal's PN-Law 94, appeals to the notion **internal survivor**, which is defined as follows

### 53. **Definition of Internal Survivor**

Given a constituent  $X$  and an arc  $A$ ,  $A$  is an internal survivor relative to  $X$  iff  $A \in X$  and there is no  $B \in X$  such that  $B$  assassinates  $A$  and all sponsors of  $B$  are elements of  $X$

Obviously, if  $A$  is an internal survivor relative to  $X$ , it is an internal survivor relative to every constituent contained in  $X$ , and conversely if  $A$  is not an internal survivor relative to a particular constituent  $X$ , it is not an internal survivor relative to any constituent containing  $X$ . With this definition in place, the Internal Survivor Law can be formulated as follows:

### 54. **The Internal Survivor Law**

If  $A$  and  $B$  are distinct arcs and both are internal survivors relative to some constituent  $X$ , then  $A$  and  $B$  do not overlap

The consequences of the Internal Survivor Law are quite ramified (cf. the discussion in section 11.9 of Johnson and Postal), but for now it is enough to be aware on the one hand that the law forces one of any pair of distinct overlapping arcs to be erased (because an unerased arc is always an internal survivor relative to any constituent) and that it also forbids self-erasure of arcs which overlap with some distinct arc (because self-erased arcs are also necessarily internal survivors); thus the Internal Survivor Law in fact formally guarantees that  $S$ -graphs are trees, as we have been assuming all along. The next of the erasure laws to be introduced is Johnson and Postal's PN-law 93, which forbids the situation where an arc assassinates another which is in turn directly or indirectly responsible for the assassination of the first. There is some overlap between this law and the Survivor Law, but apparently it is not possible to dispense with one of them. We formulate the new law as follows:

### 55. **The Assassination Independence Law**

If  $A$  assassinates  $B$ ,  $B$  does not  $R$ -assassinate  $A$

The next erasure law, PN-Law 11 in Johnson and Postal, forbids erasure of an arc by a parallel non-successor:

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<sup>38</sup> Inexplicit nominals should not be confused with dummies, i.e. heads of ghost arcs. The latter are semantically empty in the sense that they do not contribute anything to the meaning of the clauses in which they appear (because they head no unsponsored arc, cf. section 2.7. below), whereas inexplicit nominals do contribute to the interpretation of the clause, but are extremely unspecific as regards the exact nature of their referent. In fact, UN is assumed to impose no conditions at all on its referent, whereas ON imposes the condition that the referent should be animate or perhaps "human" (cf. fn. 66), but nothing in the way of more specific restrictions.

**56. The Parallel Assassin Law**

If A assassinates B and A and B are parallel, A is B's successor

The last erasure law to be introduced here, PN-Law 76 of Johnson and Postal, guarantees that only arcs with inexplicit heads can be erased by a non-overlapping arc which they do not sponsor:

**57. The Nominal Arc Zeroing Law**

If A erases a nominal arc B whose head is explicit and A and B do not overlap, B sponsors A

Let us now turn our attention to the Sponsor relation. Johnson and Postal assume as part of the definition of Pair Network that every arc must have a sponsor, and they impose a law, PN-Law 7, which limits the number of sponsors an arc can have to two. I adopt the latter view here but not the former. Instead, I follow more recent work of Postal (cf. e.g. Postal (1990)) and assume that the sponsor relation is irreflexive and that exactly those arcs which were self-sponsoring under Johnson and Postal's original assumptions have no sponsor. As far as the question of which arcs have two sponsors is concerned, I follow the suggestions the end of chapter 8 of Johnson and Postal and assume that an arc has two sponsors only if it does not have a local predecessor, which means in particular that chomeur arcs, like other arcs with a local predecessor, have only one sponsor. To implement these assumptions, I propose the following three PN-Laws:

**58. The Sponsor Independence Law**

If A sponsors B, B does not R-sponsor A

Given any relation R, the R-R is the reflexive transitive closure of R; hence, an arc A R-sponsors an arc B iff A and B are identical or there is a chain of sponsorship pairs linking A and B. The Sponsorship Independence Law thus forbids self sponsoring arcs as a special case, whereas Johnson and Postals law of the same name does not because its antecedent appeals to the notion of D-sponsoring, i.e. sponsoring of an arc A by a **distinct** arc B.

**59. The Maximum Two Sponsor Law**

No arc has more than two sponsors

**60. The Double Sponsorship Law**

If an arc with two sponsors is not a replacer, it is an immigrant

An immigrant is simply an arc with a foreign predecessor. The following law guarantees that immigrant arcs have a local sponsor and corresponds to PN-Law 12:



### 61. **The Immigrant Local Sponsor Law**

If A is an immigrant, it has a local sponsor

The next sponsor law determines the identity of the local sponsor of an immigrant in those cases where the latter is a nominal arc. This is particularly important for us because these are precisely the raising constructions. It is somewhat simpler than Johnson and Postal's PN-Law 112, to which it essentially corresponds, because the latter must take account of clause union constructions, whereas we assume here that clause unions are monoclausal, as proposed in Davies and Rosen (1988), and do not involve raising:

### 62. **The Nominal Immigrant Local Sponsor Law**

If A is a nominal immigrant, B its predecessor, and C its local sponsor, then C supports B

The next law guarantees that in those replacement configurations where there is an arc which overlaps with the replacee, that arc is the second sponsor of the replacer; it is slightly stronger than the corresponding law in Johnson and Postal, PN-Law 8, because the antecedent of the latter singles out only those cases where the arc overlapping with the replacee is its successor:

### 63. **The Overlapping Arc Replacer Law**

If B replaces A and C is an arc distinct from A which overlaps A, then there is an arc D such that D overlaps A and C and sponsors B, and if C is the successor of A, then  $D=C$

One desirable consequence of the Overlapping Arc Replacer Law is that it guarantees that predecessors which are replaced have uniquely determined successors. The proof goes essentially as follows: Assume that A replaces B and there are two distinct successors C and D of B. By the definition of replacement, B sponsors A, and by the Overlapping Arc Replacer Law, both C and D sponsor A. Hence, A has three sponsors, in violation of the Maximum Two Sponsor Law. Hence the assumption that C and D are distinct must be false. Note that the law does not say which of a set of overlapping arcs one of which is replaced must sponsor the replacee if no arc in the set is the successor of another. Returning to the matter of the uniqueness of successors, it would be an advantage if not only successors of replacees, but successors in general, as well as predecessors, replacers and replacees were always uniquely determined, so that we could safely speak of **the** predecessor, successor, etc., of an arc, as we have done in some places already. Now the uniqueness of successors and replacers is in fact guaranteed by the system as outlined so far. Taking the former first, it has already been shown that successors of replacees are uniquely determined. If an arc A has a successor B and no replacer, B erases A by the Successor Erase Law, hence it follows from the Unique Eraser Law that there can be no distinct successor C of A, because C would also have to erase A. The uniqueness of Replacers is also straightforwardly guaranteed by the Unique Eraser Law and the Replacer Erase Law; the latter requires replacers to erase their replacees without exception, so that by the former there can again be only one replacer. The uniqueness of replacees is provable by appeal to the

definition of replacement and the Maximum Two Sponsor Law. If an arc A replaces two distinct arcs B and C, it has to be sponsored by both and by at least one arc D distinct from both B and C, violating the Maximum Two Sponsor Law. This leaves us with the task of proving the uniqueness of predecessors. This is not provable from the assumptions made so far, but the following additional PN-Law will do the trick:

**64. The Multiple Sponsorship Limitation Law**

If an arc A sponsors arcs B and C, then if B and C overlap, they are identical

Since predecessors sponsor their successors by definition, it follows directly from this law that an arc can have at most one successor.

The Sponsor and Erase relations play an important role in the determination of the coordinates of arcs, as we will now briefly discuss. In contrast to Johnson and Postal, I assume that the first coordinates of unsponsored arcs (self sponsoring arcs in their system) are not fixed absolutely, but rather governed by the following principle:

**65. The First Coordinate Law**

If A is a self-sponsoring nominal arc with first coordinate  $c_i$ , there is a P arc neighbour of A with first coordinate  $c_i$

The reason for this divergence is that I assume Davies and Rosen's monoclausal analysis of clause union constructions, because the most straightforward translation of this into APG terms requires unsponsored (quasi-initial) arcs which do not belong to the first stratum of their clause. The coordinates of local successors are determined by Johnson and Postal's PN-Law 20, which I render as follows:

**66. The Local Successor Coordinate Law**

If A is the local successor of B and B's last coordinate is  $c_i$ , A's first coordinate is  $c_{i+1}$

The first coordinates of immigrants are determined in accordance with PN-Law 22:

**67. The Immigrant Coordinate Law**

If A is an immigrant and  $c_i$  is the first coordinate of its local sponsor, the first coordinate of A is  $c_{i+1}$

Note that it may of course happen that the first coordinate of an immigrant's local sponsor is also its last coordinate. In particular, this is necessarily the case whenever the immigrant is a nominal arc. The next coordinate law, which conflates Johnson and Postal's PN-Laws 23 and 24, determines the first coordinates of **grafts**, i.e. arcs which have sponsors but are not successors or, put differently, arcs with at least one sponsor but with no overlapping sponsor:

## 68. The Locally Sponsored Graft Coordinate Law

If  $A$  is a graft and  $\langle c_i \dots c_j \rangle$  the coordinate sequence of its local sponsor, then the first coordinate of  $A$  is  $c_{j+1}$  if  $A$  is a replacer and  $c_{j+1}$  otherwise

It must be noted that there may be grafts which have no local sponsors and are hence not covered by the law just introduced, but they will play no role in the present study. Johnson and Postal stipulate that these simply have  $q$  as their first coordinate, but this is not compatible with the Davies and Rosen analysis of clause union which I adopt. I therefore tentatively assume that the first coordinate of a graft without a local sponsor is one greater than the first coordinate of the last predicate of its clause. To conclude this discussion of the laws determining initial coordinates, we need to ensure that despite the fact that unsponsored arcs do not necessarily have coordinate  $c_1$  in the present system, every stratal family which contains an unsponsored arc also contains a  $c_1$  arc. This is guaranteed by the following PN-Law:

## 69. The Initial Arc Law

For any node  $b$ , if there is an unsponsored arc  $A$  with tail  $b$ , there is an arc  $B$  with tail  $b$  and coordinate  $c_1$

Having ensured that arcs have the right first coordinates, we can now turn to the laws which specify the conditions under which arcs **fall through** from one stratum to the next. As a first step, we guarantee that each stratum in a stratal family is **motivated**, i.e. contains some arc which is not in the preceding stratum. This is achieved by Johnson and Postal's PN-Law 21, adapted here as follows:

## 70. The No Vacuous Fall-Through Law

Whenever an arc  $A$  with tail  $b$  has coordinates  $q$  and  $c_{i+1}$ , there is an arc  $B$  with tail  $b$  whose first coordinate is  $c_{i+1}$

This law ensures that, metaphorically speaking, something always happens between the  $i$ -th and the  $i+1$ -th stratum of a node. The next law, essentially Johnson and Postal's PN-Law 27, guarantees that if an arc is in the  $i$ -th stratum of its tail node and the latter has a motivated  $i+1$ -th stratum, this arc is also in the latter stratum, i.e. that it **falls through** from the  $i$ -th to the  $i+1$ -th stratum:

## 71. The Fall-Through Law

If an arc  $A$  with tail  $b$  has coordinate  $q$  and the  $i+1$ -th stratum of  $b$  is motivated,  $A$  has coordinate  $c_{i+1}$  iff  $A$  is not locally assassinated

This brings us to the last of the coordinate laws, PN-Law 27 in Johnson and Postal:

## 72. The Local Assassination Coordinate Law

If  $A$  locally assassinates  $B$ , the first coordinate of  $A$  is greater than the last coordinate of  $B$

This law is particularly important because it guarantees that locally assassinated arcs are never in the final stratum of their tail node. Crucially, it says nothing about self erasing arcs. The latter are in fact always final arcs, because the Fall Through Law forces any arc which is not locally assassinated to fall through to the next motivated stratum. By the same reasoning, the law also guarantees that arcs with foreign erasers are in the final stratum of their tail, which means in particular that the predecessors of immigrants are final arcs. It is crucially important for what follows not to confuse final arcs and surface arcs: the latter are the arcs which are not erased, the former those which are not locally assassinated, hence every surface arc necessarily is a final arc but not conversely. We are now also in a position to specify the notion of **asurface constituent**. A surface constituent of an R-graph X is simply a constituent of X which heads an unerased arc in X. Crucially, arc erasure can lead to the "deletion" of a constituent X. This happens just in case all arcs headed by X (more precisely, the root of X) are erased. One situation where this can happen in conformity with the PN-Laws we have introduced so far is that in which an arc without a successor self erases. This may be the appropriate representation for what is commonly called "pro-drop". Obviously, the erasure laws specified so far do not yield an empirically adequate theory of pro-drop and related phenomena, although they do correctly exclude many logically possible but empirically unwarranted cases of arc erasure. In particular, self erasure of successorless arcs is not limited to arcs with pronominal heads, and as a matter of fact, we have no notion of "pronominal" within the theory as outlined so far. Although I do not want to pursue the issue of pro-drop and related phenomena too far here, I will remedy at least the defect just mentioned. This means first of all that the notion of a pronominal constituent must be specified within APG. In Johnson and Postal's system, pronominal constituents are defined in purely structural terms, essentially as heads of nominal graft arcs which do not support any of their sponsors. This view entails that pronominals are never constituents of initial strata, which seems rather artificial because it seems to imply that even deictic pronouns should be represented as heading replacer arcs, which raises the question of what the head of the replacee should be. More generally, the problem in my view is that Johnson and Postal's system always forces a pronoun to stand in some structural, not merely semantic, relation to a (possibly invisible) pronominal, and no allowance is made for pronominals which function syntactically just like ordinary nominals. In view of these considerations, I propose to characterize pronominals as a subcategory of the nominals, independently of the configurations in which they occur. However, I follow Johnson and Postal insofar as I assume that pronominals in the sense just introduced must appear in the configurations defined as pronominal in their system, though they may also appear in others. This makes it necessary to be able to identify pronominal constituents independently from the configuration in which they appear. Technically, this is most easily achieved by positing a terminal node, call it PRO, which can label nominal constituents. This idea is embodied in the following definition:

### 73. **Definition of Pronominal Constituent**

A constituent X with root b is pronominal iff b is labelled both N and PRO

Given this, we can state a law which requires the heads of graft arcs of certain kinds to be pronominal constituents:

#### 74.    **The Pronominal Graft Law**

If A is a graft which does not support any of its sponsors, the constituent whose root is the head of A is a pronominal

The antecedent of this law singles out exactly those arcs defined as pronominal by Johnson and Postal (def. 165, p.456), and we will also call such arcs **pronominal arcs**; hence in the present system all pronominal arcs have roots of pronominal constituents as heads, but not conversely. We are now also equipped to state a law restricting self-erasure to arcs with pronominal heads:

#### 75.    **The Self-Erasure Law**

If A self-erases, the head of A is the root of a pronominal constituent

This concludes the discussion of the formalism of RG and APG and some of the more abstract laws of the latter theory. I would like to point out that while the laws introduced so far do not correspond in any very direct way to pretheoretically identifiable constructions, they nevertheless go a long way toward constraining the possible analyses of natural language phenomena. In the next section, I will introduce and discuss a few laws of RG/APG Universal grammar whose empirical import is perhaps more immediately obvious.

### 2. 2. The inventory of R-Signs

It is generally assumed within RG/APG that grammatical statements can refer not only to individual **R-Signs** but also to classes of **R-Signs**, and we have in fact already appealed to one such class, that of nominal **R-Signs**. I am now going to specify the inventory of **R-Signs** and **R-Sign** classes I assume somewhat more systematically, basing myself largely on the inventories proposed in Johnson and Postal (1980: 198) and Perlmutter and Postal (1983: 86):

#### **R-signs:**

    structural R-Signs:

        nominal R-Signs:

            central R-Signs:

                core R-Signs:

                    term R-Signs:

                        nuclear Term R-Signs: 1 (Subject), 2  
  (Direct Object)

                        object R-Signs: 2, 3 (Indirect Object)

                        oblique R-Signs: Ben, Inst, Loc, etc.

                    derivative R-Signs: Cho

                overlay R-Signs: Top, Foc

            non-nominal R-Signs: P (Predicate), Con (Conjunct), F (Flag), Marq  
  (Marquee), Poss (Possessor), H (Head), Mod (Modifier)

        non-structural R-Signs: L (Label)

Note that this classification does not form a taxonomic tree, because a few R-signs are multiply classified, for instance 2 is classified both as a nuclear term R-Sign and an Object R-sign. Unsurprisingly, the above inventory is incomplete in two ways. First, it does not include R-signs which have been proposed in the previous RG/APG literature but which play no role in the analyses to be developed in the present study, and it does not contain R-signs which will need to be posited in a more fully developed theory of RG, i.e. one which is as explicit about all other aspects of syntactic structure as the presently available versions are with respect to the structure of basic clauses. For some of the R-Signs given, alternative notations have occasionally been used in the literature; in particular, 8 is sometimes used instead of Cho and GEN instead of POSS.

In accordance with the previous RG literature, I assume that the R-signs (and hence the primitive grammatical relations they name) are partially ordered by a **relational hierarchy**. More specifically, and perhaps somewhat unexpectedly, I assume that not 1 but P is highest in the hierarchy, followed by 1, 2, 3, the oblique R-signs, and the derivative R-sign Cho. When an R-sign R precedes R' in the relational hierarchy, we say that R **outranks** R' or that R is **less oblique** than R'. The reasons for putting P above 1 will be discussed further below, here I merely note that this assumption will obviously have no consequences for the effect of laws or rules referencing nominal relations, because P is not a nominal R-sign and 1 therefore remains the highest term relation and the highest nominal relation; because of this the likelihood of harmful consequences of this revision is not as great as it may appear at first glance.

Before concluding this section on the inventory of primitive grammatical relations and the relational hierarchy, I want to introduce five **defined grammatical relations** which will be of some importance further below. Technically, these are defined as properties of arcs relative to strata (cf. Johnson and Postal (1980: 231):

## 76. Defined Grammatical Relations

For any node b, any coordinate index q and any arc A with tail b whose coordinate sequence includes q

- a. A is **ergative** in the i-th stratum of b iff A is a 1 arc and there is a 2 arc in the i-th stratum of b
- b. A is **accusative** in the i-th stratum of b iff A is a 2 arc and there is a 1 arc in the i-th stratum of b
- c. A is **unergative** in the i-th stratum of b iff A is a 1 arc and there is no 2 arc in the i-th stratum of b
- d. A is **unaccusative** in the i-th stratum of b iff A is a 2 arc and there is no 1 arc in the i-th stratum of b
- e. A is **absolutive** in the i-th stratum of b iff A is a nuclear term arc and there is no nuclear term arc in the i-th stratum of b which outranks A

As may be expected, a **transitive stratum** is a stratum which contains both a 1 arc and a 2 arc, an **unaccusative stratum** is an intransitive stratum which contains a 2 arc, and an **unergative stratum** is an intransitive stratum which contains a 1 arc (note that the definitions say nothing about arcs which are not nuclear term arcs, hence an intransitive stratum may contain more than one arc, for instance a 1 arc and a 3 arc, but obviously not two nuclear term arcs). Some readers will note a similarity between the notions just

defined and the notions S, A, and O often used in typological work following the lead of Dixon (1979), with S corresponding roughly to absolutive, A to ergative, and O to accusative. The main difference between these notions and the derived grammatical relations of RG and APG is that the latter are relativized to strata.

## 2. 3. Some laws of basic clause structure

The Stratal Uniqueness Law embodies one of the most fundamental aspects of the RG view of syntactic structure, in particular of clause structure. Its original formulation in Perlmutter and Postal (1983) said that for every term R-Sign R, there could be at most one R arc in any stratum of any node b. In the original APG system of Johnson and Postal (1980), Stratal Uniqueness was derived as a theorem from their Earliest Strata Uniqueness Law, but because the proof of this theorem cannot be taken over into the present system without modification because of our assumptions about Clause Union, and also because PN-law 48 is not significantly simpler than the original Stratal Uniqueness Law, I assume an adaptation of the latter which, however, includes the Predicate relation in its scope. This reads as follows:

### 77. The Stratal Uniqueness Law (SUL)

For any node b, any R-sign  $R \in \{1, 2, 3, P\}$ , and any coordinate  $c_i$ , if A and B are R arcs with coordinate  $c_i$ , then  $A=B$

From now on, the R-signs 1, 2, 3, and P will be referred to as the **foundational R-signs**, following Postal (1986). The SUL guarantees that there cannot be two neighbouring arcs with the same foundational R-sign and the same first coordinate, and together with the coordinate laws it guarantees that in situations where an arc with a foundational R-sign "comes in later" than a neighbour with the same R-sign, i.e. has a greater first coordinate, the "earlier" arc must have a local successor with a distinct R-sign. The foundational R-signs are also crucial for the next important law of basic clause structure, which was also first proposed in Perlmutter and Postal (1983). This is the Motivated Chomage Law, which I will state using a defined relation between arcs called **overrun**. The latter is defined as follows:

### 78. Definition of Overrun

An arc A overruns an arc B iff A and B are neighbours with the same foundational R-sign and the first coordinate of A is one greater than the last coordinate of B

The Motivated Chomage Law then takes the following form:

### 79. The Motivated Chômage Law

If A is a Cho arc, there is an arc B which overruns A's local predecessor

The Motivated Chômage Law states that Cho arcs are only licit as local successors of overrun foundational arcs. However, not all such successors need to be Cho arcs. Nevertheless, the choice of R-sign for local successors of overrun arcs is not

completely free. In particular, by the Oblique Law of Perlmutter and Postal (1983), they cannot have oblique R-signs. The same result is also guaranteed by the No Oblique Successors Law of APG (Johnson and Postal's PN-law 49), which has the advantage of not making reference to the initial stratum. We adopt the latter law in the following form:

#### 80.     **The No Oblique Successors Law**

If A is the successor of B, A is not oblique

Note that this law precludes demotion to oblique quite generally, not only in those cases where it would serve to avoid a violation of the Stratal Uniqueness Law. However, it appears that successors in overrun situations are more narrowly constrained than those of successors generally. In particular, I know of no convincing cases of successors of overrun arcs which are less oblique than their predecessors, and also of no data whose analysis requires term arcs having P arc successors (though the reverse seems to occur<sup>39</sup>). The latter observation would follow from a law like the following:

#### 81.     **The Overrun Demotion Law**

If A is the local successor of an overrun arc B, A is more oblique than B

This law is not traditional in the way the other laws of basic clause structure are, but it seems to me that it has some plausibility and I will assume its validity from now on. To account for the apparent non-occurrence of P arc successors of term arcs, I propose the following law:

#### 82.     **The P Arc Independence Law**

If A is a P arc, A has no sponsor

This law forbids not only P arc successors of term arcs, but all kinds of sponsored P arcs. In contrast to the two laws just introduced, the next law is again traditional in that it has explicit predecessors (PN-Laws 41 and 47) in Johnson and Postal (1980) and its validity is tacitly assumed in all RG work I am aware of:

#### 83.     **The Foundational Arc Stratal Continuity Law**

If any stratum of a node b contains a foundational arc, then every non-empty stratum of b contains a P arc and a term arc

We will call a node which is the tail of a foundational arc and hence meets the antecedent of this law a **basic node** and a constituent rooted in a basic node a **basic constituent**. A **basic clause** is simply a basic constituent which belongs to the syntactic category of clauses. The next law of basic clause structure to be introduced is in a sense the RG analogue of the "extended part" of the Extended Projection Principle of GB (cf. Chomsky (1982: 10)) (historically, of course, the RG law is the predecessor

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<sup>39</sup>For instance, Dubinsky (1990) argues for an analysis of certain "light verb" constructions in Japanese which involves 2 arc successors of P arcs.



and the GB-principle the successor, though this is obscured by the fact that many of the seminal papers in RG were published in fully official form only long after being first circulated):

#### 84. **The Final 1 Law**

The final stratum of every basic clause  $b$  contains a 1 arc

In accordance with what has been said above, a basic clause is a clause whose stratal family contains a foundational arc. The restriction to basic clauses is necessary because we do not, for instance, want the law to apply to coordinate clauses or to overlay clauses, i.e. clauses containing a "wh-moved" constituent and another clause from which the latter has been extracted.<sup>40</sup> Crucially, the Final 1 Law does not require that there be a **surface** 1 arc in a basic clause. Recall that final arcs are exactly those which are not locally assassinated. This leaves open three possibilities. A final arc may have a foreign eraser, it may self erase, or it may fail to be erased. With respect to final 1 arcs, the first situation typically arises in cases of raising (of the non-copy variety) and wh-extraction (again of the non-copy variety). In these cases, the final 1 arc of some clause  $b$  is erased by its foreign successor, a term arc in a higher clause in the case of raising and an overlay arc in the case of wh-extraction, and the constituent at its head, the final subject of  $b$ , is therefore not a surface constituent (constituent of the S-graph) of the clause rooted in  $b$ . The second situation, self erasure of the final one, is, I assume, what accounts for pro-drop phenomena. Here again, we have no surface subject, although there is a final subject (and analogously for other term relations). Only the last case, that where the 1 arc is not erased, would yield structures with an overt subject. The Final 1 Law has been the subject of some amount of controversy precisely because it does not guarantee the presence of an overt subject. The dispute mainly involved impersonal passives, which we will deal with in the next chapter. For now, I merely want to note that the main argument in favour of the Final 1 Law is not some aesthetic notion of uniformity but the fact that it has largely desirable, if only indirect, empirical consequences, crucially also in languages which do not necessarily have overt subjects. The next law to be introduced is also a traditional law of RG, and it is like the Final 1 Law in making specific reference to the subject relation:

#### 85. **The 1-Advancement Exclusiveness Law (1-AEX)**

If  $A$  and  $B$  are 1 arc local successors with tail  $b$ , then  $A=B$

(a 1 arc local successor is a successor which is itself a 1 arc, not a successor of a 1 arc)  
It should be pointed out that the last two laws are the only ones introduced so far which make specific reference to the subject relation. Thus it is not true, though this is sometimes suggested, that the theory of RG would become uninteresting if the subject relation turned out not to be as important universally as traditionally assumed within this framework. Incidentally, it is possible that the 1-AEX can be strengthened to the following law, which no longer specifically mentions the subject relation:

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<sup>40</sup>Actually, we have not guaranteed that the roots of coordinate or overlay clauses cannot be tails of foundational arcs, but it is likely that this will be provable in a more fully developed version of APG, and in the worst case a law stipulating it could still be formulated.

## 86. The Term-Advancement Exclusiveness Law (T-AEX)

For any term R-sign R, if A and B are R arc local successors with tail b,  $A=B$

Gerdt (1992) suggests that a law with the effect of the T-AEX can supplant the 1-AEX. If she is correct, this would leave the Final 1 Law as the only law of basic clause structure applying specifically to elements bearing the subject relation.

To conclude the discussion of the laws of basic clause structure, I want to introduce some laws governing the syntax of dummy nominals. What we need first is a definition of the notion of a dummy. Following in part Johnson and Postal (1980: ch. 10), I define a dummy as a pronominal heading **aghost arc**. The latter notion is defined as follows:

## 87. Definition of Ghost Arc

A is a ghost arc iff A is a pronominal arc and not a replacer

A dummy can now be characterized as a constituent, necessarily a pronominal constituent because of the Pronominal Graft law, whose root is the head of a ghost arc.<sup>41</sup> The following law, essentially Johnson and Postal's PN-Law 84, crucially constrains the distribution of ghost arcs:

## 88. The Ghost Arc Law

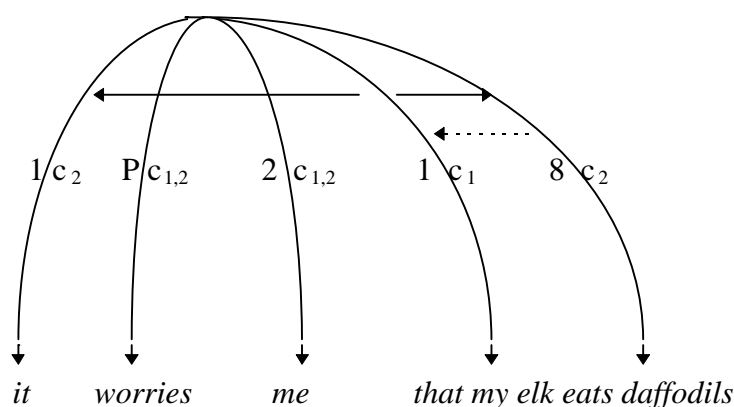
If A is a ghost arc and B the sponsor of A, there is an arc C which is a local R-successor of A and has the same R-sign as A

(recall that the R-successor of an arc A is either A itself, the successor of A, the successor of the successor of A, etc., i.e. that R-successor is the reflexive transitive closure of the successor relation between arcs). Like Johnson and Postal, we distinguish between **stable ghost arcs** and **unstable ghost arcs**; the former are those which have the same R-sign as their sponsor themselves, the latter those which have a distinct R-successor which has the same R-sign as their sponsor. Intuitively, the sponsor of a dummy arc is of course one headed by the nominal "displaced" by the dummy. For instance, in the structure underlying an English sentence like *it bothers me that my elk eats daffodils* the dummy *it* heads a final (and surface) ghost 1 arc sponsored by a 1 arc headed by the complement clause (hence it is a stable dummy). This is shown in the following diagram:

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<sup>41</sup>Note that "weather it" cannot be a dummy according to this definition unless a sponsor arc with no overt head is postulated. I am inclined to think that subject pronouns in meteorological sentences are indeed not dummies in the technical sense assumed here, but rather represent an additional sort of implicit nominal beside UN and ON, which might be represented as Z (to suggest Zeus in his role as the rainer).

89.



As in all following diagrams of this kind, arcs are represented by curved arrows with the R-sign written to the left and the coordinate sequence to the right. The sponsor relation is indicated by plain straight arrows and the erase relation by straight arrows with interrupted shafts. In this respect, I deviate from the standard graphic representation of Pair Networks, in which arrows with zigzagged shafts represent the sponsor relation and double shafted arrows represent the erase relation; the reason for the deviation is purely technical. The diagram above shows that the initial 1 arc headed by the complement clause is overrun by the 1 arc ghost (headed by the dummy *it*) which it sponsors. To avoid a violation of the SUL, the complement clause must assume a different grammatical relation, and because of the Overrun Demotion Law, the new relation must be lower on the relational hierarchy than the original one. No law stated so far dictates which of the relations below 1 the complement must assume in such a situation. For concreteness, I have represented it as assuming the *chômeur* relation, but it could also become a 3 or a 2 in accordance with the laws formulated so far. While the possibility of ghost sponsors having 3 arc successors must probably be admitted to account for so called impersonal inversion constructions, I know of no good evidence for 2 arc successors of overrun 1 arcs. Therefore, I propose the following law excluding this possibility:

#### 90. The Overrun Term Successor Law

If A is the successor of an overrun term arc, A is not a nuclear term arc

A perhaps somewhat curious consequence of the system developed so far is that while term arcs can have neither P arc successors (because of the P Arc Independence Law) nor nuclear term arc successors (because of the law just stated), P arcs can have term arcs of all kinds as successors and arcs with any R-sign whatever can have arcs with the same R-sign as successors. Taking the latter point first, it seems reasonable to assume that an arc can have a foreign successor with the same R-sign, but it is not clear what purpose should be served by local successors having the same R-sign as their predecessors. Hence we exclude the latter situation by adopting Johnson and Postal's PN-law 5:

#### 91. The Local Successor Distinct R-Sign Law

If A is the local successor of B, A and B have distinct R-signs

Concerning the possible successors of P arcs, we will see in the discussion of Clause Union that at least 2 arc and Cho (8) arc successors of P arc are apparently required, and it seems not too unreasonable to expect that other term arc successors of P arcs could turn out to be required for the analysis of some constructions in some languages. Hence I will not impose further universal constraints on P arc successors. This brings us to the last law of basic clause structure, which guarantees that a chômeur remains a chômeur and cannot be readvanced to a less oblique relation:

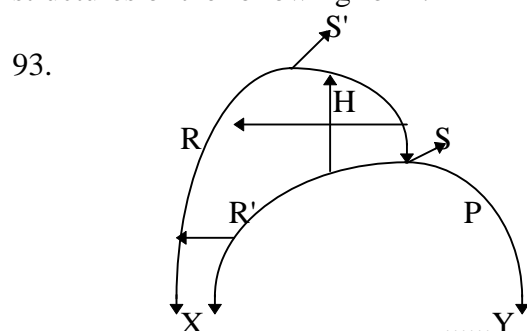
## 92. The Chômeur Advancement Ban

If A is a Cho arc, A has no local successor

Note that this law only precludes the existence of local successors of Cho arcs. Foreign successors of Chô arcs could arise under the traditional multiclausal analysis of Clause Union if there is, for instance, passive in the "downstairs" clause (though this is disallowed in many languages which have Clause Union constructions), and they are still required to account for raising of chômeurs, as we will see in chapter 4. In addition, there are Cho arc replacers which are foreign successors of Cho arcs, as we will see in the discussion of flagging structures in section 2.6 below.

## 2. 4. The structure of overlay clauses

In this section, I want to touch briefly on the structure of non-basic clauses, more precisely, overlay clauses and coordinate clauses (I leave it open whether there are other kinds of non-basic clauses). These have received much less attention within RG/APG than basic clauses, but it is important to see that the theories nevertheless have the resources to deal with such constructions, though they have admittedly not contributed very much to their understanding up to now. Turning first to overlay clauses, these are assumed to be clauses whose roots are tails of overlay arcs, i.e. structures of the following form:



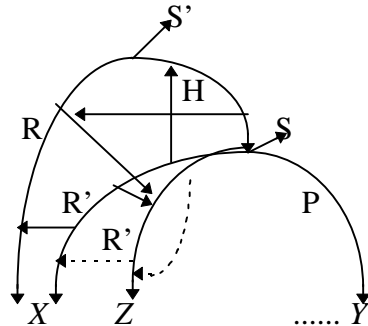
Here, R is an overlay R-sign, R' is a central R-sign, and X represents the "extracted" constituent. The arcs pointing to the symbols S and S' are labelling arcs (for the sake of familiarity, I use S as the category name for basic clauses and S' as that for overlay clauses). Note that the predecessor of the overlay arc could be embedded more deeply than shown in the diagram. Note also that I have not indicated coordinates and erasure pairs. The reason is that these depend on whether the predecessor of the overlay arc is replaced or not. If it is not replaced, it is erased by its foreign successor in accordance with the Successor Erase Law; in this case, it is necessarily a final arc, though not a surface arc. If the predecessor is replaced, it is erased by the replacer in accordance with the Replacer Erase Law, and is hence neither a final nor a surface arc. Note that

the replacer of the predecessor of an overlay arc is necessarily of the kind whose head must be a pronominal. This is so because a replacer has two sponsors by definition (and could not have more because of the Maximum Two Sponsor Law), one of which is necessarily the replacee, which again by definition is a neighbour of the replacer and can hence not be supported by it. Hence in order to escape the effect of the Pronominal Graft law, the replacer would have to have a co-sponsor which it supports, and this is impossible because of the Overlapping Arc Replacer Law, which forces the overlay arc to be the co-sponsor of the replacer. As a matter of fact, it is a standard assumption within RG/APG that so called **resumptive pronouns** in *wh*-constructions are nothing else than heads of arcs replacing predecessors of overlay arcs.<sup>42</sup> Johnson and Postal (1980, sect. 7.6.) impose various laws ensuring that overlay arcs do indeed appear in structures of the kind just illustrated. I will not review their discussion here, but merely note some of the consequences of the laws they propose. Most importantly, they ensure that overlay arcs can never be neighbours of central arcs, that they must arc-command their predecessors, and that they cannot have successors with non-overlay R-signs. Concerning the last point, they in fact require that the successor of an overlay arc have the same R-sign as its predecessor, but I suspect that this assumption is too restrictive. Recent work by Müller and Sternefeld (1993) within the GB-framework suggests that, in present terms, not only the central relations but also the overlay relations are ordered relative to each other (though not necessarily relative to the central relations) by the relational hierarchy, and that successors of overlay arcs may have overlay R-signs different from those of their predecessors as long as the successor is less oblique than the predecessor. I will not pursue the matter here, but it should be clear that whatever constraints on successors of overlay arcs turn out to be empirically justified will be easy to incorporate into the present framework. Also, constraints on the "distance" between overlay arcs and their predecessors are easy to impose. Altogether, the RG/APG view of overlay constructions is not very different from that of recent versions of Transformational Grammar. Perhaps the most significant difference between the two frameworks in this domain concerns the treatment of resumptive pronouns. Within GB and related approaches, both the link between an extracted constituent and its trace and that between an extracted constituent and a resumptive pronoun are indicated by the same mechanism, coindexing, whereas within APG there is a very clear difference between the two cases, because in the case of plain "extraction", the overlay arc erases the central arc, whereas in the case of copy (resumptive pronoun) constructions the central arc predecessor of the overlay arc is erased not by its successor but by the replacer whose head is the resumptive pronoun. At the same time, the similarity between the two cases is captured by the fact that in both the overlay arc is the successor of the central arc. Thus it seems that APG might be better equipped than GB-type approaches to account for both the similarities and the differences between plain and copy extraction. In particular, island constraints of the kind first investigated in Ross (1967) could potentially be formulated both in terms of the sponsor relation and in terms of the erase relation; the former would apply indifferently to both copy and non-copy extractions, while the latter would only apply to the non-copy cases. I suspect of course that at least some of the classical island constraints should be formulated as constraints on foreign erasure and will therefore not apply to copy extraction structures. It would also be interesting to try to develop the idea that certain cases of apparent plain extraction involve invisible resumptive

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<sup>42</sup> The syntax and semantics of resumptive pronouns is treated at considerable length, though still far from exhaustively, in Sells (1984). I am not aware of any more recent study of this phenomenon whose scope even approximates that of Sells' work.

94.

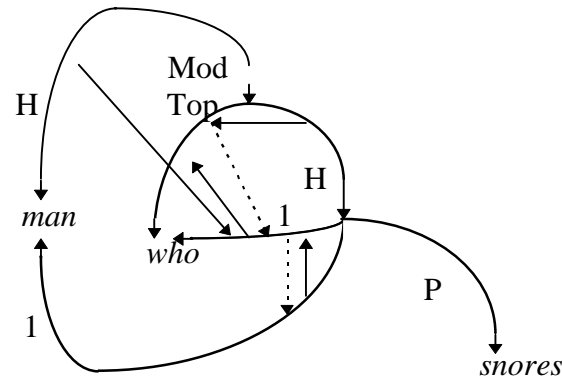


## 95. The Replacer Successor Law

The idea that a replacer could have an overlay successor can be exploited to further articulate the analysis of relative clauses which has been proposed in Frantz (1981). Frantz argues that relative clause constructions involve multiattachment of the relative head as both the head of the noun phrase and a constituent of the relative clause, and he also suggests that the arc representing the "downstairs" relation of the head nominal could be erased by a pronominal replacer, but he is not explicit about the way relative pronouns of the type found in English and many other languages arise. I propose that they are precisely heads of overlay successors of replacers of central arcs, so that a nominal which contains a relative clause of the *wh* type receives the partial analysis shown in the following example:<sup>43</sup>

60

96.

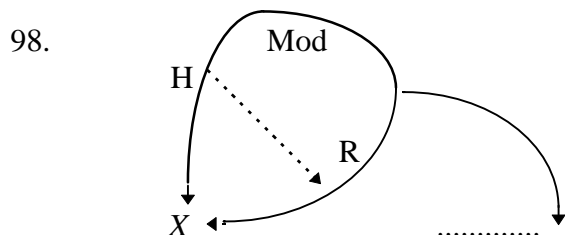


The diagram tentatively identifies the overlay relation of the relative pronoun with the Topic relation, following in this respect Bresnan and Mchombo (1987), but the essential point is not this choice but the assumption that relative clauses introduced by relative pronouns involve multiattachment of the head nominal which is resolved by replacing the lower arc of the multiattachment. Now many languages have relative clauses introduced not by a relative pronoun but by an invariant relative particle, either in addition to those with relative pronouns or as the only option. Bernese Swiss German is a language of this type in which restrictive relative clauses are introduced by an invariant particle *wo* (which is homonymous with the locative interrogative pronoun but used indifferently with relative heads of all cases, numbers, and genders) and contain either a gap or a resumptive pronoun in the position relativized. The gap strategy is used obligatorily when the subject is relativized and is also preferred with the direct object, but is available for indirect object relativization only for some speakers and not at all for more oblique functions.<sup>44</sup> The gap strategy is illustrated by the following example of direct object relativization:

97.    *s Gschänk won i gchouft ha*  
          the gift    Rel I bought have  
          "the gift which I have bought"

Relative constructions of this kind could be assigned a structure which is exactly like that given above for "wh-relatives" except that the replacer arc supporting the relative pronoun self erases. This would also be a conceivable analysis for other constructions which have been assumed to contain so called "empty operators" in GB terms (see for instance Browning (1987)). Alternatively, they might involve no replacer, the arc headed by the head nominal within the relative clause being erased by the H arc headed by the same element, as in the following diagram, where X represents the head noun and the dots represent the relative clause, and R is some central grammatical relation:

<sup>44</sup>The distribution of the two relativization strategies is an instance of a broader generalization uncovered by Keenan and Comrie (1977) according to which primary relativization strategies, i.e. those which, in a given language, apply to subjects must apply to a continuous segment of the relational hierarchy.



The relative marker is not shown in this diagram, but we may assume that it would be a Flag in a Flag-Marquee structure (these structures will be explained in section 2.6. below); however, this complication does not interact with the representation of the relative dependency, which is established by the H-R-multiattachment of  $X$ . The surface position of the head nominal  $X$  is determined by the fact that it is the R arc rather than the H arc which is erased. Incidentally, no law of APG prevents the lower arc in a non-local multiattachment from erasing the higher arc; if this happens in a structure of the kind just shown, the head nominal ends up as a surface constituent of the relative clause, and such "internally headed relative clauses" are indeed attested in many languages. The following example from Cole (1985: 49) illustrates the phenomenon in Imbabura Quechua (the element glossed Nl<sub>z</sub>r is a nominalizing verb suffix, very roughly a kind of past participle suffix, and the item glossed Val is a so called validator, an evidential clitic):

99.    *[wambra wagra-ta randi-shka] ali wagra-mi*  
          boy    cow-Acc buy-Nl<sub>z</sub>r    good cow-Val  
          "The cow which the boy bought is a good cow."

Given facts of this kind, it seems to be a virtue of the APG formalism that it makes available an analysis of them which differs only minimally from that of more ordinary (from a European point of view) relative constructions. In many languages which have relative clauses of the form "relative marker+clause containing a gap", there are also relative clauses of the form "relative marker+clause containing a resumptive pronoun". Again Bernese can serve as an example. In this language, the resumptive pronoun strategy can optionally be used for non-subject relativization and must be used to relativize on those functions for which the gap strategy is unavailable. An instance of the latter kind is given in the following example:

100.    *Lüt wo s schwäär isch, mit ne uszchoo*  
          people Rel it difficult is with them to-get-along  
          "People which are difficult to get along with"

Under present assumptions, the simplest analysis of such relative clauses is one where the resumptive pronoun is the head of a replacer which simply fails to have an overlay successor, although it could also be taken to be a replacer of a replacer having a self-erasing overlay successor. Of course, the latter option is only available if replacers can have replacers in their turn. Nothing said so far prevents this, but of course the theory would be more restrictive if replacers of replacers were banned, and such a restriction would also make an interesting empirical prediction, namely that resumptive pronouns in relative clauses should only be possible in the absence of a relative pronoun, because under present assumptions relative pronouns themselves already are replacers. As far as I can tell, the prediction is largely but perhaps not totally correct. Those languages which I am aware of which productively use resumptive pronouns in relative clauses indeed have relative clauses introduced by invariant particles rather than relative

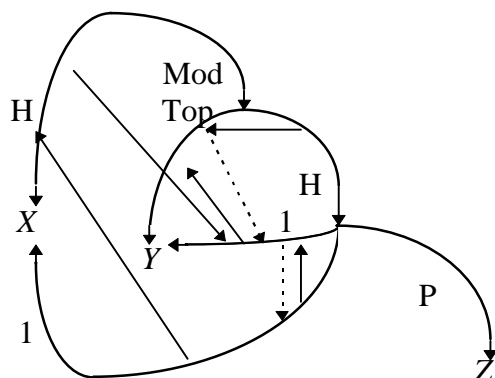


pronouns,<sup>45</sup> but Ross (1986: 260-261) claims that there is a dialect of English which allows resumptive pronouns in relative clauses and gives the following example which involves a relative pronoun binding a resumptive pronoun:

101. *the only kind of car **which** I can never seem to get **its** carburetor adjusted right is them Stanley Steamers*

While I would prefer to know precisely what dialect of English such examples represent and how typical of that dialect they are, it would not be safe to simply disregard them. Hence, I am forced to conclude that the correlation between lack of relative pronouns and presence of resumptive pronouns is not absolute and should not be enforced by law. Before concluding this brief discussion of the structure of relative clauses, I would like to point out that there is a certain similarity between my adaptation of Frantz's analysis of relative clauses and that proposed in Vergnaud (1985, especially ch. 5) within a transformational framework. Both analyses take the head nominal to be a constituent of the relative clause, but the crucial difference between the two proposals is that I take the head nominal to head an unsponsored arc in both the relative clause and the NP, whereas Vergnaud takes it to be raised first into the COMP of the relative clause and then into the head position of the NP, the latter being empty at D-structure. The present analysis is in part motivated by the assumption that only heads of unsponsored arcs contribute to semantic interpretation. In addition, a literal translation of Vergnaud's proposal would contradict the assumption that overlay arcs cannot have non-overlay successors. However, it is easy to imagine a partial adaptation of Vergnaud's analysis which does not involve a non overlay successor of an overlay arc, though it does involve a non-nominal successor of a nominal arc, which is perhaps also not a completely innocuous assumption. In this analysis the higher H arc would be an immigrant successor of a central arc within the relative clause and the relative pronoun would head an overlay successor of the replacer of the predecessor of the H arc, i.e. it would involve the structure shown in the following partial Pair Network:

102.



While such an analysis is presumably not adequate for ordinary restrictive relatives for the semantic reasons already hinted at, it might be considered for "pseudo relatives" as discussed in Declerck (1981) and could be seen in part as an APG adaptation of the analysis proposed there. Before definitely adopting it, several questions would have to be settled, but the possibility might be worth pursuing, though I will not attempt this here. I hope to have shown in this section that the RG framework is not inconsistent

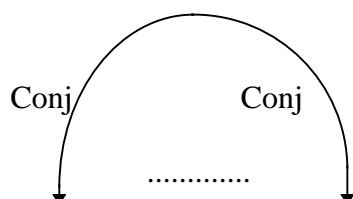
<sup>45</sup>Examples include Modern Irish (McCloskey (1990)), Modern Hebrew (Borer (1984)), Bernese, and many languages in the sample of Keenan and Comrie (1977).

with the insights into wh-movement phenomena which have been gained by researchers working within the framework of Transformational Grammar, and that the specific concepts of APG open up interesting perspectives for further developing these insights.

## 2. 5. Coordinate structures

Coordinate structures can be characterized in RG/APG terms as constructions involving arcs with the R-sign Conj, which appear exclusively in the following configuration:

103.



I take the two essential properties of Conj arcs to be that they can only appear as sisters of at least one other Conj arc (recall the HPSG Proper Coordination Principle) and that they cannot be successors of other arcs. This is guaranteed by the following two laws:

### 104. The Proper Coordination Law

If A is a Conj arc, there is a neighbouring arc B distinct from A which is also a Conj arc and there is no neighbouring arc C distinct from A which is not a Conj arc

### 105. The No Conj Arc Successor Law

If A is a Conj arc, A is not the successor of any arc

I now want to briefly address the question of the conditions under which Conj arcs or arcs supported by Conj arcs can be predecessors or replacees. The basic generalization to be captured is that elements of coordinate structures, in our terms constituents whose roots are heads of Conj arcs, cannot undergo plain (non-copy) extraction, and that plain extraction out of elements of coordinate structures must proceed "across the board" in the sense of Williams (1978), i.e. each conjunct must have a constituent extracted from it. These restrictions are imposed by the following two laws:

### 106. The No Conjunct Extraction Law

No Conj arc has a foreign eraser

### 107. The Across-The-Board Extraction Law

If an arc A contained in some conjunct W of a coordinate structure X is erased by an arc B outside of X, each conjunct Y in X contains an arc C such that C overlaps with A and B

Three points in connection with these laws should be clarified before we proceed. First, the No Conjunct Extraction Law correctly forbids plain extraction of conjuncts, no matter whether this proceeds across the board or not, but it does not ban copy extraction of conjuncts, and this is correct in view of examples like the following one from Bernese:

108. *weli Frou meinsch dass sii u dr Hans guet würde zämepasse?*  
 Which woman think-you that she and the Hans well would suit-each-other  
 "Which woman do you think that she and Hans would suit each other well?"

Second, the Across-The-Board Extraction Law allows both copy extraction which does not apply across the board and mixed across the board extraction, i.e. cases where some of the extraction sites are empty and others are occupied by resumptive pronouns, and again such structures are attested in languages with resumptive pronouns, as the following two Bernese examples show:

109. *weli Frou hesch gseit dass ii u iiri Tochter zäme grad hundert Joor aut si?*  
 which woman have-you said that I and her daughter together just a hundred years old are  
 "Of which woman did you say that I and her daughter together are exactly a hundred years old?"
110. *weles Buech hesch vo A bis Z gläse u nächär e Rezension drvo gschribe?*  
 Which book have you from A to Z read and then a review thereof written  
 "Which book have you read from cover to cover and then written a review of?"

Third, the laws as formulated apply not only to extractions of the wh-type, but to all constructions involving foreign erasure under the specified conditions. In particular, they apply to relative clauses of the Bernese type, i.e. relative clauses without overt relative pronouns, whether these involve an empty operator or not, as the following example illustrates:

111. *s Buech won i vo A bis Z gläse u nächär e Rezension drvoo gschribe ha*  
 the book Rel I from A to Z read and then a review thereof written have  
 "The book which I have read from cover to cover and then written a review of"

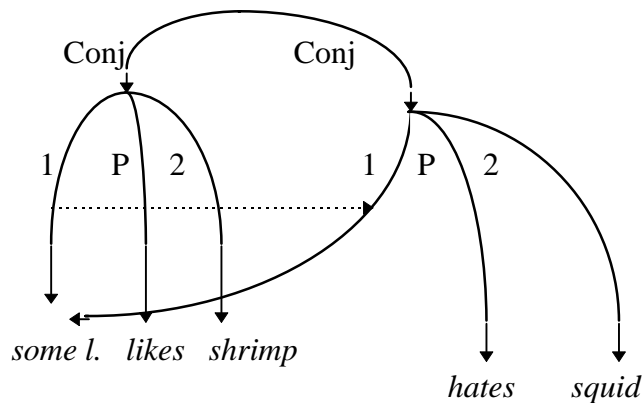
I want to conclude this admittedly selective discussion of the syntax of coordination with a remark on the analysis of apparent cases of incomplete constituent coordination such as the following:

112. *some linguist likes shrimp but hates squid*

Since the predicate and its arguments and modifiers are all immediate constituents of the clause under standard RG/APG assumptions, examples of this kind would seem to involve some kind of "deletion" or ellipsis. As is well known, deletion analyses of examples like the one just given lead to semantic problems, because they predict that there should be a reading according to which some linguist likes shrimp and some potentially distinct linguist hates squid, whereas the only available reading is one under which one and the same linguist has this particular combination of tastes, but the APG formalism actually makes available an account of ellipsis in coordinate structures which is not susceptible to this kind of criticism. The idea is that elements of coordinate

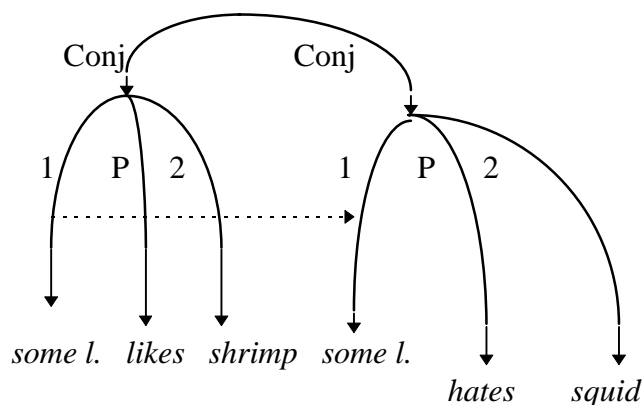
structures can have final stratum constituents in common as long as all but one of the arcs supporting the shared constituent are erased. In the example just given, this would mean that two clauses are conjoined and that the same occurrence of the NP *John* is a constituent of both, as shown in the following diagram:

113.



The key aspect of this structure is that we have the very same object (not merely two isomorphic objects) as final subject of both clauses, whereas an APG adaptation of a traditional deletion analysis would involve two different occurrences of the NP *John*, as shown in the following diagram:

114.



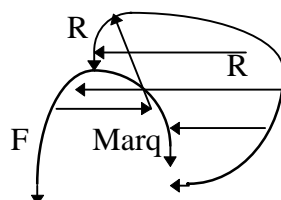
Assuming that semantic interpretation can be made sensitive to this difference, there is no need to posit additional constituent structure involving some analogue of a VP, although this would present no particularly daunting problems.

## 2. 6. The structure of non-clausal constituents

As has been mentioned already, the analysis of non-clausal constituents has received very little attention within RG and only slightly more in APG. Once again, it must be stressed that this does not show a fundamental weakness of these theories but is simply a result of research priorities which need not forever stay the same. However, since the present study is almost exclusively concerned with clause-level syntax, it is not my job here to expand the scope of the framework in the direction of non-clausal syntax, but I nevertheless want to briefly discuss two issues in this domain which interact crucially with the analysis of NP-movement phenomena, namely the structure of prepositional phrases and that of possessive constructions.

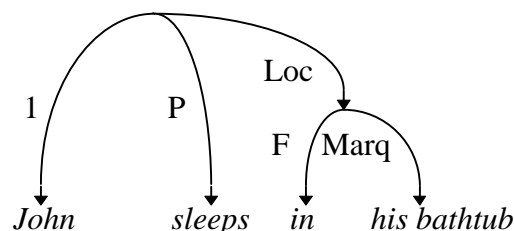
The APG analysis of prepositional phrases crucially involves the R-signs F (Flag) and Marq (Marquee). It is assumed that PPs have a binary branching structure in which the preposition heads an F arc and the object of the preposition a Marq arc. In Johnson and Postal (1980: ch. 13) it is assumed that PPs are always "derived" constructions in which the Marq arc is an immigrant whose predecessor is a neighbour of the arc supporting the PP and the F arc is the head of a graft arc. This is shown in the following diagram:

115.



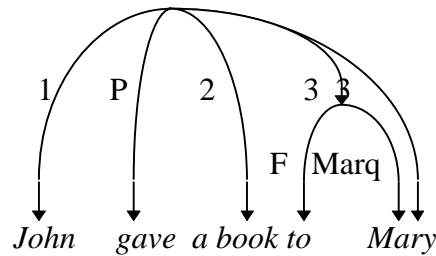
In this structure, the R arc which is the predecessor of the Marq arc is replaced by the R arc which supports the PP. Arcs like the Marq arc in the structure above, i.e. immigrant arcs whose local sponsor is a graft sponsored by the foreign predecessor of the immigrant, are called **pioneers** and the graft locally sponsoring a pioneer is called its **companion**. A typical instantiation of this kind of structure is that where the root node is a clausal node and R is some central grammatical relation, most typically 3 (indirect object) or some oblique relation. The assumption that F arcs and Marq arcs are only licit as grafts and immigrants, respectively, and the assumptions about semantic interpretation which I will outline in the next section together entail that PP structures are irrelevant to semantic interpretation. While this is certainly correct for purely grammatical uses of prepositions, i.e. those cases where the choice of preposition is not free but determined by a neighbouring predicate, it leads to problems in those constructions where more than one preposition is possible and the choice of one rather than the other seems to be semantically significant. In view of this, I will simply assume that there are no PN-Laws which force F and Marq arcs to have sponsors of particular kinds, so that both "base generated" and "derived" PP structures are legal. The former case is illustrated by the following partial structure for the English sentence *John sleeps in his bathtub*:

116.



The structure associated with "case marking" adpositions is illustrated by the following partial representation of *John gave a book to Mary*:

117.



As the diagram shows, the nominal "Mary" heads both an unsponsored 3 arc whose tail is the clause node and a Marq arc within the PP (the sponsor relations are as in the abstract structure given at the beginning of this section). Hence, *Mary* is the initial indirect object of the clause and the final Marquee within the PP, while the PP *to Mary* is the final indirect object of the clause. We assume that the semantic relation of *Mary* to the predicate *give* is determined by the fact that it is the initial 3 of the clause and that there is a rule of English Grammar which requires 3 arcs to have replacers supporting a Marq arc headed by the preposition *to*. This kind of analysis is plausible whenever there is an independently motivated grammatical relation which the preposition can be seen as marking, but extending it to all kinds of PPs would make it necessary to inflate the inventory of grammatical relations solely to account for what one would intuitively take to be the meanings of individual adpositions.<sup>46</sup>

Given the decision to abandon the assumption that Flag-Marquee structures cannot be basic, the analysis of possessor-head structures is fully parallel to that of the former, the H arc corresponding to the F arc and the Poss arc corresponding to the Marq arc. Cases of NPs motivating an analysis in terms of non-basic possessor-head structures, i.e. ones where the Poss arc is an immigrant and the H arc a graft, are perhaps less familiar than those of PPs for which the corresponding Flag-Marquee structure seems appropriate, but they exist nevertheless. In many languages, reflexive nominals are of the form N+PRO, where PRO is a personal pronoun and N is a noun, usually one meaning "self", "head", or something similar, and PRO is treated morphosyntactically as the possessor of N. In such structures, the head noun does not have its ordinary meaning, but simply signals that the pronoun is to be interpreted as bound by a local antecedent, as in the following Modern Greek example from Joseph and Philippaki-Warburton (1987: 79) shows:

118. *o Janis aγapá ton eafτό tu*  
 the Janis loves the-Acc self-Acc his  
 "Janis loves himself."

<sup>46</sup>Once the semantic motivation for distinguishing various oblique relations disappears, it becomes possible to envisage a revision of RG/APG in which there is only one oblique grammatical relation. Farrell (1994) in fact proposes a revised version of RG in which individual oblique relations are abandoned and the primitive *chômeur* relation is replaced by a definition of *chômeur* arcs as oblique arcs with term arc local predecessors. Farrell argues that there are no term arc successors of oblique arcs and that the phenomena which have been taken to involve such arcs can be analysed differently. He systematically allows for alternative alignments of semantic roles with initial grammatical relations and considerably reduces the number of constructions analysed as involving revaluations, but at the same time he also argues forcefully that there are constructions best analysed in terms of elements bearing different grammatical relations in different strata, though there are fewer of them than assumed in traditional RG/APG. I have only recently become aware of Farrell's work and have not had occasion to investigate the possibility of a revision of APG embodying his ideas, but as far as I can see nothing I propose in the present study is fundamentally incompatible with his views.

Perhaps even more surprisingly, such so called camouflage structures are also used in some languages to mark oblique grammatical relations, in the same way as adpositional constructions are in others. This is the case for instance in K'ekchi Mayan, where final indirect objects and obliques are camouflage structures headed by so-called "relational nouns", as the following example from Berinstein (1985: 160) illustrates:

119. *junelec na-Ø-a-q'ue cu-e li tumin*  
 always Tns-B3-A2-give A1-Dat the money  
 "You always give money to me."

The item glossed B3 is the third person agreement morpheme of the B (absolutive) series, while A1 and A2 are first person and second person agreement morphemes of the A (ergative/genitive) series (like other Mayan languages, Tzotzil in particular, K'ekchi has an ergative agreement system). Of course, some relational nouns will be semantically contentful and hence head unsponsored arcs, but in the case of the dative relational noun in the above example, it seems plausible to assume a camouflage structure which simply serves to mark the indirect object.

## 2. 7. Some semantic issues

As far as I know, no one has proposed a specific system of semantic representation and interpretation for RG or APG, and none will be proposed here. I will, however, briefly discuss how I think the interface between syntactic and semantic structure should be conceived in these theories. In RG/APG work, it is generally assumed either implicitly or explicitly that all and only the initial arcs in a structure are relevant for semantic interpretation. Within the present system, this assumption has to be modified somewhat because we allow unsponsored arcs which are not initial arcs but whose heads nevertheless represent semantically relevant constituents. Taking this into account, the intuition behind the traditional view can be expressed in the following two statements:

120. A constituent X which is an immediate constituent of Y is taken into account in computing the semantic value of Y if and only if X heads an unsponsored arc in Y
121. If X is the head of a P arc A, then Y is a semantic argument of X only if Y is the head of a core arc B which is present in the first stratum of the P-sector of A

The first of these statements picks out those constituents which are at all relevant for semantic interpretation. The second statement ensures that only nominals which start their career in the same stratum as a predicate can be arguments of that predicate. Note that it does not exclude the possibility that a predicate may assign a semantic role to an element whose first stratum precedes its own. This possibility is probably instantiated in the case of auxiliaries which assign a semantic role to their subject. Auxiliaries<sup>47</sup> are

<sup>47</sup>In earlier RG/APG work, auxiliaries were generally taken to be raising to subject verbs (if they were not altogether ignored). Under the monoclausal analysis of clause union constructions adopted here, the characterization of auxiliaries given in the text clearly represents the simplest reasonable possibility, and hence auxiliaries in the pretheoretical sense should be classified as auxiliaries in this technical sense whenever possible, but it is obviously to be expected that this is not always possible.

plausibly analyzed in the present framework as heads of noninitial P arcs which do not initialize any nominal (this is analogous to the HPSG characterization to be given in the next chapter). Following Gerdts (1988a), I assume that predicates which do not initialize any nominal may nevertheless assign a semantic role to one of those which they inherit. As a concrete example of this, consider the following Italian example:

122.     *ti voglio     aiutare*  
           you want-1.Sg. help  
           "I want to help you."

Following Davies and Rosen (1988), La Fauci (1988), and other recent RG work, I assume that the auxiliary *volere* in this construction heads a P arc which enters in the second stratum of the clause and forces the initial predicate *aiutare*, the main verb, to assume some other grammatical relation, presumably the chômeur relation, to avoid a violation of the Stratal Uniqueness Law. Since *volere* clearly bears a semantic relation not only to the proposition expressed by the elements present in the first stratum but also to the subject among the latter, I propose to analyse auxiliaries in general as modifiers of the predicate of the preceding stratum, an analysis which supports both neutral and subject oriented interpretations.

What has been said so far ensures that only heads of unsponsored arcs are relevant for semantic interpretation and guarantees that a predicate can only take elements which are present in its first stratum as arguments. However, I have said nothing on how the semantic argument positions of a particular predicate are aligned with elements bearing specific grammatical relations. With respect to this problem, I assume that for each predicate a mapping from grammatical relations of potential arguments to semantic argument positions of that predicate is specified, and that this mapping may only take into account the first grammatical relation which a potential argument of a predicate bears in the latter's P-sector. I thus follow Rosen (1984), Farrell (1994), and other authors, which argue against the Universal Alignment Hypothesis of Perlmutter and Postal (1984), which says that the alignment of semantic roles with the initial relation of the arguments which bear them can be predicted on the basis of the content of the former and need not be specified with reference to individual predicates. The position adopted here obviously does not entail that there are no semantically motivated constraints in this area, it only denies that the latter are sufficient to unambiguously determine the alignment of semantic roles and initial (or P-initial) grammatical relations.

To conclude this brief discussion, I want to say something about the interpretation of multiattachments and the representation of anaphoric connections in RG and APG, since this is an issue which bears directly on the analysis of passive and raising construction. Essentially, I assume that if a constituent X is multiattached, i.e. its root is the head of two or more distinct arcs, then only those of the arcs which it heads which are unsponsored are relevant for its semantic interpretation. Thus if a multiattached element heads just one unsponsored arc (in which case the others must be R-successors of the latter), it is treated semantically just as if it headed only the unsponsored arc. This means in particular that subjects of passive clauses are interpreted on the basis of the direct object relation they bear, and raised elements are

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An example of an auxiliary which apparently has to be analysed as a raising verb even under present assumptions will be presented in section 3.3. in the next chapter.



interpreted as constituents of the lower clause. If an element heads two or more unsponsored arcs, as may happen in (semantically) genuine reflexive constructions and in equi constructions, then its semantic value is stored, a variable is inserted in every semantic argument position corresponding to the grammatical relation represented by one of the arcs, and the semantic value is quantified in at the lowest node which dominates all arcs of the multiattachment. For instance, in an equi sentence like *John wants to feed a manati* the NP *John* heads both an unsponsored 1 arc in the complement clause and an unsponsored 1 arc in the main clause. Using IL as the translation language, this sentence receives the schematic translation  $\text{John}'\lambda x[\text{want}'(\text{feed-a-manati}'(x))(x)]$ . As a matter of fact, it is possible to generalize the interpretation procedure just outlined to anaphoric relations which do not involve multiattachment of whole constituents. For instance, one could introduce **referential indices** as a special sort of terminal nodes and attach an L arc whose head is a referential index to the root of every constituent. The heads of two or more distinct arcs would then be anaphorically linked exactly if they had the same referential index, and this would trivially be the case whenever they overlap. Sketchy as these remarks are, I think they suffice to make it plausible to assume that a semantics for RG/APG could be developed which would not be too different from those that have been proposed in connection with other syntactic approaches.

## Chapter 3: Passive Constructions

### 3. 1. Some descriptive data

In Perlmutter and Postal (1983a), Passive clauses are characterized as clauses with two subsequent strata such that the first of them contains a subject and a direct object and the direct object of the first is the subject of the latter and the earlier subject is either suppressed (in a sense to be made precise) or assumes some oblique relation to avoid a violation of the Stratal Uniqueness Law. While this characterization obviously presupposes a multistratal view of syntactic representation, the intuition behind it can be used as the basis for a theory-neutral heuristic criterion which picks out at least the prototypical instances of passive and is applicable in the context of any set of syntactic assumptions which allows one to identify nominals as bearing grammatical relations such as subject or direct object in a clause. Assuming further that it is possible to identify the unmarked morphosyntactic realization of the semantic roles assigned by a predicate to its arguments, a passive clause can then be identified as a clause in which the nominal with the semantic role which would canonically be realized by the direct object is the subject and the nominal with the semantic role which would canonically be realized by the subject has some oblique grammatical relation or is simply missing syntactically. This new characterization allows the syntactic representation of a passive to have a substructure in common with that of the corresponding active clause, as is required by Perlmutter and Postal's characterization, but it does not require this and is therefore also compatible with theories which endorse a lexical view of passive. Passive constructions in the relatively theory-neutral sense just outlined are widespread among the languages of the world, although not every language has them.<sup>48</sup> Apart from the presence or absence of the construction, parameters of variation include the verbal morphology associated with passive, the marking of the agent phrase, i.e. the nominal whose semantic role would be expressed by the subject in an active construction, and the degree to which passive interacts with other relation-changing processes.<sup>49</sup> Before turning to the analytical problems posed by passive constructions, I want to briefly illustrate some of this cross linguistic variation. As far as the realization of the demoted subject is concerned, the first point to note is that, as pointed out by Keenan (1985), syntactic realization of the agent phrase is not obligatory in any language, and there are even languages where it is impossible, for instance Classical Arabic. However, even when there is no agent phrase, the existence of an entity bearing the semantic role of the active subject is entailed. This is a crucial difference between agentless passives and anticausative constructions like *the ice melted* in English, which do not entail the existence of an agent. In those languages which allow agent phrases, these usually behave like oblique nominals, that is, they are marked with adpositions, camouflage structures, or oblique cases, appear in positions where other obliques also appear, and fail to trigger predicate agreement, and they are in general syntactically relatively inert, i.e. they do not participate in grammatical processes restricted to terms. This typical situation is illustrated by the following Italian example:

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<sup>48</sup>Good cross-linguistic surveys of passive constructions can be found in Siewierska (1984) and Keenan (1985).

<sup>49</sup>The term "agent phrase" is convenient but slightly inaccurate because while subjects of actives with corresponding passives are typically agents, they can also have other semantic roles.

123. *Berlusconi è stato criticato dalla stampa*  
 Berlusconi is been criticised from-the press  
 "Berlusconi has been criticized by the press."

There are also languages in which agent phrases are marked like subjects, but nevertheless share the relative morphosyntactic inertness of obliques. Such is the case of the Quechua Languages, where agent phrases appear in nominative (unmarked) case, like subjects, as illustrated by the following example from Imbabura Quechua (Cole (1985: 133)):

124. *alku-ka Marya riku-shka-mi ka-rka*  
 dog-Top María see-Past-Val be-past 3.Sg.  
 "The Dog was seen by María."

Although they look like subjects in these languages, agent phrases do not trigger verb agreement, cannot be raised or controlled in equi constructions, and quite generally behave unlike subjects or direct and indirect objects. Turning to the verbal morphology associated with passives, again there seem to be two main types.<sup>50</sup> Many languages have periphrastic passives, that is, passives in which the main predicate appears in some non-finite form, either participial or fully nominalized, and the tensed verb is an auxiliary, often one meaning something like "be", "get" "become", or "come" (cf. Keenan (1985: 2.1.2)). This situation is found in many Western European languages, for instance German, as is shown in the following example:

125. *Das Bierfass wurde von Heinrich angestochen*  
 the beer-barrel became from H. tapped  
 "The beer-barrel was tapped by Heinrich."

There are also languages like Vietnamese and other languages of Southeast Asia which have what appear to be periphrastic passives but lack verbal morphology which would justify speaking of finite or participial verb forms. The following Vietnamese example illustrating this kind of passive is taken from Keenan (1985: 260):

126. *Quang bi (Bao) ghet*  
 Quang suffer Bao detest  
 "Quang is detested (by Bao)."

Keenan notes that in languages with such "verb serializing" passives, there is often a choice between several passive auxiliaries. This happens also in inflecting languages with periphrastic passives. For instance, Italian has two passive auxiliaries *essere* "be" and *venire* "come", the choice between the two correlating with an aspectual difference whose exact nature is not relevant here. An important point in connection with languages with periphrastic passives is that many of them do not have passive morphology in the strict sense. In the case of languages of the Vietnamese type, this is obvious because these have practically no morphology of any kind, and hence

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<sup>50</sup> From now on, I will occasionally use the term morphology in a very broad sense to include both morphology proper and what are traditionally called periphrastic constructions. This is purely for expository convenience and does not imply a special theoretical status for the latter or for morphology in this broad sense.

obviously no passive verbal morphology, but it also holds true for inflecting languages like German, English, or Italian, for instance. In all of these, the verbs used as passive auxiliaries also have uses outside passive constructions and show the same morphology in both contexts, and the main verbs in passives take the form of past participles, the same form which appears in the active voice in the compound past tenses. When I say the same verbform, this is to be taken quite literally. In particular, not only regular verbs but also all irregular ones take the very same form in both passives and active periphrastic past tenses, so it is very unlikely that there are two different morphological rules, one forming passive verbs and the other past participles, because this would mean that English has two distinct morphological rules whose results for any given input are necessarily indistinguishable. As a matter of fact, traditional descriptions of English invariably state that the form of the main verb in passives simply is the past participle. In contrast to languages with periphrastic passives, languages with what Keenan calls strict morphological passives obviously have passive morphology, in the sense of morphology which, at least relative to a given stem, unambiguously marks a verb form as passive. The latter qualification is necessary because of phenomena like the deponent verbs of Latin, verbs which take passive morphology but have active, or at least not canonically passive, syntax and semantics. Because of the deponent verbs, it is not possible to say that all and only the verbs with passive morphology appear in passive clauses in languages like Latin, but at least the equation holds for the non-deponent verbs, whereas in English and similar languages there is no class of verbs with a morphological form which by itself is unambiguously passive. Strict morphological passives are found in the older Indo-European languages such as Latin, Ancient Greek, and Sanscrit, but also in Modern Greek and in many languages outside the Indo-European family, for instance in Tzotzil, a Mayan Language of southern Mexico, as illustrated by the following example from Aissen (1987: 63) (the passive morpheme is in boldface):

127. *Ja7 la ch-maj-at y-u7un maxtroetik...tay yan x-chi7iltak 7une*  
 ! cl icp-hit-psv A3-by teachers those other A3-companions cls  
 "Those other friends of his were beaten by the teachers."

Incidentally, the agent phrase in this example again illustrates the use of camouflage structures to mark non-nuclear grammatical relations. There are also languages with both periphrastic and strict morphological passives. For instance Welsh, which has a periphrastic personal passive and a strict morphological impersonal passive. The former is interesting because the main predicate appears as a so-called verbal noun prefixed by a genitive clitic agreeing with the subject, as shown in the following example from Jones and Thomas (1977: 268):

128. *mi gafodd y bachgen ei daro gan Mair*  
 PT got the boy his hit LOC Mair  
 "The boy was hit by Mair."

The data introduced so far has consisted of examples of what could be called canonical passives, i.e. passives which correspond to active transitive clauses and are hence immediately identified by the heuristic criterion outlined at the beginning of this section. I now want to illustrate some structures which are classified as passives under at least some analyses although they do not correspond to active transitive clauses, or at least not as obviously as the canonical passives. Perhaps the most transparent kind

of such non-canonical passives are **reflexive passives** of the kind found in many Romance languages. Reflexive passives are simply passives which have the form of semantically reflexive clauses in the language under consideration<sup>51</sup>. Across languages, reflexive passives seem to disallow agent phrases even more commonly than ordinary passives, a fact which tends to obscure their existence, but as in other passives the existence of an entity playing the semantic role associated with the subject in the active is entailed in reflexive passives, which distinguishes them from reflexive unaccusatives and other non-passive "false reflexive" constructions. As an example of a reflexive passive construction, consider the following Italian example, which is taken from Rosen (1988: 99):

129. *Gli avanzi si buttano via*  
 the leftovers Refl throw away  
 "The leftovers are thrown away."

As far as verbal morphology is concerned, reflexive passives without agent phrases are indistinguishable from (semantically) genuine reflexive clauses like the following, though in contrast to the latter they only occur with third person subjects:<sup>52</sup>

130. *Gianni si guarda nello specchio*  
 Gianni REFL sees in-the mirror  
 "Gianni is looking at himself in the mirror"

In addition to reflexive passives, many languages have other "false" reflexive constructions, i.e. structures with reflexive morphosyntax but non-reflexive semantics, a point to which I will return. Another kind of non-canonical passive is constituted by **impersonal passives**. Pretheoretically, these can be characterized as constructions in which the subject is realized by an agent phrase or is syntactically missing but semantically present, as in personal passives, but where no direct object is promoted to subject, so that they end up with no overt subject or else a semantically empty dummy subject (hence the name). There are two cases to distinguish: impersonal passives corresponding to transitive clauses and impersonal passives corresponding to intransitive clauses. Many languages only allow the former, for instance German, as shown by the following pair of examples:

131. *hier wird hart gearbeitet*  
 here becomes worked  
 "People work hard here."

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<sup>51</sup> This characterization does not exclude the possibility that a language may have more than one kind of reflexive morphology and only one of these is used in passive constructions (in fact Italian is a case of exactly this sort, as we will see below). However, if a particular kind of morphology used in passive clauses in some language has **no** genuine reflexive use in the same language, the passives containing it are not reflexive passives in the sense intended here, even if the morphology in question is diachronically derived from genuine reflexive morphology.

<sup>52</sup> The full reflexive clitic paradigm, arranged in the usual order, is *mi, ti, si, ci, vi, si*. The first and second person forms are indistinguishable from the non-reflexive object clitics and, as can be seen, the form of the third person, which is thus the only unambiguously reflexive form, is identical in the singular and the plural. For a detailed presentation of both the syntactic and the morphophonological aspects of the pronominal system of Italian, cf. Renzi (ed.) (1988: Part IV).

132. \**hier wird verschiedene Analysen des Passivs diskutiert*  
 here becomes various analyses of-the passive discussed  
 "Various analyses of the passive are discussed here."

The second example would be grammatical with plural agreement on the verb, but this would be a personal passive with the NP *verschiedene Analysen des Passivs* as subject. There are in fact languages which allow impersonal passives corresponding to transitive active clauses, for instance Welsh, as shown by the following example from Comrie (1977: 54):

133. *lladdwyd dyn (gan ddraig)*  
 kill-Pass man by dragon  
 "A man was killed (by a dragon)."

Impersonal passives must not be confused with non-passive impersonal constructions of the kind instantiated by English examples like *There may come a time when all of what I'm writing now will seem ridiculous*. The latter are like impersonal passives insofar as they involve a displacement of the subject without concomitant promotion of an object, but in many languages they are clearly distinguished from passives by the fact that they involve neither special verbal morphology nor a special marking of the displaced subject. As we will see in section 3.4. below, there probably are a few languages in which "passive" morphology is indeed extended to non-passive impersonal constructions, but if there were no distinction between the two constructions there could be only this latter type of language, which is clearly not true. The next type of non-canonical passive I want to discuss is again personal, i.e. it has a semantically non-empty subject, but while this subject corresponds to a non-subject in the corresponding active clause, it does not correspond to a direct object (nor even to another argument of the main verb) but rather to an NP contained within a PP. This construction, usually called "pseudo-passive" is crosslinguistically rare but is attested in English and in Norwegian (cf. e.g. Lødrup (1991). The following English example from Perlmutter and Postal (1984: 101) may serve to illustrate it:

134. *this hall has been lectured in by three Nobel laureates*

The last type of passive construction, called **generalized passive** in Postal (1986), is somewhat like the pseudo-passive in that it involves the promotion of a nominal which is neither a subject nor a direct object, but is unlike the latter in that the adposition marking the nominals function "before" passivization is not stranded but simply disappears. I know of only one language where this kind of passive appears to be attested, namely Imbabura Quechua. In this language, sentences involving passivized indirect objects and even instrumentals are apparently grammatical for at least some speakers, as shown in the following pair of examples from Jake (1985: 66):<sup>53</sup>

<sup>53</sup> The qualification is necessary because Cole (1985) explicitly states that passivization is restricted to direct objects in Imbabura Quechua. Since I have no reason to suspect either Cole or Jake of falsifying data (Jake's description is available in print for ten years now and has not, as far as I know, been challenged with respect to the constructions I am interested in), I assume that Jake's data represent a variety of the language which is, in certain respects, more liberal than others. The same qualification applies to the raising constructions involving non-subjects which will be discussed in the next chapter.

135. *ñuca rucu-man micuy-ta cara-rca-ni*  
 I old-dat food-Acc serve-Past-1.Sg  
 "I served food to the old man."
136. *rucu-ca micuy-ta (ñuca) cara-shca ca-rca*  
 old-Top food-Acc I serve-Pas be-Past  
 "The old man was served food by me."

The item glossed Pas in the second example is a kind of past participle morpheme which also appears in active periphrastic past forms, hence what we see here is a periphrastic passive of the type familiar from Romance and Germanic languages. One piece of evidence which indicates that the nominal meaning "old man" is indeed the subject of the passive clause is that the active subject (which may be pro-dropped) ceases to determine verb agreement. While this would also be consistent with an impersonal passive analysis, Jake provides additional data which shows that the personal passive analysis is correct. For instance, the verb morphology of adverbial clauses in Imbabura and other Quechua languages indicates whether the subject of the adverbial clause is coreferent with the subject of the superordinate clause or not, and if an adverbial clause is embedded in a passive clause and the unexpressed subject of the former is coreferent with the presumed subject of the latter under the personal passive analysis, the switch-reference morphology of the adverbial clause does in fact indicate subject-subject coreference, as shown in the following example from Jake (1985: 67):<sup>54</sup>

137. *can-ga<sub>i</sub> wawa cuintu-ta villa-shca-chu ca-rca-ngui (can<sub>i</sub>) shamu-shpa*  
 you-Top child story-Acc tell-Pas-Q be-Past-2.Sg you come-Cor  
 "Were you told the story by the child when you came?"

Crucially, it appears that passives whose subjects correspond to indirect objects and instruments in Imbabura Quechua are not derived indirectly via some direct object creating rule analogous to Dative Shift in English (although the variety of Imbabura Quechua described by Jake does have such a rule), because Jake is able to show that the original direct object retains not only the marking of a direct object, which would be expected because *chômeurs* are quite generally marked like the corresponding terms in the Quechua languages, but also the relevant syntactic properties, for instance the ability to be raised, which is a characteristic of terms (and some obliques) but not of *chômeurs* in this language. In this respect, passivization of constituents other than direct objects in Imbabura Quechua crucially differ from instances of apparent passivization of indirect objects and obliques in other languages, which can often be shown to represent combinations of rules "creating" direct objects with ordinary (non-generalized) passives, or are at any rate consistent with such an analysis.<sup>55</sup>

In the cases considered so far, actives and corresponding passives are truth conditionally synonymous (of course this does not preclude the possibility that actives and passives differ with respect to topic-comment structure or quantifier scope and binding possibilities). However, there are also cases in which actives and

<sup>54</sup> In Imbabura Quechua, there is also a kind of complement clause with switch-reference morphology, but this has no counterpart in non-Ecuadorian Quechua, as far as I know.

<sup>55</sup> A classic description of such an object-creating rule and its interaction with passive and other rules can be found in Chung (1976).

corresponding passives are semantically related but not truth-conditionally equivalent. An example for this kind of phenomenon is provided by the dialect of Marathi, an Indo-Aryan language, which is analysed in Rosen and Wali (1989). In this dialect there is, in addition to the regular personal passive, an impersonal passive with a modal meaning. This is illustrated in the following set of examples from Rosen and Wali (1989: exx. 1.a-c). The first example illustrates the active construction, the second the ordinary passive, and the third the modal passive, which Rosen and Wahli call the capability passive:

138. *Mini-ni Ravi-laa pakad-la*  
Mini-Erg Ravi-Dat catch-Past  
"Mini caught Ravi."
  
139. *Mini-kadun Ravi-laa pakad-la ge-l-a*  
Mini-by Ravi-Dat catch-PTCP Pass-Past-Agr  
"Ravi was caught by Mini."
  
140. *Mini-kadun Ravi-laa pakad-(av-)la ge-l-a naahi*  
Mini-by Ravi-Dat catch-CP-PTCP Pass-Past-Agr not  
"Mini was unable/could not bring herself to catch Ravi."

The morpheme glossed PTCP is a morpheme deriving perfective participles, and the morpheme glossed CP is the characteristic of the capability passive. Since the latter is optional, capability passives can look exactly like ordinary passives, but Rosen and Wali show convincingly that the two passives represent different constructions. What is important for the moment, however, is simply the fact that there can be a systematic semantic relation between actives and corresponding passives which does not amount to truth conditional equivalence. I suspect that where actives and corresponding passives are not truth conditionally equivalent, the difference will always lie in a modal, temporal, or aspectual increment of meaning associated with the passive as opposed to the active construction.

One final point must be raised before concluding this brief outline of the properties of passive constructions. Up to now I have created the impression that the passive agent has the thematic role of the subject of the corresponding active (modulo semantic effects of the kind just illustrated for Marathi), but that it nevertheless behaves morphosyntactically just like other obliques. However, cases where passive agents have more subject properties than that of being interpreted semantically like the subject of the corresponding active have repeatedly been pointed out, especially by authors working within the RG/APG framework. For instance, Postal (1986) observes that in French the subjects of adverbial phrases like *en hurlant* "(while) screaming" can be controlled by matrix subjects and by passive agents, but not by other kinds of non-subject constituents in particular not by direct objects, as is shown by the following set of examples from Postal (1986: 101):

141. *Les policiers ont dispersé beaucoup d'étudiants en hurlant*  
the policemen have dispersed many of students while screaming  
"The police dispersed many students while screaming."



142. *Beaucoup d'étudiants ont été dispersés par les policiers en hurlant*  
 many of students have been dispersed by the policemen while screaming  
 "Many students have been dispersed by the police while screaming"

In the active example, the screamers can only be the policemen, whereas in the passive example they can be either the policemen or the students. In other words, the implicit subject of *en hurlant* and similar adverbial phrases can be controlled by (surface) subjects and passive agents, but not, for instance, by (surface) direct objects. Legendre (1987: ch. 4., sect. 5), elaborating on Postal's observations, argues convincingly that the potential controllers of adverbial clauses in French are exactly those nominals which would be analysed under RG/APG assumptions as subjects at some level, though not necessarily final subjects. Note that it will not do to claim that the condition on controllers of adverbial phrases should be stated in terms of thematic roles rather than syntactic relations. While such an account would correctly predict subjects of active clauses and passive agents to be possible controllers, it would not account for why also subjects of passive clauses, whose thematic roles correspond to those of active direct objects rather than subjects, can fulfil that function. More generally, no phenomenon which groups active and passive subjects together with passive agents can receive an explanation in terms of thematic roles. A particularly striking example of such a phenomenon is raising in Halkomelem Salish. According to Gerdts (1988: 5.2.2.), this language has a raising to object rule which applies to subjects of active and passive clauses and to passive agents, but to no other nominals, in particular not to surface direct objects (I refrain from citing examples because they would require an unusually large number of diacritics and special characters, but the phenomenon is amply documented in Gerdts' work). Incidentally, the claim of a subjectlike status for passive agents is also supported by the fact that they are marked like subjects in several languages; such marking is utterly unexpected for an oblique, but rather more plausible for an oblique which is in some sense also a subject. In view of such facts, I think we must conclude that passive agents are not ordinary obliques, a point which will have to be borne in mind when it comes to evaluating different possible analyses of passive constructions.

### 3. 2. Toward an HPSG analysis of passive constructions

Since passive is a relation-changing rule and grammatical relations are closely tied to subcategorization in HPSG, the obvious way to analyse passive within that theory is by means of lexical rules which modify the SUBCAT values of predicates. More precisely, personal passive lexical rules in HPSG can be characterized as rules which remove the first element of the SUBCAT list of the input predicate and either eliminate it altogether or append it at the end of the SUBCAT list of the output. This change in the SUBCAT list has the automatic side effect of making the second argument of the input predicate the first argument of the output, and hence its subject. This much is standard wisdom, but since we have seen that not all second arguments are necessarily direct objects, we must require in addition that the input predicate be transitive. Finally, for reasons that will be discussed shortly, I postulate a new attribute of HEAD values of sort *verbal*, called VOICE, with three sorts of atomic values, *active*, *middle*, and *passive*. The following principle ensures that all transitive predicates are active:

### 143. The Voice Principle

If the TRNS value of a sign  $X$  is +, the value of VOICE in  $X$  is *active*

Given the machinery assembled so far, we can now formulate the following template for personal passive lexical rules:

### 144. Template for Personal Passive Lexical Rules

If there is a lexical entry  $E$  with SUBCAT value  $\langle \alpha, \dots \rangle$ , TRNS value +, and translation  $P$ , there is also a lexical entry  $E'$  which is like  $E$  except that its SUBCAT value is  $\langle \dots, (\alpha') \rangle$ , its VOICE value is *passive*, and its translation is  $\lambda X_1 \lambda X_n \dots \lambda X_2 [M(P)(X_n) \dots (X_2)(X_1)]$  if  $\alpha$  is present in its SUBCAT value and  $\lambda X_n \dots \lambda X_2 \exists X_1 [M(P)(X_n) \dots (X_2)(X_1)]$  otherwise, where the  $X_n$  are variables over NP intensions, i.e. of type  $\langle s, \langle \langle e, t \rangle, t \rangle \rangle$ , with  $2 \leq n$ ,  $M$  is instantiated either as a temporal, modal, or aspectual predicate operator, or else as zero, and  $\alpha'$  is like  $\alpha$  except for changes explicitly specified in individual instantiations of the template

It should be noted that the output of a passive lexical rule must be intransitive because of the voice principle, hence this need not be stated in the template just given. It must be stressed that the Voice Principle represents an empirical claim about passive in natural languages, because without such a principle the output of a passive lexical rule could be transitive if the input has at least three arguments. The voice principle thus embodies the claim that in clauses like English *John was given a book* the postverbal NP "a book" is not a (final) direct object, though its position and the absence of any prepositional marking are consistent with such a view, and that this is moreover not a peculiarity of English but rather a consequence of the nature of passive. Unfortunately I know of no evidence which directly confirms this claim, but I nevertheless suspect that it is correct at least as far as plain personal passives are concerned (reflexive passives and generalized passives may be a different matter). With respect to the semantics of the passive template, note that the introduction of the predicate operator position marked by the metavariable  $M$  is motivated by the apparent existence of modal passives such as the capability passive of Marathi. To be sure, the latter is an impersonal passive construction (though it looks superficially like a personal passive, a point to which I will return), but I think we must anticipate the possibility that personal passive constructions with similar semantic effects may turn up. One potential example of such a construction can even be found in English, namely the passive with *get* rather than *be* as passive auxiliary. It has often been noted that *get*-passives tend to give rise to an entailment or at least a conventional implicature to the effect that the subject is adversely affected by the action described by the main verb, as in *For some reason I don't understand, I always get visited by Jehovah's Witnesses* (cf. for instance Quirk et al. (1985: 3.66)). In essence, then, the template just proposed says that a passive lexical rule is a lexical rule which removes the first element of the SUBCAT value of the input and either deletes it altogether or else attaches it at the end of the SUBCAT value of the output predicate, changes the specifications of TRNS and VOICE as shown, and modifies the translation of the input in such a way that the lexical semantic content of the input is preserved and the alignment of semantic roles and syntactic functions is changed in accordance with the change in the SUBCAT value. Because grammatical relations are defined in terms of the SUBCAT value and the feature

TRNS in the present theory, this amounts to saying that the direct object of the input predicate becomes the subject of the output, while the subject of the input is demoted or altogether removed syntactically.

Since we assume as a general convention that all aspects of the input of a lexical rule which are not specifically mentioned in that rule are preserved in the output, the case marking associated with the various argument positions of predicates to which passive lexical rules apply is preserved. This might seem to be a problem at first sight, but given Sag et al.'s theory of lexical and default case, which was introduced in section 1.5. in chapter 1, it turns out to be a virtue of the present approach. Recall that under this conception the CASE and DCASE values of SUBCAT elements corresponding to arguments which are not idiosyncratically case marked are equated without a particular case value being specified, the value of DCASE (and hence that of CASE) being supplied by general rules which make reference to grammatical relations. Hence if the SUBCAT member X corresponding to the direct object in the input lexical entry is regularly case marked, i.e. specified as (X)CASE = X (DCASE), this specification will remain and the corresponding element in the output lexical entry will also receive default case, but obviously the default case appropriate for subjects. In other words, the passive lexical rule need not change the case of the input's direct object if the latter. Now if we assume that passive lexical rules in fact **never** change case specifications, then if the object SUBCAT element X in the input is lexically case marked, i.e. associated with a specification of the form (X)CASE=*case*, where *case* stands for some specific case value *dative* for instance, that specification will also be carried over to the output of the rule and the new subject will receive the same lexically specified case as the old object. Interestingly, Zaenen, Maling, and Thráinsson (1990) show that this is exactly what happens in Icelandic, where subjects of passive predicates which correspond to ordinary accusative direct objects are nominative but passive subjects corresponding to objects with "quirky" case receive the same case as the latter. As an example of this state of affairs, consider the following pair of examples, Zaenen et al.'s (8)a. and (11)a., respectively (⟨> stands for the runic edh in the original):

145. *Ég hjálpaði honum*  
I helped him(D)

146. *Þeim var hjálpad*  
them(D) was helped

In addition to quirky passive subjects corresponding to quirky direct objects in active clauses, there are also basic quirky subjects, as shown in the following example (Zaenen et al.'s (13)):

147. *Henni hefur alltaf þótt Ólafur leiðinlegur*  
her(D) has always thought Olaf(N) boring(N)  
"Olaf has always seemed boring to her."

Zaenen and colleagues show in detail that quirky subjects are indeed subjects with respect to behavioural and control properties like the ability to be controlled in equi and raising constructions, and that the position they occupy is indeed the subject position and not a topic position in spite of the fact that they do not have the other

coding properties of subjects, nominative case and verb agreement.<sup>56</sup> Hence Icelandic passives with quirky subjects do not instantiate the same construction as, for instance, the superficially similar German clause type illustrated by the next example:

148. *Bedürftigen Schnabeltieren muss geholfen werden*  
 needy platypuses(D) must helped be  
 "Platypuses in need must be helped."

In contrast to their (apparent) Icelandic counterparts, the apparent dative subjects in such examples show neither the behavioural nor the control properties of subjects, for instance, they cannot be "equi victims" (note that the following example would be equally ungrammatical (worse if anything) with the subject in the dative):

149. *\*Die Schnabeltiere hoffen, von der Regierung geholfen zu werden*  
 the platypuses hope by the government helped to be  
 "The platypuses hope to be helped by the Government"

These facts are accounted for if passives of clauses with nonaccusative objects in German are impersonal rather than personal passive constructions. This raises the question why such clauses have no personal passive variants. A priori, there are at least two plausible explanations. The first of these would hold that objects with cases other than accusative are not direct objects in languages like German. In present terms, this would mean that verbs like *helfen* have two elements on their SUBCAT list but are nevertheless intransitive and their lexical entries therefore form no legal input for passive lexical rules which conform to the template proposed above. This would in essence amount to the claim that German, unlike Icelandic, has no idiosyncratically case marked direct objects. The second plausible explanation would hold that German does have idiosyncratically case marked objects but that the German passive rule does not apply to lexical entries which assign a specific case to the direct object. While I cannot resolve the issue here, it seems to me that the first alternative is preferable. One reason for thinking so is that all potential non-nominative subjects in German, not only those which could be thought of as arising from passivization, fail most tests for subjecthood.<sup>57</sup> Under the assumption that German has no idiosyncratic case marking for nuclear term arguments, this follows immediately, whereas a rule specifically constraining the applicability of the passive lexical rule obviously says nothing about non-passive constructions and hence leaves this fact unexplained.

Alert readers may have noted that the passive template not only fails to specifically mention case, but also says nothing about agreement. Whereas we have just seen that the facts of case assignment in passives actually fall out from the

<sup>56</sup>The terms "behavioural properties" and "control properties" are due to Keenan (1976) and are used here and in what follows in the sense explained in that work.

<sup>57</sup>Most, but not all. Dative "subjects" of verbs like *gefallen*, i.e. verbs which would be classified as inversion verbs in RG/APG terms, can control unexpressed subjects of adverbial participles, just like ordinary nominative subjects of verbs like *besuchen* but unlike ordinary direct or indirect objects. Thus both *Aus England zurückgekehrt, fiel Fred Feuerstein auf, dass der Dinosaurier gewachsen war* "Having returned from England, Fred Flintstone realized that the dinosaur had grown" and *Aus England zurückgekehrt, besuchte F.F. zuerst Barney* "Having returned from England, F.F. first visited Barney" are fine with "Fred" as the controller of the adverbial clause, whereas *Aus England zurückgekehrt, schenkten seine Freunde Fred einen neuen Meissel* "Having returned from England, his friends gave a new chisel to Fred" cannot have this reading.

relation-changing effect of passive lexical rules together with the theory of lexical and default case I have adopted, the situation with respect to agreement is somewhat more problematic. Descriptively, the main generalization is that passive verbs agree with the same arguments as active verbs, i.e. in languages with subject-verb agreement passive verbs agree with the subject rather than with the passive agent. Apparent exceptions to this generalization have occasionally been noted, but it appears that none of them have really stood up to scrutiny. It thus seems appropriate to ensure that passive predicates indeed agree in the same way as actives. The reason why this has to be specifically ensured is that nothing said so far prevents the **input** of a passive lexical rule from being a lexical entry which already has undergone an agreement rule. In such a situation, since the passive template says nothing specifically about agreement features, the agreement features associated with different SUBCAT elements will be shifted around along with these, so that a passive predicate in a language with subject agreement could indeed end up agreeing with the passive agent. Apparently the only simple way to exclude such a possibility at the level of UG is the following meta-constraint on language-specific sets of lexical rules:

#### 150. **The Agreement Principle**

No agreement rule can apply to the output of a rule which changes SUBCAT values

Summing up what has been said so far, the proposed template for passive lexical rules adequately accounts for the changes in grammatical relations, case marking, and agreement which are associated with personal passive constructions, and it does this without saying anything specifically about case marking. What the theory as sketched so far does not account for is the marking of the passive agent, so I will now say a few words on this topic. Basically, the proper marking of passive agents can be achieved in two ways. One way is to let language-specific instantiations of the passive template be enriched in such a way that they explicitly specify the marking of the demoted subject. In other words, language specific passive rules would either fix a value for CASE, a value for MARKING, or value for PFORM for the last SUBCAT element of their output, where PFORM is an attribute of HEAD values of sort *adposition* whose values serve as tags identifying those prepositions which are semantically empty and only serve a marking function<sup>58</sup>. The other possibility consists in formulating a default case rule for the last argument of a passive verb. The latter option has the apparent advantage that individual lexical entries for passive verbs need not specify the marking of the agent, but since these lexical entries are not listed individually, but rather produced by the passive lexical rule(s) of the language in question, this argument of economy has little force. Hence I just assume for the time being that both options are actually available, that is, language specific passive lexical rules may or may not impose a specific marking on the passive agent. Hence language-specific instantiations of the passive template can differ with respect to the marking they impose on the agent phrase (if any), the semantics associated with the

<sup>58</sup>For concreteness, we may assume that the sort *adpositions* is a cover term for language-specific subsorts of *verbal*. The distinction between semantically empty adpositions marking grammatical relations on the one hand and markers in the technical sense of HPSG on the other can be difficult to draw, but since adpositions are here taken to be substantive rather than functional elements, criteria which distinguish between major and minor categories could be brought to bear. One such criterion could be the ability to sanction traces and empty pronominal arguments, as it seems plausible to view these as properties of elements of major categories.

predicate operator position symbolized as M above, and of course with respect to their effect on the PHON value of the input and associated morphosyntactic features. In contrast to these parochial aspects, the changes in the SUBCAT value and the values of TRNS and VOICE are taken to be part of the universal characterization of (personal) passive constructions. However, the theory as outlined so far is not as general as one would like because so far it says nothing about nonpersonal passives, that is, passive constructions which do not involve promotion of an argument the subject function, and it also says nothing about generalized passives, i.e. those which involve the promotion of an indirect object or an oblique to subject status. As far as generalized passives are concerned, the problem one faces in trying to generalize the present theory to account for them is that the template as it stands does not explicitly promote anything. Rather, the promotion of the direct object is an automatic consequence of the fact that the first SUBCAT element of the input is removed. It thus appears that generalized passives in those languages that have them must be handled by a separate rule which not only removes the first SUBCAT element but in addition explicitly promotes some element other than the original direct object. Perhaps this is not as bad a result as it may appear to be at first sight, because clear instances of generalized passives are apparently rare, which may precisely reflect the fact that a language needs an additional rule in order to produce them. Nevertheless, the fact that there are apparently languages with more than one passive rule is somewhat disquieting, but as we will see in a moment this conclusion seems to be inevitable even if generalized passives are disregarded, because nonpersonal passives also have to be characterized differently from personal passives, as I am going to show further below. Before doing this, however, I want to say a few more words about the morphological side of passive rules and about the analysis of periphrastic or copular Passives.

The fact that there is no universal characterization of passive morphology was one of the driving forces behind the development of relational analyses of passive. By relational analyses, I mean not only analyses specifically within the frameworks of RG and APG, but more generally analyses which hold that the essential effect of Passive is a change in grammatical relations, more specifically in the alignment of (surface) grammatical relations with semantic roles, with changes in verb morphology, case marking, word order, etc. being consequences of the change in grammatical relations rather than defining characteristics of the construction. The present account is clearly a relational account in this sense, as are other lexical analyses of passive such as the classical LFG analysis of Bresnan (1982) or the more recent LFG analyses within lexical mapping theory (cf. for instance Bresnan and Moshi (1990)). The relational view of passive is also, as far as I can see, the view embodied in most of traditional grammar, but it is not the view characteristic of the mainstream of Transformational Grammar down to and including GB theory. The latter approach relies precisely on the notion of there being a "passive morpheme" identifiable in every language, no matter how the morphology associated with passive actually looks. In the classical GB account of Chomsky (1981: 2.7.), this passive morpheme is assumed to "absorb" the case assigned to the direct object by the verb and to somehow demote the thematic role of the subject in such a way that it is no longer assigned to the canonical subject position, though it may be assigned to some oblique element (the passive agent). The net result of these two effects of passive morphology is that movement of the direct object to subject position becomes both possible (because the latter is athematic) and necessary (because the object receives no case in its canonical position). The more recent and more elaborate theory of Baker (1988) and Baker, Johnson, and Roberts (1989) takes the passive morpheme itself to be an argument expression which needs a

thematic role and case, although the latter requirement can be circumvented in various ways. The theory of Baker and colleagues boasts considerable success in analysing the range of cross-linguistic variation in passive constructions, but it suffers from the weakness that the crucial passive morpheme can in fact not be identified in a uniform way across languages. Returning to the main thread of this discussion, then, I hold that passive is to be characterized in relational rather than in categorial or morphological terms, but nevertheless the fact remains that passive usually has some effect on verbal morphology (broadly speaking), as has already been illustrated in part. The simplest case of passive morphology is that where the main verb is marked for passive by a separate passive morpheme, as in Tzotzil. In these cases, we may assume that the passive lexical rule directly modifies the PHON value of the input. Slightly more complex are cases like Latin or Ancient and Modern Greek, in which passive verb forms are characterized by a special set of personal endings. Since we must assume that valency-changing lexical rules like passive precede lexical rules introducing agreement morphology, there can be no simple morphological effect associated directly with the passive rule. Rather, it must apparently be assumed that the passive rule does not change the form of its input, but that the agreement rules are sensitive to the voice specification of their input and hence treat elements whose VOICE value is *passive* differently from those with VOICE value *active*.<sup>59</sup> Turning next to periphrastic passives, these raise two kinds of problems. The first is related to the fact that the main verb in periphrastic passives often has a form which is also used in other periphrastic constructions, as is the case with the past participle in Germanic and Romance. Crucially, the identity of passive verb form and past participle in these languages is completely systematic, i.e. it holds irrespective of declension class and similar factors. The simplest way to account for this is to assume that the passive lexical rule in languages where passive verb and past participle are identical actually operates on past participles and has no morphological effect of its own. This is the position I adopt here, notion that, once again, the issue is not quite exhausted by these comments.<sup>60</sup> This leaves us with the problem of accounting for the auxiliaries in periphrastic passives. I assume that auxiliaries are characterized by having SUBCAT values of the following form:<sup>61</sup>

$$151. \quad \langle (1) [ ] \dots (n) [ ] [ \text{SUBCAT } \langle (1) [ ] \dots (n) [ ] \rangle ] \rangle$$

In other words, an auxiliary is a predicate which subcategorizes for an unsaturated complement and for all the arguments of the latter.<sup>62</sup> The unsaturated complement may either be a VP, as is probably the case in English, i.e. a verbal sign lacking exactly one argument, or else an even less saturated predicate, possibly even a lexical predicate (though in order to formally allow the last possibility the Lexicality Principle will have to be modified, which presents no unsurmountable problems). A passive auxiliary can

<sup>59</sup>Though I cannot pursue the matter further here, I want to suggest that the so called deponent verbs of Latin, like *videri* "seem", are characterized by the VOICE specification *middle*, which makes them unable to undergo passive, and that the agreement rules actually treat middle and passive verbs alike and differently from active ones.

<sup>60</sup>For further discussion, see especially Zwicky (1987).

<sup>61</sup>This view of the SUBCAT value of auxiliaries is inspired by the HPSG treatment of German coherent infinitive constructions in Kiss (1993).

<sup>62</sup>I assume that all auxiliaries in the pretheoretical sense are characterized by this kind of SUBCAT value, but I leave it open whether the term auxiliary should have theoretical status, and if so, whether having the kind of SUBCAT list shown in the diagram is only a necessary or in fact a necessary and sufficient condition for auxiliary status.

now be characterized simply as an auxiliary whose SUBCAT value corresponds to the template just given and which in addition specifies the unsaturated rightmost SUBCAT element as VOICE *passive*. The latter specification is necessary because passive participles do not have the same distribution as active past participles in spite of their systematic formal identity. This can be seen very clearly in English, where only past participle verb forms which are indeed passive can be embedded under passive auxiliaries (thus we get *John was invited for dinner (by Marsha)* but not *\*John is just arrived from Boston*). Note incidentally that the presence of the passive auxiliary is not necessary for passive interpretation, in other words, the relation changing rule is indeed associated with the main verb, because absolute constructions such as the highlighted portion in *his pet platypus killed in a road accident, John turned to botany* are clearly passive, but passives without auxiliaries cannot form independent sentences, presumably because the passive verb form itself is nonfinite. Having clarified this, it remains to consider the last widespread kind of passive morphology, reflexive passives of the kind found in Italian and other Romance languages. An example of this construction has already been provided in section 3.1. above. The following additional example, taken from Lepschy and Lepschy (1977: 213), shows that the construction can also occur with an agent phrase, though they note that this usage is rare:<sup>63</sup>

152. *Questo Giornale si legge ogni mattina da moltissima gente*  
 this paper REFL reads every morning by very-many people  
 "This paper is read each morning by very many people"

Since it has been plausibly argued by various authors that pronominal clitics of the kind found in Romance are actually verbal affixes (cf. Miller (1991: ch. 5 and Wegmüller (1993) for discussion and further references), this kind of passive construction would seem to pose no particular problems, that is, one might assume that it has the same morphosyntactic properties as an ordinary personal passive and just happens to make use of the same morphological operation which is also used by the semantically genuine rule of reflexivization. This, it might be said, is no more mysterious than the ordinary personal passive rule's borrowing the morphology of the past participle. Actually there are reasons to suspect that this is not quite the whole story, but I will first discuss the HPSG analysis of nonpersonal passives and return to the question of the connection between different constructions with reflexive morphology toward the end of this section.

For analytical purposes, two basic varieties of nonpersonal passive constructions must be distinguished, the widespread impersonal passive construction and the relatively rare pseudo-passive. The former is characterized by the fact that the active subject is demoted or eliminated, just as it is in other kinds of passive, but no other contentful nominal assumes the subject function, that is, either there is no visible subject at all, or else a dummy acts as subject. Pseudo-passives, in contrast, have a semantically nonempty subject, like personal passives, but this does not correspond to an argument of the active verb, but rather to the object of a PP which is apparently an argument or modifier of the verb in both the active and the passive version. In addition

<sup>63</sup>Some sources, for instance Renzi (ed.) (1988: ch. I, sect. 6.3.6.), actually state that reflexive passives cannot be used with agent phrases, but obviously this is only largely but not completely true. All sources I have consulted agree that reflexive passives are only possible with third-person subjects, hence the notion of my being seen by some unspecified person cannot be expressed by *mi vedo* but only by *mi si vede*, using the *impersonal-si* construction.



to pseudo-passives and obvious impersonal passives like those of German or Welsh cited earlier, there are also what might be called masked impersonal passives, i.e. impersonal passives in which the element which is the direct object in the active version has some of the coding properties of a subject, though not its behavioural and control properties. A particularly striking example of this kind is the Marathi capability passive. There the notional direct object has **all** the coding properties of a subject, yet, as Rosen and Wali show with great care, it has none of the behavioural and control properties which it should have if it were indeed a subject. Thus the analysis of pseudo-passives and impersonal passives poses a number of problems, at least some of which I will now try to solve.

With respect to pseudo-passives, the main empirical question that needs to be answered before an analysis can be suggested is whether these constructions indeed contain a PP with a missing object, as argued by Postal (1986: ch. 6), or whether the preposition forms a constituent with the verb instead, as suggested by Bresnan (1982) and Farrell (1994: 3.3.3.), among others. As Farrell points out, the existence of participial adjectives corresponding to pseudo-passives, such *assought after*, supports the view that such collocations form complex predicates which take a direct object. In addition, he notes that the behaviour of the sequence participle+preposition in Gapping structures supports the view that this sequence corresponds to a constituent, although the same test argues against the constituent status of the corresponding sequence in active clauses, as the following examples illustrate:

153. \**Makepeace **slept in** the bed and Dempsey \_ the sleeping bag*
154. *This bed **has been slept in** by the Shah and the other one \_ by the Pope*
155. *Some houses **were paid for** with guns and others \_ with drug money*  
Farrell (1994: 127)

In view of such facts, it appears that the best analysis for English pseudo-passives is one where they involve reanalysis of the verb+preposition sequence, though their active counterparts do not. Technically, this could be implemented by a lexical rule of the following form:

#### 156. **Lexical Rule for English Pseudo-passive Predicates**

If E is a lexical entry with VFORM value *psp* (past participle), SUBCAT value  $\langle \alpha, PP \rangle$ , TRNS value -, VOICE value *active* and translation P, and E' is a lexical entry with HEAD value of sort *preposition*, SUBCAT value  $\langle \gamma \rangle$  and translation P', then there is a verbal lexical entry E'' with all properties of E except that its SUBCAT value is  $\langle \gamma, (\beta[PFORM \textit{by}]) \rangle$ , its PHON value is  $PHON(E) + PHON(E')$ , and its translation is  $\lambda X_1 \lambda X_2 [P(P'(X_2))(X_1)]$  if  $\beta[PFORM \textit{by}]$  is present in the output and  $\lambda X_2 \exists X_1 [P(P'(X_2))(X_1)]$  otherwise

The input of this rule is required to be an intransitive verb because of the empirical fact that only intransitive predicates can yield pseudo-passives in English, i.e. there are no pseudo-passives like \**John was given a book to \_*. There are two respects in which the HPSG account of English pseudo-passives just sketched is still incomplete. First, it seems that in at least some cases pseudo-passives can also promote objects of PPs

which one would tend to consider as modifiers rather than as arguments (in fact the example given in section 3.1 above was of this kind). Since the SYNSEM values of modifiers are not represented on the SUBCAT value of the head, this case is not directly accounted for by the system as outlined so far. For the moment, I assume that the problem can be circumvented by a lexical rule which appends an additional slot at the end of the SUBCAT value of the input predicate and semantically interprets the element filling that slot as a modifier. Nothing in the theory of HPSG as developed in the present study or elsewhere is incompatible with such a move, though the question of which kinds of modifiers can alternatively be realized as oblique arguments remains to be investigated. The second weakness of the present account is that it does not predict which of the structurally conceivable pseudo-passives in English are actually fully acceptable, which are awkward, and which are completely unacceptable. However, it seems clear that while a structural mechanism for deriving pseudo-passives must obviously be provided by the theory, no purely structural account of the construction is feasible because semantic and pragmatic factors apparently play significant part in accounting for its distribution (cf. Ziv and Sheintuch (1981) for discussion).

Before concluding the discussion of the pseudo-passive, I want to mention a property which crucially differentiates the Norwegian pseudo-passive from its English counterpart. As Lødrup (1991) shows, in Norwegian indefinite direct objects can intervene between the verb and the preposition in pseudo-passives, as is illustrated in the following example (Lødrup's number 11):

157. *Talgen støptes lys av \_*  
the-tallow mould-Pass candles from  
"The tallow was made into candles."

This means that an account along the lines sketched for English cannot work for Norwegian. The alternative which suggests itself (and is actually inspired by Lødrup's own LFG analysis) is one where the stranded preposition function as an unsaturated argument of the main verb and the subject valency of the latter is identified with the SUBCAT element of the preposition. This means that Norwegian must have a rule for prepositional passives which yields outputs with SUBCAT values of the following form:

158.  $\left\langle (1) \left[ \begin{array}{l} \text{HEAD prep} \\ \text{SUBCAT } <(1) [ ] > \end{array} \right] \right\rangle$

The translations of verbs with such SUBCAT values will be of the following form, with prep a variable of whatever type is appropriate for prepositions:<sup>64</sup>

159.  $\lambda X_1 \lambda \text{prep} \dots \lambda X_n [P(\text{prep}(X_n)) \dots (X_1)]$

To conclude this sketch of the analysis of various passive constructions in HPSG, let us turn to the second kind of non-personal passive constructions, impersonal passives. As far as I can see right now, this is the kind of passive for which

<sup>64</sup>This is a simplification, as it is by no means likely that all prepositions have the same logical type, but this does not affect the point at hand.

HPSG offers the least revealing analyses. Ordinary impersonal passives, i.e. those of the kind illustrated from Welsh above, in which there is no obvious candidate for subjecthood, pose no special problem. All we have to assume is a rule which effects the usual change in TRNS and VOICE values, removes or demotes the subject valency, also in the way familiar by now, and inserts a dummy subject valency. The following schema illustrates this idea:

#### 160. Template for Impersonal Passive Lexical rules

If there is a lexical entry E with SUBCAT value  $\langle \alpha, \dots \rangle$  and translation P, there is also a lexical entry E' which is like E except that its SUBCAT value is  $\langle D, \dots, (\alpha') \rangle$ , its VOICE value is *passive*, and its translation is  $\lambda X_1 \lambda X_n \dots \lambda X_2 \lambda Y [M(P)(X_n) \dots (X_2)(X_1)]$  if  $\alpha$  is present in its SUBCAT value and  $\lambda X_n \dots \lambda X_2 \lambda Y \exists X_1 [M(P)(X_n) \dots (X_2)(X_1)]$  otherwise, where the  $X_n$  and Y are variables over NP intensions, i.e. of type  $\langle s, \langle \langle e, t \rangle, t \rangle \rangle$ , M is instantiated either as a temporal, modal, or aspectual predicate operator, or else as zero, and  $\alpha'$  is like  $\alpha$  except for changes explicitly specified in individual instantiations of the template

This template is largely identical to that for personal passives, but differs from the latter in three crucial respects: It specifies no TRNS value for its input, hence it can apply to transitive as well as intransitive predicates (in fact, we have seen that some language-specific instantiations of the template, for instance the German one, only apply to intransitive predicates), it places a dummy in the first SUBCAT position of the output, and it creates a semantic argument position for the dummy subject by vacuous abstraction on the variable Y.<sup>65</sup> The dummy symbol D is to be read as standing for a *synsem* object whose RT value is of sort *pronominal* and whose RI value is of sort *expletive*. Language-specific instantiations of the impersonal passive template (as well as other dummy-creating relation-changing rules) may in addition specify the NULL value of the dummy as + or -yielding non-overt dummy pronouns in the former case an overt ones in the latter, or else language-specific rules may specify dummies as null or overt either generally or in accordance with syntactic factors. One interesting feature of this analysis of impersonal passive is that, like the RG/APG analysis of impersonal passive to be outlined in the following section, it embodies the claim that impersonal passives involve a dummy subject even if no overt subject is present, but for quite different reasons. Essentially, the function of the dummy valency in the present context is that of preventing the non-subject elements of the SUBCAT value of the input predicate from advancing as a consequence of the removal of the subject, whereas the function of the dummy in the RG/APG analysis is that of satisfying the final 1 law and providing a mechanism for the transfer of case and agreement features which are associated with the final subject relation to the underlying direct object, as will be explained more fully in the next section. The HPSG analysis of impersonal passive constructions just sketched successfully accounts for the observation that impersonal passives involve no promotion of non-subject arguments, though only at the cost of a stipulation not motivated by the analysis of other varieties of passive, namely the introduction of a dummy subject, and it accounts for their intransitivity by the same

<sup>65</sup>I assume for concreteness that all valency changing lexical rules which introduce dummy argument positions create the corresponding semantic argument place by vacuous lambda abstraction, as proposed by Gazdar et al. (1985: 222-223). This ensures that dummies have no semantic effect and makes it unnecessary to posit special translations with special improper denotations for them.

mechanism that is used to account for the intransitivity of other passives, namely the Voice Principle. Its main weakness is that it provides no nonad hoc analysis for "brother-in-law" phenomena, i.e. the transfer of case and agreement features between dummies and the nominals they displace (this weakness of the theory in fact extends to the analysis of all impersonal constructions, not just impersonal passives).

Before concluding this section, I want to turn to two kinds of passives about whose analysis in HPSG I have so far said little in one case and nothing at all in the other, namely reflexive passives and generalized passives. With respect to the former, I suggested above that they could be dealt with in a manner analogous to ordinary personal passives but also hinted that this simple minded view might turn out to be untenable. The problems here are essentially of two kinds. First, I have characterized personal passive rules as rules which remove the first SUBCAT element of a transitive input predicate, which automatically makes the former second SUBCAT element the first and hence the subject. If reflexive passives are to be accounted for along the same lines, this means that there can be no direct object in reflexive passives, and the question is whether this squares with what is known about reflexive constructions more generally. The idea that reflexivization is a kind of valencychanging and more specifically valencyreducing operation is fairly widespread and certainly has some plausibility for those reflexive constructions in which there is no reflexive pronoun functioning as an independent nominal, for instance the reflexive clitic constructions in the Romance languages. Nevertheless, I am not sure that reflexivization can universally be characterized in this way or that only those reflexive constructions which conform to the characterization can have passive uses. At present I know of no clear case of reflexive passive involving full NP reflexives, but I know positively that there are languages which have reflexive unaccusative constructions involving full NP reflexives. One such language is Tzotzil. As shown in Aissen (1987: ch. 6, sect. 2), in reflexive unaccusative constructions in this language the reflexive element is a complex NP in which the pronoun proper appears as the possessor of a special noun stem **-ba**, which means "top" or "face" when used outside of reflexive constructions. This complex structure is cross-referenced on the verb by type B (absolutive) agreement morphology, whereas the subject is cross-referenced by type A (ergative) agreement morphology. This construction is illustrated by the following example from Aissen (1987: p.88, ex. 2):

161. *7i- s- ni7 s-ba yalel*  
 cp A3 pull A3 self down  
 "It sagged."

Type B agreement for third person is morphologically null, but the fact that the subject is cross-referenced by type A (ergative) agreement nevertheless shows that this is a transitive structure with the complex reflexive NP serving as the direct object. Since the meaning of this construction is not reflexive but rather involves only a single argument role, it is clear that there can be reflexive constructions in natural languages in which there are more syntactic than semantic argument slots, and hence I think we must be prepared to find reflexive passives involving full NP reflexives as well. Of course this does not exclude the possibility that those reflexive passives, more generally those reflexive constructions, which are amenable to an interpretation involving valencyreduction should be so analysed. Nevertheless, the existence of reflexive unaccusative constructions involving full NP reflexives together with the

presumed existence of reflexive passives of the same kind means that certain of the assumptions made so far may need to be modified. In particular, this holds for the Voice Principle, the principle which requires that transitive predicates must be active, because reflexive unaccusatives of the kind found in Tzotzil must be classified as middle despite the fact that they are transitive, which is incompatible with this principle. The Voice Principle will in all likelihood also raise problems for the analysis of generalized passives, because these constructions are characterized precisely by the fact that something is promoted "across" the direct object without the latter losing its status. If the voice principle is abandoned, and the other assumptions made so far are held constant, the fact that ordinary personal and impersonal passive rules produce intransitive outputs must be made part of the templates characterizing these classes of rules. Such a move could be avoided by introducing primitive grammatical relations into the theory, a possibility which was mentioned briefly in section 1.5. in chapter 1 above. I think that the latter option is preferable because we have already seen in various places that not only the standard HPSG theory of grammatical relations but also the minimal extension involving the feature TRNS which is assumed in the present study do not yield a sufficiently articulated crosslinguistically valid characterization of grammatical relations.

With respect to passive phenomena in general, I think it is fair to say that the present HPSG approach achieves a fair amount of success, though at the price of a certain number of stipulations which have no obvious motivation outside the realm of passive constructions. Apart from many details which obviously might be filled in or improved, I think the main respect in which an account like the present one should be further improved concerns the exact status of the various lexical rule templates which have been proposed. Obviously, they have to be part of HPSG Universal Grammar in order to have genuine explanatory potential, but their exact formal status vis a vis the other components of the theory remains to be clarified, and in particular it will ultimately have to be explained what it means technically for a lexical entry or a lexical rule to instantiate a given universal template. However, these are questions which I can only raise but not answer satisfactorily at present.

### 3. 3. The RG/APG analysis of passive constructions

Since the basic idea underlying the RG/APG analysis of passive has been widely discussed in the literature, I will only briefly recapitulate it here and then go on to discuss the analysis of reflexive and impersonal passives in some detail, concluding the section with a few remarks on pseudo-passives and generalized passives. Passive clauses are characterized in RG/APG terms as clauses which contain a 1 arc A which is the local successor of a 2 arc B and which overruns some 1 arc C. The latter condition is necessary to distinguish passives from Unaccusative Advancement constructions. These also contain 1 arcs which are local successors of 2 arcs, but unlike the situation in passives the successor 1 arc does not overrun an earlier 1 arc. In the case of plain (i.e. non-reflexive) personal passives, the characterization of passive just given is almost the whole story (I disregard passive auxiliaries for the moment). The only significant parameters of variation in passives of this kind concern the fate of the overrun 1 arc. The laws of APG stated in chapter 2 guarantee that this has to have a local successor which is not a nuclear term arc, which leaves 3 (indirect object) and 8 (chômeur) as options. Individual grammars then have to specify which of these options is chosen and what marking the demoted subject receives if it goes into chômage (if it demotes to 3, it will of course be marked like other 3s in the absence of further statements). For agentless passives, I follow Johnson and Postal (1980: 8.1 and 9.3.) in assuming that the initial subject in these cases is an inexplicit nominal, more precisely either UN or ON, and that the 1 arc headed by this unspecified nominal, which is overrun by the local successor 1 arc headed by the initial object, is erased by the latter. Short passive constructions in different languages (and also the short varieties of different passive constructions within the same language) may differ with respect to whether they require UN or ON as the unspecified agent; in the former case, the nature of the unexpressed participant will be left completely open, whereas in the latter it will be constrained to be animate.<sup>66</sup>

One aspect of the structure of passives which is often left open in RG/APG work and which we need to discuss briefly before going on to more specific problems is the structure associated with passive auxiliaries. Fortunately, this raises no great problems, because most passive auxiliaries clearly fit the more general characterization of auxiliaries as non-initial predicates which do not initialize any argument but simply inherit the arguments of the preceding predicate. A possible exception to this generalization is constituted by the Welsh personal passive, which involves a pronominal copy of the passive subject on the main verb, as can be seen in the example given above and repeated here for convenience:

162. *mi gafodd y bachgen ei daro gan Mair*  
PT got the boy his hit LOC Mair  
"The boy was hit by Mair."

As the example shows, the main verb in the personal passive in Welsh is in a form known as the verbal noun and cross-references its subject by a possessive clitic. Since clitic agreement does not otherwise cooccur with non-pronominal arguments in Welsh,

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<sup>66</sup>Johnson and Postal (1980: 390) characterize the possible referents of ON as "mind-possessing entities", which is a slightly narrower characterization than that implied by the term animate. Other authors often characterize the unexpressed notional subject in the constructions which are taken to involve ON in RG/APG as "human", but this suggests a biological dimension which seems more accidental than essential.

this indicates that, even if the clitic itself is analyzed as part of the morphology of the verbal noun rather than as its argument, the subject position must be assumed to be filled by an empty pronominal. This is not possible under a monoclausal union analysis, because under this analysis all that "happens" in a copular passive is that the passive auxiliary enters in the second stratum and forces the main predicate to assume some other relation, presumably the *chômeur* relation in most cases, though predicate demotion to direct object also seems to occur (cf. Dubinsky (1990)). Since the arcs headed by the arguments of the main predicate just fall through into the Psector of the auxiliary, there is occasion for a replacement giving rise to a copy pronoun. However, the Welsh structure can be accommodated by assuming that the passive auxiliary in this language is not a union predicate but rather a raising to subject predicate, more precisely, a predicate which initializes a clausal direct object and no subject, and assuming further that the subject of the embedded clause, i.e. the clause headed by the main predicate, raises into the main clause to become the subject of the passive auxiliary, leaving a pronominal copy in the lower clause with which the embedded predicate can agree. This means of course that the Welsh passive auxiliary is not an auxiliary in the sense of section 2.7. in chapter 2, but in view of the comment made there concerning the term "auxiliary", nothing of importance is lost if some auxiliaries in the pretheoretical sense turn out not to be auxiliaries in the technical sense. However, I continue to assume that passive auxiliaries in the pretheoretical sense are to be analysed as auxiliaries in the sense defined unless clear evidence indicates that a biclausal analysis is called for.

Having clarified these matters, let us now turn to some aspects of the APG analysis of reflexive personal passives. The only fundamental syntactic difference between plain and reflexive personal passives in APG terms is that in the latter, the 2 arc local predecessor of the overrunning 1 arc is not erased by the latter, but is instead erased by a replacer cosponsored by it and its successor. Let me illustrate this a bit less abstractly using an Italian example already introduced in the preceding section:

163. *Questo Giornale si legge ogni mattina da moltissima gente*  
 this paper REFL reads every morning by very-many people  
 "This paper is read every morning by very many people"

In this example, the NP "this paper" heads a 2 arc in the first stratum and a 1 arc in the second (and final) stratum, just as it would in a plain personal passive, and the NP "many people" likewise heads a 1 arc in the first stratum and a *chômeur* arc in the second stratum, in complete analogy to the situation in plain personal passives. As for the replacer of the initial 2 arc which defines the structure as a reflexive passive, this is obviously somehow represented by the reflexive clitic *si*, but as stated already the latter is best viewed not as an independent nominal but rather as part of the morphology of the predicate, more specifically as a kind of agreement. This warrants a short excursus on the representation of agreement in APG.

Integrating various suggestions made earlier, I would like to propose the following revisions to the formalism of RG/APG (the combined label is used because they do not involve the sponsor and erase relations and are therefore applicable to both theories):

- Instead of the single non-structural relation named by the R-sign L, there is a whole family of non-structural relations representing various kinds of morphosyntactic properties of constituents
- Non-structural arcs can support other non-structural arcs, but no structural ones
- The head of a non-structural arc A is a terminal node if and only if A doesnot support any further non-structural arcs. However, only those of the non-terminal nodes which are endpoints of structural arcs are taken to represent constituents.

As far as agreement in particular is concerned, I propose that UG makes available a non-structural R-sign AGR, and that AGR arcs support structures which, borrowing the matrix notation used for HPSG, can be represented as follows:<sup>67</sup>

$$164. \left[ \begin{array}{c} \text{AGR1} \left[ \begin{array}{c} \text{PERS } \alpha \\ \text{NBR } \beta \\ \text{NCL } \gamma \end{array} \right] \\ \text{AGR2} \\ \dots \end{array} \right]$$

The Greek letters in this diagram stand for terminal nodes which represent specific values for the features involved. I assume that agreeing predicates bear agreement specifications of this sort, more technically, nodes which are heads of P arcs are also tails of AGR arcs which support structures of the kind just shown. As for the inventory of features representing the various sorts of predicate agreement, i.e. subject agreement, direct object agreement, etc., which are represented just by AGR1, AGR2, etc., in the diagram, I assume that UG specifies that a class of such **agreement R-Signs** exists, but does not specify its membership. This seems to make more sense intuitively than specifying one member of the class for every kind of predicate agreement found in natural languages and enlarging the set whenever a new kind turns up. Agreement arcs support structures which are structured like the RI values of the present version of HPSG, and fulfil largely the same function. That is, these structures are precisely the referential indices whose existence was postulated (without specifying their properties) in section 2.7. in the preceding chapter. In accordance with what was said there, I assume that referential indices appear in two kinds of structural positions: as heads (more pedantically, structures rooted in heads) of agreement arcs, and as heads of arcs with the R-sign RI whose tails are roots of constituents. As should be clear by now, in the latter function they serve to indicate anaphoric links and to guide semantic interpretation along the lines suggested in sections 1. 8. and 2.7. above. Since agreement properties are part of referential indices, agreement between pronominals and their antecedents follows automatically. As for predicate agreement, the modifications just introduced allow us represent agreement in essentially the same way as binding, that is, by multiattachment involving referential indices. What this means is that the head of the relevant agreement arc within the agreement specification of the

<sup>67</sup>As pointed out already in chapter 2, it would be possible (and possibly interesting) to completely reformulate RG/APG within a suitable attribute-value formalism, but in the present context this would lead too far.



predicate is identified with the referential index of the agreement controller, more technically, the head of the RI arc whose tail is the root of the constituent which controls the agreement. The assumption that UG does not specify a concrete inventory of agreement arcs means that individual languages could in principle have any number of kinds of predicate agreement, the controllers for each kind being determined on the basis of some grammatical property expressible in the theory. Such properties will include primitive grammatical relations like subject (1) and direct object (2), but also defined grammatical relations like absolutive or ergative, yielding ergative agreement systems like those of the Mayan languages. However, individual languages are not completely free in the kinds of criteria they can use to pick out agreement controllers. In particular, I assume that only sisters of a predicate can be agreement controllers, and that an agreement controller in addition must head a term arc in the last stratum of the P-sector of each predicate which agrees with it.<sup>68</sup> These conditions can be formulated in the form of the following tentative law:

#### 165.   **The Agreement Law**

The head X of a P arc A agrees with a constituent Y only if Y is the head of a neighbour B of A such that B is a term arc and a member of the last stratum of the P-sector of A

Note that the agreement law requires agreement controllers to head term arcs which are P-final relative to the agreeing predicate, but does not exclude the possibility that the kind of agreement triggered by some element is determined on the basis of an earlier grammatical relation. For instance, it would be possible for a language to have a kind of predicate agreement triggered by P-final terms which are direct objects in some stratum. Interestingly, rules of precisely this kind are apparently at work in at least one language, Choctaw, as argued in great detail by Davies (1986). More generally, within the limits imposed by the agreement law the actual agreement controllers in a language can be identified in principle by any combination of grammatical properties expressible within the theory, and since the number of different kinds of agreement which predicates may manifest is not fixed, the membership of the class of agreement signs being left open, there is no absolute upper limit for the complexity of predicate agreement systems of natural languages, although it is to be expected that attested languages will have a fairly limited number of agreement types, with the controllers for each type identified by relatively simple criteria. In other words, systems such as that of Choctaw are predicted to be rare, not because they conflict with UG, but because they involve relatively many and complex language specific agreement rules. As a matter of fact, most languages do identify predicate agreement controllers on the basis of simple properties such as final (or P-final) subjecthood or direct objecthood, though reference to defined grammatical relations like ergative or absolutive is also not uncommon (and these do indeed have reasonably simple definitions). If reflexive clitics of the kind found in the Romance languages are to be analyzed as a kind of agreement, as proposed here, this suggests the definition of an additional grammatical relation **reflexive** along the following lines:

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<sup>68</sup>Aissen (1990) argues that heads of final non-term arcs can exceptionally control agreement if they head an arc which is overrun by a final term arc. I do not take this proposal into account in the main text, but note that a complete account of agreement in RG/APG would have to include some such mechanism.

## 166. Definition of Reflexive Arc

An arc A which is a member of the *i*th stratum of some constituent *b* is reflexive in the *i*stratum of *b* iff A is an object arc (i.e. a 2 arc or a 3 arc) and A is sponsored by a neighbouring 1 arc B

According to this definition, an arc which replaces the object arc in a clause internal subject-object multiattachment is automatically reflexive, because under present assumptions (embodied in the Overlapping Arc Replacer Law), though not under those of Johnson and Postal (1980), it is necessarily co-sponsored by the subject member of the multiattachment. This finally brings us back to the topic of the structure of reflexive passives and reflexive clitic structures more generally.

Within RG work such as Rosen (1988) and La Fauci (1988), it is assumed that reflexive clitics signal the cancellation of a subject-object multiattachment.<sup>69</sup> Cancellation means that one of the overlapping arcs simply fails to fall through into the final stratum. The coordinate laws of APG entail that an arc can fail to fall through into the last stratum only if it has a distinct local eraser. Because of various fairly fundamental laws of APG, notably the Parallel Assassin Law and the Successor Erase Law, the eraser of the cancelled arc would have to be its successor in reflexive passives, but could not be the 1 arc in semantically reflexive structures, i.e. structures involving overlapping unsponsored arcs. Yet the potential advantage of a multistratal relational theory in the domain of reflexive constructions is precisely that in such a theory, both "genuine" and "false" reflexive constructions can be taken to involve overlapping arcs, unsponsored ones in the former case and members of a successor chain in the latter. If the determination of reflexive morphology cannot be handled alike in the two cases, this potential advantage is lost. Hence if we do not want to give up the assumptions embodied in the laws just mentioned, we need to find an alternative to the informal RG idea of cancelling multiattachments. Fortunately, the essential ingredients of this alternative are all available at this point. I propose that in all reflexive clitic structures, the characteristic subject-object multiattachment is cancelled by replacement of the object arc. In the case of genuine reflexives, this is the only option allowed by the laws of APG Universal Grammar, whereas in cases involving advancement, it is one of exactly two possibilities, the other being erasure by the successor arc. The replacer of the object arc in such situations is a reflexive arc according to the definition given above. Hence all we need to say to complete the syntactic part of the analysis is that Italian has, in addition to subject agreement and (clitic) direct and indirect object agreement what may naturally be called **reflexive agreement**, a kind of agreement, that is, whose controllers are reflexive arcs in the sense defined. Technically, this can be implemented by postulating an agreement **R**ign RA and stating the following **reflexive agreement rule**:

<sup>69</sup>La Fauci (1988: ch. 4) argues that Italian reflexive clitic constructions involve not just subject-object, but more specifically subject-direct object (1-2) multiattachment, with apparent counterexamples involving 3-2 advancement. I adopt his proposal, but will continue to speak of subject-object multiattachment in the text in places where the distinction between the two views is not relevant.

## 167. Italian Reflexive Agreement Rule

If X is the head of a final P arc A with tail b, and Y some constituent, then the head of the RA arc within the agreement specification of X overlaps with the head of the INDEX arc whose tail is Y iff Y is the head of a final reflexive arc B which is a neighbour of A and which selferases

As for the morphological side of reflexive agreement (and agreement more generally), we may assume, largely in analogy with the HPSG analysis, that there are rules which derive lexical entries for agreeing word forms by simultaneously effecting the necessary morphological changes and introducing constraints on the structure of the referential index at the head of the relevant agreement arc. Given the Reflexive Agreement Rule, which as I have just argued applies to all kinds of clitic reflexive structures, the only things which the grammar of Italian must specify about reflexive passives in that language are that they are only possible with third person final subjects and that if there is no overt agent phrase, the thematic role assigned to the active subject must be taken to be borne by ON rather than by UN. To be sure, the Reflexive Agreement Rule itself is a parochial rule of Italian (though similar if not identical rules will be needed for many other languages), but the fact that it can apply uniformly to all kinds of reflexive constructions is due in large measure to universally determined aspects of Italian clause structure.

In the preceding paragraph, we have seen how the idea that reflexive constructions of various kinds involve clauseinternal multiattachment provides the basis for a unified account of plain and reflexive passives. However, it is not the case that all kinds of reflexive constructions involve such multiattachment. In Italian specifically, there is both the reflexive construction with the clitic *si* which has been our concern up to now and a construction involving an independent reflexive pronoun *sé*, often reinforced by *stesso*.<sup>70</sup> As Rosen (1988: esp. ch. 4) shows in detail, the two constructions, though semantically roughly equivalent, are morphosyntactically entirely distinct. Not only is the form of the pronominal elements and their status as clitics vs. free forms different in the two constructions, but more importantly Rosen is able to show that the reflexive clitic construction systematically patterns with other constructions which involve clause internal multiattachment in RG/APG terms, in particular passive and unaccusative constructions. For instance, the past participle in the compound past tenses regularly agrees in number and gender with unaccusative subjects, passive subjects, and subjects in reflexive clitic constructions, but not with subjects of transitive and unergative verbs and only marginally with ordinary (i.e. non-clitic) direct objects. Crucially, clauses involving the full reflexive *sé stesso* pattern with ordinary transitive clauses in this respect, as the following examples show:

168. *Maria ha descritto Gianni*  
 M. has described-M.Sg. G.  
 "Maria described Gianni."

<sup>70</sup>The full paradigm is *me stesso/a, te stesso/a, sé stesso/a, noi stessi/e, voi stessi/e, sé stessi*, i.e. the emphatic element *stesso* agrees in number and gender with the (antecedent of) the pronominal. In the first and second persons, the pronominal element has the same form as the personal pronoun, and the emphatic element *stesso* is homophonous or even identical to the adjective meaning "same", so that *sé* is the only element of the paradigm which is unambiguously reflexive by itself.

169. *?Lea ha abbandonati i suoi sogni*  
 L. has abandoned-M.Pl the-M.Pl her-M.Pl. dreams-M.Pl.  
 "Lea has abandoned her dreams."

(La Fauci (1988: 81))

170. *Maria ha descritto se stessa*  
 M. has described-M.Sg. herself  
 "Maria described herself."

171. *Maria si è descritta*  
 M. REFL is described-F.Sg.  
 "Maria described herself."

According to La Fauci, the generalization which governs past participle agreement in Italian is that a past participle X agrees with a nominal Y only if Y heads a 2 arc in the P-sector of the P arc headed by X. Assuming that reflexive clitic constructions involve 1-2 multiattachment but structures with *sé stesso* do not, they can be subsumed under this generalization. A similar condition can also be argued to govern the choice between the perfect auxiliaries *avere* "have" and *essere* "be" under RG/APG assumptions, the latter being chosen in exactly those cases which involve a 42 multiattachment. This condition properly unites passive and unaccusative constructions with reflexive clitic constructions under the assumption that the latter involve such multiattachment. Note in this connection that participle agreement and auxiliary selection are indeed distinct phenomena, because while the participle agrees with the final subject in all cases where *essere* is selected, the converse does not hold. Further phenomena with respect to which clitic reflexive constructions pattern with passives and unaccusatives include the formation of participial absolutes and the behaviour of the partitive clitic *ne* (Perlmutter (1983)), and in all these cases full reflexives pattern with ordinary NP objects rather than with reflexive clitics. The assumption that 42 multiattachment is the common denominator in all these cases allows the rules which govern these phenomena to treat the structures to which they apply as a natural class, conferring a significant advantage to the RG/APG approach in this domain. A further kind of construction in which the difference between clitic and full reflexives is manifest are causatives. There the full reflexive pronoun counts as a direct object, as shown in the following example from Rosen (1988: 171):

172. *Quell' episodio rischia di fargli odiare sé stesso*  
 this incident risks to make-him hate himself  
 "This incident is likely to make him hate himself."

In this example, the clitic-*gli* on the embedded verb is an indirect object clitic representing its notional subject, which conforms to the Italian rule that the notional subject of the subordinate verb in causatives appears as a direct object if the verb is intransitive and as an indirect object if it is transitive under the assumption that the reflexive pronoun does indeed count as a direct object.<sup>71</sup> If the subordinate verb in a

<sup>71</sup>This rule has analogues in many languages and was for some time even taken to be universally valid, but more recent work suggests that the treatment of the embedded subject in causative unions is precisely the domain where languages may differ from each other, whereas the grammatical relations assumed by the other arguments of the subordinate verb follow from universal laws once that of the subject is fixed (cf. especially Gibson and Raposo (1986)).

causative bears the reflexive clitic, in contrast, its notional subject surfaces as the direct object, as would be expected if it were intransitive. It must be noted right away that the significance of the facts concerning causatives is slightly different from that of those cited before. Auxiliary selection and past participle agreement are governed by conditions which make reference to the fact that the final subject also heads an object arc in the same clause, but do not make reference to transitivity. In contrast, the causative facts by themselves do not prove that the subject of reflexive clitic constructions is multiattached, but suggest that such clauses are finally intransitive. This is consistent with the RG analysis of reflexive clitic constructions as involving cancellation, but not with the APG analysis I have argued for, which involves a 2 arc which self-erases and therefore belongs to the final stratum (though not to the S-graph). Since the latter fact is clearly irrelevant for the causative rule, since arguments represented by non-reflexive clitics on the verb are treated like the corresponding overt arguments by this rule, this would lead one to expect that reflexive clitic constructions should count as transitive for the purposes of causative formation, in apparent conflict with the facts of Italian. However, the conflict may be more apparent than real. Rosen (1988: 171 and note T) points out that on the one hand, in many varieties of Italian causative constructions with a reflexive clitic on the embedded verb. She suggests that this can be explained by a condition which forbids the resolution of a multiattachment in the P-sector of a non-final predicate. As for those varieties of Italian which allow apparent causatives with a reflexive clitic on the subordinate verb, i.e. sentences like the following example, she suggests that these constructions are actually not unions but raising to object constructions:

173. *Quell' episodio rischia di farlo odiarsi*  
 this incident risks to make-him hate-Refl.  
 "This incident is likely to make him hate himself."  
 Rosen (1988: 174)

I admit that even if the Italian facts which are problematic for the present analysis of reflexive clitic constructions can be explained away, there may be other languages in which reflexive clitic constructions pattern with intransitive constructions in genuine causative unions. For such cases, several options suggest themselves within the present framework. One is to appeal to the notion of a reflexive arc defined above to distinguish direct objects which arise as heads of replacers in clause-internal multiattachments from direct objects which are merely coindexed with the subject or not linked to the latter at all. A second possibility is that there are languages in which clause-internal multiattachments are necessarily intransitive, i.e. languages which contain a rule which requires a 2 arc which overlaps with a neighbouring 1 arc to have a 3 arc local successor, since it would then have to be the latter which is replaced. Such a rule would be the mirror image for the rule proposed for Italian by La Fauci (1988: p. 83) (cf. fn. 69).

Before concluding this section, I want to address a question which is implicit in what has been said so far and which I think deserves some further comment. The analysis of Italian reflexive clitic constructions just outlined is like that of Rosen (1988) insofar as it is based on the assumption that only reflexive clitic constructions, but not constructions involving full reflexive pronouns, involve the resolution of multiattachment. The crucial question this raises is of course: could things be otherwise, that is, are there languages in which reflexives which are independent NPs can be shown to arise from the resolution of a multiattachment, and are there

languages which have multiattachment reflexive constructions involving both an overt reflexive and a reflexive clitic, i.e. a kind of clitic doubling construction involving a reflexive rather than a non-reflexive object NP. The crucial data for answering the first question involve "false" reflexive constructions of various kinds, i.e. constructions in which the semantic role of the object is transferred to the subject, because these have to involve multiattachment under RG/APG assumptions, whereas in the case of semantically reflexive constructions, which do not involve transfer of the object role but rather identification of the entity filling the object role with that filling the subject role, syntactic argumentation of the kind illustrated with respect to Italian is required to show that multiattachment rather than mere coindexing is involved. As it turns out, many languages in fact have "false" reflexive constructions which involve full NP reflexives rather than reflexive clitics or other reflexive verb morphology (cf. Geniušienė (1987) for a very wide-ranging survey of various kinds of reflexive constructions). For instance, German has a whole series of reflexive unaccusative predicates like *sich öffnen* "to open", and German reflexives are clearly independent NPs, since they can be separated from the verb, as shown in the following example:

174. *Ich glaube nicht, dass dein Fallschirm sich wirklich öffnen wird*  
 I believe not that your parachute REFL really open will  
 "I don't think that your parachute is really going to unfold."

Reflexives in such structures are plausibly analyzed as heads of replacer arcs, although this does not mean that all occurrences of reflexive pronouns in German are heads of replacers and hence result from the resolution of a multiattachment. The observation that there are overt replacers in reflexive constructions involving multiattachment in some languages is of some theoretical significance because one of the main points of Rosen's analysis of Italian is that the reflexive clitic is not the clitic variant of the full reflexive in the same sense as the nonreflexive object clitics are clitic variants of full pronominal objects, and this insight is preserved in the present account. Now since there apparently are full NP reflexives which are heads of replacer arcs, the fact that Italian *sé stesso* must head an unsponsored arc (or at the least an organic arc, i.e. an arc which, if it has a sponsor at all, has an overlapping sponsor) must be stipulated as part of the grammar of Italian, for instance by means of a rule like the following:

175. **Replacement Limitation Rule (Italian):**

If an arc A replaces an arc B and is co-sponsored by an arc C which is parallel to B, then A self erases

Languages like German which have full NP reflexives in multiattachment structures must of course be assumed to lack an analogue of this rule. Concerning the possibility of reflexive clitic doubling, I know of no language with such a construction. If this reflects a genuine fact about reflexives in natural languages, it could be made to follow from a universal constraint on language-specific agreement rules which would ensure that reflexive agreement can only be triggered by heads of nonsurface arcs (this would be a rule law in the sense of chapter 14 of Johnson and Postal (1980)), but I merely hint at this possibility here since I am not too confident about the validity of the universal claim which such a law would express.

In accordance with the plan set out at the beginning of this section, I now proceed to discuss the RG/APG analysis of impersonal passives. The essential and most controversial aspect of this analysis is the idea that impersonal passives involve a dummy nominal which enters as the head of a 2 arc and advances to 1, forcing the earlier subject into chômage.<sup>72</sup> In APG terms, the dummy is the head of an unstable ghost arc sponsored by the earlier 1 arc and has a local successor which overruns the latter. The final 1 arc headed by the dummy may undergo prødrop, i.e. self-erasure in APG terms, leaving the clause without an overt subject. According to this characterization, impersonal passives involve a 1 arc which is the local successor of a 2 arc and overruns another 1 arc, just like personal passives, the difference between the two being that the overrunner in impersonal passives has no unsponsored predecessor. If the initial stratum of an impersonal passive is transitive, as is possible in languages like Welsh, the unstable ghost 2 arc headed by the dummy overruns the initial 2 arc and hence forces the initial direct object into chômage. This analysis of impersonal passive allows the idea that passive is universally characterized by the promotion of a direct object to subject status and concomitant demotion of the earlier subject to be maintained, but at the cost of postulating invisible dummies in many instances. Critics of the RG/APG analysis of impersonal passives often focus on this last aspect and more or less explicitly denounce it as a cheap trick. However, I think it is easy to show that this kind of criticism is unjust. First of all, prødrop is a widespread phenomenon in the world's languages, and it is difficult to see why it should affect dummies any less than ordinary nominals, and most languages for which analyses of impersonal passives involving invisible dummies have been proposed indeed have uncontroversial subject pro-drop structures. To be sure, there are two kinds of languages for which the hypothesis of an invisible dummy in impersonal passives is somewhat less plausible. The first kind is that of languages like Welsh which have prødrop sanctioned by agreement morphology (including pronominal clitics) on the governing head but in which the verb form used in impersonal passives shows no such agreement morphology but is truly impersonal (cf. Comrie (1977)). The second kind is that of languages which allow pro-drop only in the case of putative dummies in impersonal passives and other impersonal constructions. This group of languages includes German and certain varieties of Dutch (cf. Perlmutter and Zaenen (1984)). In these languages, impersonal constructions contain an overt dummy if no other element occupies the preverbal position in a finite main clause, but if that position is occupied, no dummy appears overtly, as illustrated in the following pair of German examples:

176. *Es wird hier kleinen Kindern kein Schnaps verkauft*  
 it gets here little-Dat children-Dat no schnaps sold  
 "Spirits are not sold to little children here."
177. *Kleinen Kindern wird hier kein Schnaps verkauft*  
 little-Dat children-Dat gets here no schnaps sold  
 (as above)

Data such as these are obviously compatible not only with the silent dummy hypothesis but also with the hypothesis that impersonal constructions in German are truly subjectless and the *Es* which appears preverbally is not a dummy subject but a dummy

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<sup>72</sup>As stated in various places already, the laws of APG assumed here actually allow overrun arcs to assume other relations than 8 in some cases, but for simplicity I will ignore this possibility in contexts where it is not relevant.

topic filling an obligatory position in front of the verb, and this hypothesis has the advantage of allowing one to dispense with a special condition sanctioning pro-drop only for dummies and not for other NP's. Similarly, in the case of Welsh the assumption that impersonal passives are genuinely subjectless would allow one to avoid the conclusion that pro-drop can be sanctioned by two different mechanisms (whatever the details would turn out to be), one for contentful NPs which involves agreement and a different one for dummies which does not involve agreement. Put differently, although the disqualification of the silent dummy hypothesis as *hocus focus* is too sweeping in view of the undisputed existence of pro-drop phenomena, there are indeed languages in which silent dummies do not fall under the same generalizations as other cases of pro-drop and in which a subjectless analysis of impersonal constructions would therefore seem to have an advantage over a silent dummy analysis. However, in my view the most serious potential objections against the promotional analysis of impersonal passives do not involve the visibility or invisibility of the putative dummy subject, but rather the syntactic and morphosyntactic consequences of the assumption that impersonal passives involve promotion and overrun. One objection of this sort is raised by Siewierska (1984: 3.3.). She claims that in those languages which have impersonal passives of transitive clauses the initial direct object remains a direct object, although the promotional analysis predicts that it should lose that status and become either a *chômeur* or an indirect object as a consequence of the entrance of the dummy. However, while it is indeed true that in many languages with impersonal passives of transitive clauses the initial direct object does show the coding properties of a direct object, this is not always the case. For instance, Perlmutter and Postal (1984a) point out that initial direct objects in Welsh impersonal passives differ from direct objects in active transitive structures in that they do not undergo initial consonant mutation. In addition, the evidence from Finnish which Siewierska adduces to show that the initial direct object in impersonal passives has not only the coding properties, but also the behavioural properties of a direct object is far from sufficient to establish her case, because instances of *chômeurs* in other constructions which have some of the behavioural properties of the corresponding terms are attested in the world's languages (cf. for instance the control facts involving French adverbial clauses which were cited at the end of section 3.1. or the raising of passive agents in Halkomelem). In addition, a quite spectacular case in favour of the RG/APG analysis of impersonal passive has been made by Rosen and Wali (1989) in connection with the capability passive of Marathi, examples of which were also cited in section 3.1. The Marathi capability passive looks superficially like a personal passive, but Rosen and Wali are able to show that while the initial subject appears as an oblique phrase in this construction and the initial direct object controls verb agreement with non-perfective predicates, as one would expect in a personal passive structure, the initial direct object nevertheless has neither the behavioural properties of a final 1 nor those of a final 2. They argue convincingly that the peculiarities of the construction can best be captured by treating it as an impersonal passive in which the initial direct object is a final *chômeur* which controls verb agreement in its function as the **brother-in-law** of the invisible final dummy subject. Intuitively, the brother-in-law relation can be thought of simply as the relation which holds between a dummy and the nominal it puts into *chômeage*. A somewhat more precise definition involving the notion of overrun can be given as follows:



## 178. Definition of Brother-in-Law

A dummy D is the brother-in-law of a constituent X iff the root of X is the head of an arc A which is overrun by an arc B whose head is D and which has no predecessor

According to this definition, the dummy subject of an impersonal passive is the brother-in-law of the initial direct object, because the first arc headed by the dummy is the 2 arc which overruns the initial 2 arc and forces it to have a local successor with a distinct R-sign. It is a long-standing assumption of RG and APG that nominals can control agreement and receive case-marking via the brother-in-law relation, though individual languages, and even particular impersonal constructions in a language, may or may not make use of this option. Motivation for postulating brother-in-law agreement and case-marking originally came not from impersonal passives, but rather from non-passive impersonal constructions of various kinds (cf. Perlmutter (1983) for extensive discussion), but once such a notion is available, it can of course be put to work in other contexts than those it was originally conceived for, and this is precisely what Rosen and Wali do. Crucially, under an analysis of impersonal passive of the kind argued for by Comrie (1977), involving spontaneous demotion of the initial subject, there is neither a final subject nor, *a fortiori*, any relation between the demoted initial subject or the direct object and some final subject, and hence no reason to expect any kind of agreement between either the former or the latter and the verb. More generally, the available evidence seems to me to show clearly that although simpler analyses of impersonal passives than the traditional RG/APG analysis may have some plausibility in individual cases, they do not match its explanatory potential. This of course does not mean that the RG/APG analysis itself cannot be improved in any way. One aspect of it which certainly invites proposals for improvement is the status of the initial direct object in impersonal passives of transitive clauses. While we have seen that Siewierska's criticism does not stand up to close scrutiny, the fact remains that in a large number of cases the initial direct object in impersonal passives of transitive clauses does look like a direct object and, perhaps even more importantly, there appear to be no languages where it clearly has the properties of a final indirect object rather than those of a final chômeur. This is one instance of a more general weakness of current versions of RG and APG, namely the fact that overrun term arcs can have either chômeur arcs or 3 arcs as local successors in many situations although only one option seems to be attested cross-linguistically. Apart from impersonal passives, this last observation is valid in particular for raising constructions. As we will see in more detail in section 4.7. below, clausal raising hosts are regularly overrun by the immigrant arc headed by the raised element and may in most cases either assume the chômeur relation or the indirect object relation in accordance with the laws of APG assumed here, yet I know of no instance of a language in which there is clear evidence that a raising host becomes an indirect object rather than a chômeur. In view of these observations, it seems desirable to further restrict the range of successor options for overrun terms without totally reverting to the old view that only Cho arc successors are legal in these cases. One suggestion that could be made in this connection is that a law should be added to APG which requires term arcs overrun by an arc with a non-overlapping sponsor to have Cho arc successors. This would force chômage in cases of overrun induced by dummies and immigrants, but would leave demotion to 3 as an option for terms overrun by a local successor, and hence in particular for 1 arcs overrun in passive constructions. However, the analysis of apparent raising to prepositional object in Irish which is proposed in Postal (1986) and will be discussed in

section 4.7. crucially involves 2 arc immigrants overrun by a dummy which have 3 arc local successors, so it seems that a proposal along the lines indicated will not be viable without further refinement.

Before concluding this section with some remarks on generalized passives, I want to discuss the analysis of pseudo-passives in RG/APG, first reviewing the proposal outlined in chapter 6 of Postal (1986) and then introducing a proposal of my own which takes pseudo-passives to be multi-predicate structures. In view of the arguments cited in the preceding section, it appears that both pseudo-passives involving reanalysis, such as those of English, and genuinely syntactic pseudo-passives, such as those of Norwegian, must be admitted by the theory. The analysis of the former raises no problems specific to RG and APG. We can simply assume, as in the HPSG account outlined in the preceding section, that there is a compounding rule which combines a verb and a preposition into a complex transitive verb with the appropriate semantics. The existence of such a rule is of course incompatible with a strict interpretation of the Universal Alignment Hypothesis, but since there are reasons to reject this hypothesis which have nothing to do with the analysis of pseudo-passives which is at issue here, there is no reason to reject the latter on account of this incompatibility. In contrast to pseudo-passives which are amenable to a complex predicate analysis, pseudo-passives of the type found in Norwegian do raise a problem for RG/APG, because the fact that the passive subject corresponds to a prepositional object in the active construction would seem to threaten the characterization of passive constructions as involving a local successor 1 arc which overruns an earlier 1 arc. One way out of this problem is proposed by Postal (1986: ch. 6). He proposes that the final 1 arc in pseudo-passives is the local successor of a 2 arc which is in turn the local successor of a 3 (indirect object) arc or an oblique arc and that the latter is not erased by its successor, (the 2 arc) but by a replacer instead. Put differently, in pseudo-passives the passive construction proper is "fed" by copy 3-2 or Oblique-2 advancement. The replacer arc associated with the advancement which feeds passivization proper has as its foreign successor a Marquee arc in a FlagMarquee structure whose Flag is the apparently stranded preposition. Under this account, then, the preposition is not really stranded, because nothing is extracted from the PP. Rather, the PP is, as it were, built up around the copy pronoun left by the advancement which yields the local predecessor of the overrunning 1 arc which defines the structure as a passive construction. As far as I can see, this analysis has two main drawbacks. The first is that it must be stipulated that the copy pronoun which is flagged by the preposition must undergo pro-drop, i.e. that the replacer arc supporting it must self erase, creating the appearance of preposition stranding. The second is that pseudo-passives are not restricted to structures involving semantically empty prepositions, which they would have to be under an analysis in which the "stranded" preposition heads a graft arc, because only heads of unsponsored arcs are taken to be visible for semantic interpretation. However, as far as I can see nothing prevents us from assuming that the structure which yields a passivable direct object is not the same in all pseudo-passives. More specifically, I propose that Postal's analysis applies to pseudo-passives which involve semantically empty prepositions, but not to those which involve prepositions with semantic content. For the latter, it might be suggested that they involve raising of a prepositional object out of the PP which immediately contains it into the clause which immediately contains the PP (and the subject to be demoted). This would be a kind of raising from a non-clausal host essentially parallel to possessor ascension, and as such it would be outside the scope of the laws which govern raising from clausal hosts, in particular the Relational Succession Law, hence we would be

free to assume that the raised nominal directly assumes the direct object relation in the matrix clause and then advances to become the subject, putting the initial subject into chômage. Alternatively, it may be suggested that pseudo-passives of the latter kind in fact involve not raising, but rather instantiate a kind of multipredicate construction similar to more familiar instances of clause union as far as its relational structure is concerned but differing from these with respect to the syntactic categories of the predicates. That is, whereas in multi-predicate clauses of the familiar kind, for instance constructions involving auxiliaries or causative predicates, all predicates involved are verbal, in the present case the initial predicate would be the stranded preposition and the main verb would be the head of a P arc starting its career in the second stratum, forcing demotion of the initial predicate. Since the promotion of the initial direct object must follow the entrance of the verb and its subject, a pseudo-passive clause must contain three strata, as is shown in tabular form below:

#### 179. Multi-Predicate Structure for Pseudo-passives

		P	2
1	P	Chô	2
Chô	P	Chô	1

In this table, the first column represents the career of the initial subject, the second that of the verb, the third that of the stranded preposition, and the last that of the object of the preposition. This appears to be a perfectly straightforward structure for pseudo-passives. In particular, unlike the other structures that have been mentioned, it involves no prepositional phrase and hence no raising out of or into a PP structure. As a matter of fact, it is an almost perfect RG/APG analogue of the HPSG analysis proposed for Norwegian pseudo-passives in the preceding section. However, the table given above hides one important problem. Recall that the need for an analysis of pseudo-passives of the Norwegian type in which the preposition and the verb are independent constituents is a consequence of the fact that the latter two elements may be separated by other constituents, in particular a direct object of the verb. The structure shown above, however, is only adequate if the verb does not initialize a direct object. If it does, i.e. if in addition to the arcs shown in the table there is a 2 arc starting in the second stratum, the initial direct object would have to assume some other grammatical relation in the second stratum to avoid a violation of the stratal uniqueness law. Now if the initial direct object goes into chômage, it cannot subsequently become a subject, because this would conflict with the Chômeur Advancement Ban, a very fundamental law of RG and APG which cannot be abandoned without depriving the notion of chômeurhood of much of its substance. A priori, there seem to be two ways to out of this dilemma. The first would involve the initial direct object demoting to indirect object simultaneously with the entrance of the direct object initialized by the verb and then advancing from indirect object to subject. This would make prepositional passives a kind of generalized passives, i.e. passives in which the local predecessor of the overrunning 1 arc is not a 2 arc but some other non-subject arc, specifically a 3 arc in the present case. The second way out would involve the claim that the apparent direct object of the verb is in fact an indirect object in the pseudo-passive (though presumably not when the same verb appears in other constructions). Applying this second idea to the Norwegian example given earlier, the following structure results:

180. *Talgen støptes lys av* \_  
the-tallow mould-Pass candles from  
"The tallow was made into candles."  
(Lødrup (1991: ex. 11))

2			P	
2	P	3	8	1
1	P	3	8	
<i>talgen</i>	<i>støptes</i>	<i>lys</i>	<i>av</i>	ON

This diagram does not indicate sponsor and erase relations, but there is only one instance of erase which needs comment. The second stratum 1 arc headed by the "unspecified human" nominal symbolized as ON is erased by the final 1 arc headed by *talgen*, and since it has a local assassin it does not fall through into the final stratum (recall that such erasure is licit for (arcs headed by) inexplicit nominals like ON, UN, or Z, but not for ordinary nominals). The multi-predicate analysis of prepositional passives which is embodied in the last table has two advantages over the alternative sketched before. The first advantage is that the local predecessor of the final 1 arc is a 2 arc rather than some other nonsubject arc, which means that pseudo-passives are ordinary rather than generalized passives, which seems desirable because Norwegian apparently does not have other instances of generalized passive. The second advantage concerns the fact that the second multi-predicate analysis, in contrast to the first, does not involve a career involving demotion followed by promotion. This means that the structures it requires conform not only to the Chômeur Advancement Ban, but to a stricter condition which would forbid the situation where an arc A has a local successor B with an R-sign which is lower on the relational hierarchy than that of A and B in turn has a local successor C whose R-sign is higher on the relational hierarchy than that of B. Such a condition has been proposed by David Perlmutter in unpublished work cited by Postal (1986a: 350), who proposes to adopt it under the name "The Demotion Ban". I follow Postal's lead and, correcting an obvious mistake in his formulation, propose the following one:

#### 181. The Demotion Ban

If A is the local successor of B and the R-sign of A outranks that of B, then B is not a local successor

Note that the Demotion Ban together with the Motivated Chômage Law entails the Chômeur Advancement Ban and hence makes it superfluous. In addition, it forbids a whole class of analyses which would involve a nominal seesawing between higher and lower term relations. This seems to me to be a highly desirable property of the new law, because the abandonment of the early RG assumption that all overrun term arcs must have Chô arc local successors in APG and later RG opened the way to a large number of analyses which do not actually seem to be needed, such as a direct and an indirect object repeatedly swapping places. In view of this, the fact that the second multi-predicate analysis of pseudo-passives conforms to the Demotion Ban clearly counts as a point in its favour, and since it is as straightforward as the first multi-predicate analysis in most respects, I propose to adopt it. There is only one potential problem that needs to be dealt with, namely the fact that the apparent direct object of the verb in pseudo-passives of transitive verbs is claimed to be an indirect object instead, although it neither has the kind of semantic role one would expect from

an indirect object nor is marked with a preposition. While I do not know enough about the details of Norwegian syntax to suggest a definitive solution to this problem, the broad similarities between English and the Mainland Scandinavian languages in the domains of case-marking and multiple-object constructions suggest a proposal which may be worth testing. This involves the assumption that apparent prepositionally marked indirect objects in Norwegian are not really indirect objects but rather obliques, as has been argued for English by Farrell (1994: 233). Farrell argues that the double object construction in English involves 3two advancement, but that prepositionally marked notional indirect objects are nevertheless heads of oblique rather than 3 arcs, i.e. pairs like *John gave Bill a book* and *John gave a book to Bill* differ both with respect to initial grammatical relations and with respect to the fact that the former involves 3-2 advancement while the latter is monostratal, as is shown in the following two tables:

182.

1	P	3	2
1	P	2	Cho
<i>John</i>	<i>gave</i>	<i>Bill</i>	<i>a book</i>

183.

1	P	2	Obl
<i>John</i>	<i>gave</i>	<i>a book</i>	<i>to Bill</i>

I cannot present the arguments for assuming these structures in detail here (cf. Farrell (1994: 3.3. and 4.4), but they appear to me to be quite solid. To give just one example for the sake of illustration, Farrell notes that neither the recipient in a double object construction nor the object in a raising to object construction can undergo Tough Movement, while the theme in NP plus PP structures can, i.e. both examples like *\*Linguists in Australia are easy to send e-mail* and ones like *\*such people are hard to believe to have failed* are systematically illformed, whereas examples like *e-mail messages are easy to send to linguists in Australia* are good. This contrast can easily be accounted for by combining the assumptions about the structure of constructions with two objects which have just been specified with a condition which restricts Tough Movement to initial direct objects. Farrell not only argues in the passages cited that the first postverbal NP in double object constructions in English is a 32 advancee, on pages 232-233 he proposes that in most varieties of English there are no final indirect objects, i.e. 3-advancement is obligatory. He further proposes that those varieties of English which allow final indirect objects are precisely those which allow passive clauses like *the car was sold Zoe by a friend*, i.e. passives of ditransitive verbs in which the direct object becomes the subject and the indirect object appears as a bare postverbal NP. Such structures are accounted for by the assumption that there are varieties of English which allow final indirect objects and mark them just like direct objects, i.e. by postverbal position in the case of full NPs and by postverbal position and objective case in the case of personal pronouns. The distinction between final direct and indirect objects could either be a matter of word order, with the latter preceding the former (this is what Farrell proposes) or alternatively it might be suggested that even in the liberal varieties of English, final 3 arcs are only licit if there is no surface (i.e. unerased) 2 arc. Assuming now that the grammar of Norwegian treats final indirect objects similarly to that of the liberal varieties of English, i.e. final 3 arcs are possible under certain conditions and their heads appear as bare NPs like those

of 2 arcs, the analysis of pseudo-passives which I have proposed no longer faces any fundamental difficulty. The only stipulative aspect which remains is that alternative initialization of a nominal which would normally be a direct object as an indirect object must be restricted, perhaps in such a way that it is only possible in the presence of a direct object inherited from a preceding stratum (it may be that some of the semantic restrictions on passivization "across" an apparent direct object could be formulated as additional restrictions on this kind of alternative initialization). It remains of course to be seen whether the idea that apparent direct objects in Norwegian pseudo-passives are final indirect objects proves to be tenable, but if so, I think the multipredicate analysis of pseudo-passive which I have proposed can fairly be said to be a nearly optimal analysis, and if not, it may still serve to illustrate the potential of multipredicate analyses in domains other than those of auxiliaries and causatives.

In order to conclude this section, I now briefly return as promised to the topic of generalized passives, i.e. passives in which the overrunning 1 arc has a local predecessor which is not a 2 arc. These pose no technical problem for RG/APG, requiring only a somewhat broader definition of passive than the one originally proposed by Perlmutter and Postal (1983a), or alternatively the definition of a notion of generalized passive of which ordinary passive is just a special case (though a very widespread one). To this effect, the following two definitions can be proposed:

**184. Definition of Generalized Passive Clause**

A clause with root *b* is a generalized passive clause exactly if there are arcs *A*, *B*, and *C* with tail *b* such that *A* is a 1 arc, *B* is a 1 arc which overruns *A*, and *C* is a core arc which is the local predecessor of *B*

**185. Definition of Passive Clause**

A clause with root *b* is a passive clause exactly if it contains arcs *A*, *B*, and *C* with tail *b* such that *A* is a 1 arc, *B* a 1 arc which overruns *A*, and *C* a 2 arc which is the local predecessor of *B*

Since the second definition entails the first, each passive clause is a generalized passive clause in the technical sense, though when I speak of generalized passives without further specification I have in mind generalized passives which are not passives in the sense of the second definition.

A point worth stressing because it does not follow from anything which has been said up to now is that generalized passives are always personal passives. The reason is that in impersonal passives the local predecessor of the overrunning 1 arc is a ghost arc (more specifically, an unstable ghost arc, though this is not crucial in the present context), hence an arc whose head is a dummy, and one of the laws of basic clause structure proposed in Perlmutter and Postal (1983), the Nuclear Dummy Law, requires that dummies head only nuclear term arcs. This law can be formulated in APG terms as follows:

**186. The Nuclear Dummy Law (APG version)**

If a node *D* is the head of a ghost arc *A*, then there is no arc *B* such that *D* is the head of *B* and *B* is not a nuclear term arc

Note that his law does not specifically constrain impersonal passives, but rather all structures containing dummies. Nevertheless, it has a nontrivial consequence for the analysis of the former. Only the Nuclear Dummy Law guarantees that the dummy which advances in an impersonal passive clause indeed enters as the head of a 2 arc, as I have assumed all along, and hence only a relational theory which contains this law or something essentially equivalent entails that in impersonal passives of transitive clauses neither the initial subject nor the initial direct object can be a final nuclear term. Since the difference between ordinary and generalized passives is in fact minimal in RG/APG terms, one may wonder why generalized passives are apparently so rare. I have no very enlightening suggestion to make concerning this point, but it may be that there is a tendency for grammars of individual languages to reduce the structural ambiguity of surface strings. In connection with such a tendency, it would be relevant that if a language allows proper generalized passives, each instance of a personal passive construction in which the final subject corresponds to something other than the initial direct object will be structurally ambiguous between an analysis involving a combination of advancement to direct object followed by passive and a generalized passive analysis. However, since many kinds of structural ambiguity are in fact tolerated in natural languages, this suggestion must be regarded as very tentative indeed.

### 3. 4. The Unaccusative Hypothesis and the 1-AEX

So far in this chapter, I have been concerned to show that plausible analyses of the various kinds of passive constructions found in the world's languages can in fact be formulated within the two varieties of generative grammar whose potential is explored in the present work. In this section, I want to turn to a notorious gap in the distribution of passive constructions, namely the fact that certain intransitive predicates yield impersonal passives and pseudo-passives, while others do not. In a famous article, Perlmutter (1978) argues that this distributional gap follows from the **Unaccusative Hypothesis**, the assumption that there are two types of intransitive predicates in natural languages, **unergatives**, which have, in RG/APG terms, an initial subject but no initial direct object, and **unaccusatives**, which have an initial direct object but no initial subject. Together with the RG/APG characterization of passive and the 1-AEX (or some stronger law such as the T-AEX), the Unaccusative Hypothesis yields the prediction that only clauses with unaccusative predicates can be passivized. The reason for this should be transparent by now: Passives are defined as structures in which a 2 arc has a 1 arc local successor which overruns a distinct 1 arc. Since the initial stratum of an unaccusative predicate contains no 1 arc by definition, one has to be created. The only way to achieve this is to let the 2 arc (or at worst some other non-subject arc, if there is one and if this option is not to be precluded by law) have a 1 arc local successor, and since the 1 AEX forbids clauses containing more than one 1 arc which is a local successor, passivization is blocked. At first sight, it might seem that the effect of the 1 AEX in clauses with unaccusative initial strata could be bypassed by the introduction of a dummy subject, but this is not so, because the Ghost Arc Law requires every ghost arc to have a local successor with the same R-sign as its sponsor. In the case of an initially unaccusative clause, the sponsor of the ghost arc would have to be the unaccusative 2 arc, hence the ghost arc would have to have a 2 arc local successor. However, this is impossible because it must at the same time be overrun by

the local successor of its sponsor for the clause to qualify as a passive clause and hence must have successor which is not a nuclear term arc in accordance with the Overrun Term Successor Law (incidentally, this shows that dummies, even invisible dummies, cannot save every structure which would otherwise be ungrammatical). In order for the prediction that only initially unergative clauses but not initially unaccusative clauses can be passive to be of interest, the distinction between the two classes of intransitive predicates must of course correlate with other properties than the possibility of forming passives, because otherwise one would simply label all predicates which can be passivized as unergative and the others as unaccusative, and nothing beyond a terminological innovation would have been gained. One such correlation concerns the semantics of intransitive predicates. Rosen (1984) shows in detail that while it is not possible to predict the membership of the two classes of intransitives on the basis of some universal semantic criterion, the fact remains that there is a strong cross-linguistic tendency for predicates denoting eventualities which do not involve a controlling or consciously experiencing participant to be unaccusative, while intransitive predicates denoting eventualities which do involve such a participant tend to be unergative. For instance, predicates such as „grow“, „rot“, „disappear“, etc., are often unaccusative, and non-verbal predicates quite generally appear to be so, while intransitive predicates whose subject argument is, broadly speaking, agentive, such as „work“ or „listen“, are typically unergative. More important than the somewhat elusive semantic correlates of unaccusativity, however, are its syntactic and morphosyntactic correlates. In some languages, a whole cluster of morphosyntactic properties of predicates and the clauses that contain them correlates with the unaccusative/unergative distinction. In Italian, for instance, this cluster includes at least the following phenomena (cf. e.g. Rosen (1988) and Perlmutter (1983)):

- Unaccusative predicates take the perfect auxiliary *essere* "be", while unergatives take *avere* (in the active construction, a point to which I will return)
- The (final) subject of an unaccusative can be represented by the partitive clitic *ne*
- Only unaccusative predicates agree with their final subject in the active construction
- Participial absolutes can only be formed with unaccusatives

Interestingly, some of these criteria not only divide the intransitive predicates into two groups, but actually put the final subjects of unaccusatives together with the direct objects of transitives. In particular, this holds for the partitive *ne* criterion, because if *ne* is used with transitive predicates, it represents the direct object rather than the subject. This is shown by the following triplet of examples, the first of which shows the partitive clitic with an unaccusative predicate, the second with a transitive predicate, while the third illustrates the impossibility of *ne* with unergatives:

- |      |                                |                                  |
|------|--------------------------------|----------------------------------|
| 187. | <i>ne sono spariti molti</i>   | "Many of them have disappeared." |
| 188. | <i>ne ho invitati parecchi</i> | "I have invited many of them."   |
| 189. | <i>*ne hanno reagito molti</i> | "Many of them have reacted."     |

To some extent, the same can be said for the agreement criterion. In contemporary Standard Italian participles do not normally agree in gender and number with overt direct objects and direct objects which have been wh-extracted, but only with direct objects represented by verbal clitics. However, such agreement is marginally possible, whereas agreement of the participle with the subject in the presence of a direct object



is as categorically excluded as agreement with an unergative subject (La Fauci (1988: ch. 4), R. Piva (p.c.)). This is shown by the following set of examples:

- |      |   |                               |
|------|---|-------------------------------|
| 190. | <i>Vera è tornata a casa</i>                  | "Vera has returned home."     |
| 191. | <i>Vera ha telefonato/*telefonata a Carlo</i> | "Vera has phoned up Carlo."   |
| 192. | <i>?Vera ha comprata una macchina</i>         | "Vera has bought a car."      |
| 193. | <i>Vera ha comprato/*comprata un trombone</i> | "Vera has bought a trombone." |

There is, then, some preliminary evidence suggesting that unaccusative subjects have something in common with direct objects. Before pursuing this further, I want to return to the issue of the impossibility of passivizing unaccusatives. Obviously, this can only be tested in languages where the relevant kinds of passives, i.e. impersonal passives and pseudo-passives, are attested and are distinguishable from other impersonal constructions. In Italian, this is not the case, because this language has no non-reflexive impersonal passives and the morphology associated with reflexive impersonal passives also serves for a number of nonpassive constructions, as has been shown in part in the preceding section (for more details, cf. again Rosen (1988)). However, the predictions of the unaccusative hypothesis can be tested in the domain of English pseudo-passives. Perlmutter and Postal (1984) show in detail that these cannot be formed with unaccusative predicates, as is illustrated by the following pair of examples (Perlmutter and Postal (1984: 101)):

194. *the package was stepped on by a camel*
195. *\*the dome was collapsed under by the model*

While it must be pointed out that not all pseudo-passives based on unergatives are fully natural in English, those based on putative unaccusatives are definitely ungrammatical. It might be suspected that the ungrammaticality of pseudo-passives based on unaccusative predicates is due to the fact that the latter typically have non-agentive and frequently even inanimate subjects, but this can not be the true explanation because it is easy to show that English passive in general has no such restriction, as passive clauses like the following, for whose subject the notion of animacy or agency would have to be stretched to the utmost, are nevertheless fully grammatical (Perlmutter and Postal (1984: 103)):

196. *the consonant cluster is followed by a morpheme boundary*

Hence if some semantic constraint were responsible for the uniform ungrammaticality of pseudo-passives based on putative unaccusatives, this would have to be one which is relevant for pseudo-passives but not for ordinary passives, clearly an undesirable result. It thus appears that there is some plausibility to the claim that certain intransitive predicates in English fail to allow pseudo-passive because they are unaccusatives. Obviously, however, the case would be strengthened if the putative unaccusatives could be shown to form a natural class with respect to criteria other than passivization. Their semantics certainly meets the rough characterization of typical unaccusatives given earlier, but since there appears to be no really hard and fast semantic basis for predicting unaccusativity, one would like to have morphosyntactic evidence for their unaccusative status as well. While English is not as generous as Italian in this respect, at least one morphosyntactic criterion can be brought to bear on this issue, namely the possibility of forming participial adjectives from intransitive verb stems. As has been

pointed out by Rappaport and Levin (1988), such adjectives can only be formed from putative unaccusatives. For instance, we can have *a fallen angel*, *a collapsed building*, or *a wilted flower*, but not *a reacted guinea-pig* or *a worked linguist*. Since participial adjectives are regularly formed from transitive verbs and the modified nominal is interpreted as the direct object in these cases (as in *an unwashed dog*, for instance), this again puts subjects of unaccusatives on a par with direct objects. Summing up these remarks, then, I think we can say with some confidence that the claim that unaccusatives cannot passivize receives some support from English. Considerable additional support for this claim comes from languages which have impersonal passives, such as German and Dutch, Welsh, and many others. In the majority of these, putative unaccusatives fail to yield impersonal passives, as the following two Welsh examples from Perlmutter and Postal (1984a: 145) illustrate:

197. *dannswyd gan y plant*  
 danced by the children  
 "It was danced by the children."

198. *\*gwywyd gan y blodau*  
 wilt-Pass by the flowers  
 "It was wilted by the flowers."

However, there are natural languages with structures which look like impersonal passives of unaccusative clauses. One such language is Lithuanian, and the construction in question is illustrated by the following example from Timberlake (1982: 511):<sup>73</sup>

199. *Vaiko sergama*  
 child-Gen sick-Ntr./Sg.  
 "(evidently) the child is sick."

In addition, Lithuanian also has apparent impersonal passives of personal passives, as shown in the following example, again from Timberlake's work (1982: 517, diacritics omitted):

200. *Tas lapelis veio nupustas*  
 that leaf (Nom. Sg.) wind (Gen.) blown (Nom./Masc./Sg.)  
 "That leaf was blown down by the wind."

Such structures would seem to constitute a serious problem for a relational theory of grammar which embodies both the Unaccusative Hypothesis and the 1AEX. However, Postal (1986: ch. 5) argues that such structures are not impersonal passives but rather impersonal constructions of the kind instantiated by English examples like *there seem to be no platypuses available*. Postal suggests that these examples look like passives because "passive" verbal morphology in this language correlates not passive in the technical sense of RG/APG, but rather with a property which passives and impersonal constructions have in common, namely the presence of a 1 arc which is overrun by an arc which is not its replacer, what Postal calls an **insecure** 1 arc. In genuine passives, the insecure 1 arc is the 1 arc which is overrun by the 1 arc local

<sup>73</sup>According to Timberlake, the impersonal passive in Lithuanian has an evidential sense corresponding approximately to what is expressed by the bracketed adverbial in the translation.

successor of a 2 arc which defines the clause as passive, whereas in nonpassive impersonal constructions it is a 1 arc overrun by a stable ghost arc, i.e. a 1 arc ghost which it sponsors. As for the marking of the agent phrase, this can of course be taken to be a consequence of its *chômeur* status in both passives and non-passive impersonal constructions, since no law of RG/APG yet proposed (nor any analogue of such a law in any other theory of UG, as far as I am aware) entails that *chômeurs* which arise in passive constructions must be marked differently from *chômeurs* which arise in non-passive impersonal constructions, although individual languages are free to make such a distinction.

Before proceeding further, I want to discuss an objection against Postal's analysis of putative violations of the 1-AEX which is almost certain to be raised. It is this: If, on encountering potential counterexamples to the prediction that there are no passives with unaccusative initial strata, we are free to say that what we have before us is not really a passive but some other structure involving an insecure 1 arc, does this not make the prediction vacuous? The answer is: not totally. The crucial point is that the syntactic structure of impersonal passives is different from that of nonpassive impersonal constructions even if this difference has no morphological reflex. Hence if there is a rule in the grammar of the language under consideration which is sensitive to this difference - this may well be a syntactic rule without any morphological reflex - this rule should treat those apparent passives which seem to contradict the 1 AEX differently from those which do not, because only the latter are or can be associated with a true passive structure, i.e. a structure containing a local successor which overruns a 1 arc, whereas the former may contain an overrunning 1 arc but only if the latter is **not** a local successor. I must admit that I know of no attempt to actually show for some language like Lithuanian that the structures associated with apparent passives are indeed of two different kinds depending on whether they can be genuine passives under RG/APG assumptions or not, and I also admit that the argumentation required to show this would perhaps have to be quite intricate, but it is important to be aware that there is room for argumentation, because I suspect that the absence of arguments in favour of the RG/APG analysis of passive based on languages like Lithuanian may have something to do with the fact that many authors simply did not take into account the possibility of constructional homonymy.<sup>74</sup> Appeal to constructional homonymy is of course a last resort in some sense, but since no theory I know of excludes constructional homonymy in a principled way, it is nevertheless a possibility to be reckoned with.

I want to conclude this section, and with it the present chapter, with a few remarks on the treatment of unaccusative phenomena in HPSG. This theory is not equipped to make the distinction between unaccusative and unergative predicates in the same terms as RG and APG, because it defines only one stratum of grammatical relations. Nevertheless, the distinction can be made at the cost of assuming a primitive which would not otherwise be necessary, namely the value *middle* of the attribute VOICE which was introduced in section 3.2. As some may have suspected, unaccusative predicates are characterized within the present version of HPSG simply by having *middle* as their VOICE value. Given the formulation of the various passive

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<sup>74</sup>Postal (1986) is itself no exception to my claim that there is no published work supporting the RG/APG analysis of passive in the way suggested in the text. All he does is show that the Lithuanian data (as well as similar facts in Turkish) do not falsify the conjunction of the 1-AEX, the Unaccusative Hypothesis, and the advancement analysis of passive.

rules in section 3.2., all of which apply to input predicates with VOICE value *active*, unaccusatives do not undergo passivization. Concerning the other syntactic correlates of unaccusativity, many of these can also be captured fairly straightforwardly by appealing to voice specifications. For instance, auxiliary selection in Italian can be handled by specifying in the lexical entry for *essere* that its complement VP's VOICE value is not *active*, whereas in the case of *avere* the complement must have precisely the latter VOICE value. Of course, this is not the whole story. For instance, for auxiliary selection to work out properly it must be ensured that reflexive predicates also have *middle* as their voice specification, and additional statements are required to handle past participle agreement and *ne*-cliticization. I think the weakness of the approach is obvious without going into further detail here. The problem is not that of formulating rules to account for the phenomena mentioned, but rather the fact that the essentially diacritic approach involving the VOICE feature is incapable of expressing what the various phenomena have in common. This is a weakness which has to do with the general architecture of monostratal theories of syntax, the price which unavoidably has to be paid for their greater inherent restrictiveness.

## Chapter 4: Raising Constructions

### 4. 1. The morphosyntactic reality of raising constructions

In this chapter, I want to discuss some problems in connection with the analysis of what are commonly called **raising constructions** (within RG, the term "ascension" is also used). Pretheoretically, raising constructions can be identified as constructions in which some possibly unexpressed argument, usually the subject, of an embedded clause-like constituent is interpreted as coreferential with a syntactic argument of the matrix predicate which is not a semantic argument of the latter. In this respect they contrast with **equi constructions**, which are similar in all other respects but in which the controlling nominal is a semantic argument of the higher predicate. I will from now on refer to equi and raising constructions jointly as **control constructions**, and to the matrix nominals controlling a gap or pronoun in the embedded clause as **controllers**, and predicates which optionally or obligatorily appear as matrix predicates in raising constructions will be called **raising governors**. The present use of the term control deviates from that which is common in recent Transformational Grammar, where the term control is used only for what is called equi here. The reason for the deviation is that I find it useful to have a term covering both equi and raising. As an additional terminological point, note that I will refer to the clause or clause-like constituent which contains the controlled gap or pronoun in a raising construction as the (raising)**host**. Since semantic argumenthood is not always easy to determine directly, a number of more easily observable phenomena which may reasonably be assumed to be correlates of it are commonly used to decide whether a particular control construction is of the equi or of the raising variety. One such criterion is related to the possibility for the controller to be an expletive. In raising constructions, the controller may be an expletive exactly if the embedded predicate allows an expletive to occur in the controlled argument position, whereas in equi constructions both the embedded and the matrix predicate must be compatible with an expletive for this situation to be legal. In addition, only weather expletives and not expletives corresponding to a nominal or clausal argument are possible with equi predicates. This is illustrated by the following triplet of English examples:

- 201. *it seems to bother Bill that Jane smokes*
- 202. *\*it tries to bother Bill that Jane smokes*
- 203. *it seldom rains without snowing*

A related criterion distinguishing between equi and raising constructions is the possibility of idiom-chunks as controllers, which exists only in raising but not in equi constructions:

- 204. *Bill's goose seems to be cooked*
- 205. *Bill's goose wants to be cooked*

While both of these sentences are structurally well-formed, only the former has the idiomatic reading of "cook someone's goose", whereas the latter only has the somewhat bizarre reading according to which Bill owns a real goose which has the wish to be cooked. Another diagnostic for raising is the lack of existential entailments

with respect to the controller. This is illustrated by the following two examples, only the latter of which entails the existence of a unicorn:

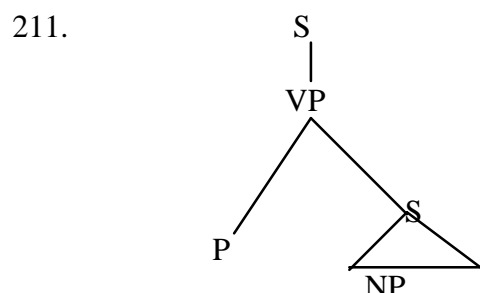
206. *a unicorn appears to be approaching the house*  
 207. *a unicorn tries to approach the house*

The last of the semantically based criteria commonly used to distinguish raising from equi constructions is the presence of selectional restrictions imposed by the matrix predicate in the latter but not the former, which is illustrated by the next three examples:

208. *#the analysis of raising tries to drive linguists crazy*  
 209. *raising constructions tend to drive linguists crazy*  
 210. *#raising constructions tend to enjoy driving linguists crazy*

The first of these examples is semantically deviant (indicated by the sharp sign) because a selectional restriction associated with *try* has been violated, essentially the requirement that the subject of *try* should denote an animate entity. In contrast to this, the second example is fully acceptable because the raising verb *tend* does not impose selectional restrictions on its subject. Finally, the third example is again deviant, despite the fact that *tend* is a raising verb, because a selectional restriction associated with the embedded verb *enjoy* is violated, again one essentially amounting to the requirement that the subject should denote an animate entity. Note that the issue here is not whether semantic deviance is a kind of ungrammaticality or merely a semantic property inducing unusual, possibly metaphorical interpretations; all that matters is that semantic deviance of the kind just illustrated is never due to the interaction of a raising verb with its "raised" argument, precisely because the latter is only a syntactic and not a semantic argument of the former.<sup>75</sup>

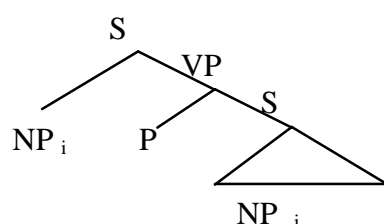
The standard transformational account of the difference between equi and raising constructions, as first developed in detail in Rosenbaum (1967), essentially amounts to the claim that raising constructions are derived from deep structures of the following form, where NP is the controller and P the matrix predicate:



<sup>75</sup> I use the terms "verb" and "predicate" more or less interchangeably in contexts where function rather than category membership is primarily relevant. This does not mean, of course, that I think the terms are always interchangeable.

Whereas equi constructions are derived from deep structures of the following form:

212.



Here, P is again the matrix predicate, and the two occurrences of NP<sub>i</sub> represent two coreferential NPs. The surface structure of a raising construction is derived by moving the controller NP out of the embedded clause and making it the subject of the matrix clause, while the surface structure of equi clauses is derived by deleting the lower NP. In both cases the result is the same, but because deep structure rather than surface structure is assumed to be the input to semantic interpretation, the semantic differences between the two constructions are nevertheless accounted for. In more recent transformational accounts of equi and raising in the wake of Chomsky and Lasnik (1977), the raised NP does not simply disappear from the complement clause, but leaves a trace there, and the subject of the complement clause of an equi construction is taken to be an abstract pronominal coindexed with the controller rather than a full NP deleted under coreference with the latter. Nevertheless, these more recent accounts share with the classical one the idea that the controller in raising constructions is not a deep-structure constituent of the matrix clause and also the assumption that this explains the semantic differences between equi and raising constructions. However, if all differences between equi and raising constructions are ultimately semantic, it might be possible to devise an analysis in which the syntactic structure and even the semantic functor-argument structure of the two is identical and the differences are exclusively a function of the lexical semantics of the matrix predicates. This line of research has been pursued in Montague Grammar and its extensions, notably Generalized Phrase Structure Grammar, and is summarized in Dowty (1985). Dowty argues that control predicates in the broad sense, i.e. including both equi and raising predicates, are simply predicates which take at least an NP-type type argument, the controller, and a VP-type argument, the constituent whose missing subject is interpreted as bound by the controller, whose lexical meaning is such that it gives rise to entailments involving the entity denoted by the NP argument having the property expressed by the VP argument. Formally, such entailments can be guaranteed by the use of so called **meaning postulates**, formulas of IL which must be true in every admissible model.<sup>76</sup> More specifically, subject control predicates, i.e. equi predicates like *try* and raising predicates like *seem*, are characterized by the fact that their translations are among the values which the metavariable  $\alpha$  can take in the following schema, where  $\beta$  represents some non-trivial property of propositions (the schema for object-controlled equi predicates would be analogous except that the predicate would of course have one more argument and the controller would be its second-to last rather than its last argument):

<sup>76</sup>Meaning postulates essentially serve to narrow the range of admissible models for the translation language in such a way as to take account of the semantics of ordinary content words. Thus it must not be thought that the use of meaning postulates complicates a grammar, because lexical semantics will have to be accounted for in some way in any conceivable approach.

### 213. Schematic Meaning Postulate for Subject Control Predicates

$$\forall P \forall x [\alpha(\wedge P)(\wedge x^*) \rightarrow \beta(\wedge P(\wedge x^*))]^{77}$$

A control predicate is semantically of the equi variety exactly if its translation figures as the value of the metavariable  $\alpha$  in an instantiation of the schema above in which the individual variable  $x$  occurs in the value of the metavariable  $\beta$ . For instance, setting  $\alpha$  as 'try' one of the pertinent instantiations of  $\beta$  would be a formula of IL paraphrasable as "x intends to bring about  $\wedge P(\wedge x^*)$  by x's actions", and since the controller variable  $x$  figures crucially in the part corresponding to  $\beta$ , *try* is an equi predicate. Control predicates of the raising variety can be semantically characterized in a negative way as those which are not associated with any meaning postulate which involves an instantiation of  $\beta$  containing the controller variable. As Dowty (1985) points out, there is also a meaning postulate schema which positively expresses the fact that raising predicates are those control predicates which do not entail anything about the controller which is not a function of the proposition formed by putting the controller and the semantic value of the controlled constituent together. This schema is the following:

### 214. Meaning Postulate Schema for Raising Predicates

$$\forall P_1 \forall P_2 \forall Q_1 \forall Q_2 [[P_1(\wedge Q_1) \leftrightarrow P_2(\wedge Q_2)] \rightarrow [\alpha(\wedge P_1)(\wedge Q_1) \leftrightarrow \alpha(\wedge P_2)(\wedge Q_2)]]$$

A predicate is a raising predicate if and only if its translation is a proper instantiation of  $\alpha$  in the schema just given. Thus if indeed the differences between raising and equi constructions are merely semantic, the Montagovian approach is definitely to be preferred. Unfortunately (or fortunately), however, this is not the case. As Jacobson (1990) shows in detail, even in English, a language where raising and equi constructions are at first glance indistinguishable morphosyntactically, there are nevertheless differences between the two constructions which cannot be derived from their different semantics. One such difference is that infinitival complements of equi verbs cannot be subject to null complement anaphora, as the following two examples show:

215. A: *did you finish your thesis on time?*  
       B: *well, no, but I tried*
216. A: *does he know what he's talking about?*  
       B: *\*well, he seems*

Likewise, equi complements can be replaced by nominals, which does not hold true for raising complements:

217. *nobody has ever tried this before*  
 218. *\*the global climate has never tended this before*

Moreover, equi complements can be passivized, whereas raising complements cannot:

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<sup>77</sup>The notation  $x^*$  is an abbreviation for  $\lambda P[P(x)]$ , i.e. the IL expression which denotes, relative to any set of coordinates, the characteristic function of the set of all extensional properties of the individual denoted by  $x$ .



219. *it has never been tried to cross a skunk and a domestic cat (by anyone)*  
 220. *\*it has never seemed to vanish into thin air (by anything other than a unicorn)*

Finally, unlike raising hosts equi complements can be wh-extracted:

221. *what did you try before you gave up?*  
 222. *\*what do cats tend when you feed them too much?*

It must be admitted that not all of the phenomena just enumerated pick out all equi verbs - null complement anaphora in particular seems to be subject to idiosyncratic lexical restrictions - but still it seems that the complements of all putative equi verbs have at least some of the properties enumerated, while those of the putative raising verbs have none of them. Quite generally, then, it seems that the clausal or clauselike complements of raising verbs are syntactically relatively inert, similarly to obliques, whereas those of equi verbs show a behaviour quite similar to that of direct object NPs. This impression is confirmed in languages in which the (final) transitivity of a clause has overt morphological reflexes, because in such languages the matrix clauses of raising to subject constructions regularly show the hallmarks of final intransitivity despite the fact that they contain a final subject and a clause like complement which could be the direct object (the situation is different with raising to direct object, of course, because the raised nominal in these constructions necessarily makes the clause transitive, regardless of the grammatical relation of the raising host). As an illustration of this effect of raising to subject on transitivity, consider the following pair of examples from K'ekchi Mayan (Berinstein (1985: 259, 272), the item glossed Nom in the first example is a verb-nominalizing morpheme):

223. *t-Ø-incu-aj      x-nau-bal      li K'ekchi*  
       Tns-B3-A1-want A3-know-Nom the K'ekchi  
       "I want to understand K'ekchi."  
 224. *yo-qu-in      chi alinac*  
       Cont-Asp-B1 Prep run  
       "I am running."

The raising predicate in the second example is the item glossed "Cont", an aspectual predicate. The contrast in transitivity between the equi and the raising example shows up both in the form of verbal agreement (the first person singular subject is cross-referenced on the matrix predicate by the series A affix in the equi example and by the series B affix in the raising example) and in the prepositional marking of the clausal complement in the raising case (the element *chi* marks unquestionable obliques in addition to clausal complements in raising constructions, whereas subjects and direct objects are always unmarked). While not all languages show the contrast in transitivity between equi and raising constructions as beautifully as K'ekchi, I know of no language in which morphological diagnostics for transitivity clearly contradict the assumption that raising clauses are finally intransitive or in which syntactic tests of the kind brought to bear on English above group raising hosts with direct objects. In this context, it must be mentioned that Chung (1989: section 3.3.) presents data involving *tutuhun*, the Chamorro counterpart of the English aspectual verb *begin*, which she

claims contradict the hypothesis that raising to subject constructions are universally intransitive. However, assuming that the semantics of *tutuhun* is indeed parallel to that of English *begin*, it can be argued that it is not a raising verb according to the semantic characterization of that notion just outlined, because it is clear that at least with animate subjects *begin* gives rise to entailments relative to its subject which cannot be derived from its function as the semantic subject of the VP complement. For English, it has actually been argued by Perlmutter (1970) that there are two verbs *begin*, one an equi predicate and the other a raising predicate, but as far as I can tell nothing prevents us from assuming that Chamorro has only one lexeme *tutuhun*, which has equi-type entailments with animate subjects and raising-type entailments with inanimate ones, and such a predicate would technically be an equi predicate because its meaning would not be fully definable in terms of a sentence embedding counterpart. Summing up, the hypothesis that raising constructions are universally intransitive remains the strongest hypothesis compatible with the presently available evidence, though there are potentially problematic data which deserve to be further investigated. Put differently, I maintain that the syntactic distinction between raising and equi control correlates precisely with the semantic distinction between control predicates giving rise to subject oriented (more generally, controller oriented) entailments and those which do not. Note though that even if this correlation should finally turn out to be less than perfect, the distinctions within the semantic domain on the one hand and the morphosyntactic domain on the other would not disappear and would still have to be accounted for. Now even if it is true that raising to subject constructions are always intransitive, it is not the case that equi complements are always direct objects, though they often are, as in the K'ekchi example above. Yet even in a language which has both intransitive subject controlled equi constructions and raising to subject, the two constructions may be discernible morphosyntactically. This would be the case, for instance, if the language in question leaves nuclear terms unmarked, marks indirect objects and obliques with adpositions, and treats *chômeurs* like the corresponding terms. In such a language, the controlled complement in subject-controlled equi would be marked with an adposition, while the raising host in raising to subject constructions would be unmarked, though syntactic rules or verbal agreement might betray its status as a *chômeur* rather than a term. I know of no language which suits this description at present, but it seems clear enough what to look for. In any event, the main claim advanced here is that raising hosts in raising to subject constructions are never direct objects and that the clausal complements of equi predicates will never be less accessible and in general will be more accessible to syntactic and morphosyntactic rules than raising hosts, and this is borne out by the facts known to me and partly presented in this section. This establishes the conclusion anticipated by the title of this section: the raising construction is a genuine syntactic construction distinct from other kinds of complementation involving clause-like elements, and in particular distinct from the other control construction, the equi construction. Before formulating proposals for the exact nature of the construction, however, I want to broaden the database by introducing various raising phenomena which deviate from the prototypical case of subject-to-subject raising, beginning with the well known, though not uncontroversial, case of raising to direct object.

#### 4. 2. Raising to direct object

Traditionally, Transformational Grammar countenanced a rule of raising to direct object parallel to raising to subject, which was held to account for contrasts like the following:

225. *I believe that Jane has completed her studies in cultural anthropology*  
226. *I believe Jane to have completed her studies in cultural anthropology*

According to the traditional assumption, the second of these examples is derived from a deep structure similar to the surface structure of the first by moving the subject of the complement clause into the object position of the matrix clause. This assumption accounted for the fact that while the construction exemplified in the second example is synonymous with that exemplified in the first one, the putatively raised NP does behave like a direct object of the higher verb, in particular it can be passivized, as shown in the following example:

227. *Jane is believed to have completed her studies in cultural anthropology*

The assumption that grammars of natural languages could contain a rule of subject-to-direct object raising was abandoned in Chomsky (1973), a move which was countered, unsuccessfully as far as the development of the mainstream of Transformational Grammar was concerned, in Postal (1974). Since then, mainstream Transformational Grammar has adhered to the position that raising to object is universally disallowed, and a number of mechanisms have been proposed to account for what had earlier been taken to be effects of raising to direct object by making the clause boundary in such constructions more "transparent" than ordinary clause boundaries, so that normally clause-bounded processes like passivization, reflexivization, or case-marking can apply across it. As a consequence of this, while recent transformational theories are more restrictive than their predecessors and competitors insofar as they disallow raising to object, they must allow many structures which are not needed in theories with raising to object, and it seems to me that in fact the theoretical price of banning raising to object is too high. In order to fully defend this position, of course, it would be necessary to attempt a detailed comparison of representative theories of both kinds, but perhaps this is unnecessary because there are phenomena which are very difficult to account for on the assumption that the putative raised object is not a constituent of the main clause and for which appeal to exceptional transparency of the clause boundary provides no solution. What I have in mind here are structures in which the raised or exceptionally case-marked NP is separated from the clause to which it belongs semantically by elements which belong to the main clause but not to the subordinate clause, as appears to be the case in the following English example from Pollard and Sag (1994: 117):

228. *I believe George Washington to this very day to have been a great statesman*

Similar examples are also well-formed in Icelandic, as shown in the following example from Zaenen, Maling and Thráinsson (1990: 100):

229. *Ég taldi Guðrúnu í barnaskap mínum sakna Haraldar*  
I believed Gudrun(A) in foolishness my miss Harold(G)  
"I believed Gudrun in my foolishness to miss Harold."

Pollard and Sag do not fail to point out that there are adverbials in English which can, for whatever reason, appear within embedded clauses and yet be interpreted as modifying the matrix clause, but crucially *to this very day* does not belong to this class, as is shown by the following example, also from Pollard and Sag (1994: 117), where the adverbial is uncontroversially situated within an embedded clause and which is semantically deviant precisely because the adverbial cannot be interpreted with scope over the matrix predicate (unfortunately I do not know whether the analogous argument could be made in Icelandic, but given that adverbials taking scope outside the clause in which they are immediately contained are the exception rather than the rule, the default assumption is nevertheless that the Icelandic example cited instantiates raising to object):

230. #*I have been hoping for Kim to this very day to be proven innocent*

In view of such data and in view of the theoretical complications necessary to allow passivization, reflexive binding, and case marking across clause boundaries, it seems best simply to allow raising to object, and interestingly even linguists working within the GB framework are coming around to this conclusion (cf. e.g. Bowers (1993)).

#### 4. 3. Raising to prepositional object

Taking it as established that the subject and the direct object relation can be targets of raising, the question naturally arises whether these are the only possible target relations. To a large extent, this seems to be the case, but I am aware of two languages in which NPs which, according to the criteria used in the more usual cases, are raisees surface as objects of prepositions. The first such language is Modern Greek. As is shown in detail by Joseph (1990), in this language subjects of clauses serving as complements to the preposition *me* can be raised to become the objects of that preposition, with the clause presumably assuming some oblique relation and without any significant change in the meaning of the construction. The following two examples from Joseph (1990: 265) illustrate the raised and the unraised variant of this preposition+clause structure:

231. *me to na kalípti i máska to prósopo, anasénete fisiká*  
with the SBJ covers the mask the face, breathe-Imp-Pl naturally  
"With the mask covering your face, breathe naturally."

232. *me ti máska na kalípti to prósopo, anasénete fisiká*  
with the mask SBJ covers the face, breathe-Imp-Pl naturally  
"With the mask covering your face, breathe naturally."

The preverbal particle glossed SBJ in these examples marks clauses whose verbs would appear as subjunctives or infinitives in other languages. The first definite article in the first example belongs to the whole following clause, making it suitable to serve as the object of a preposition. This use of the definite article to nominalize whole finite clauses is not a peculiarity of the construction under discussion, but is quite productive, in fact the only fully productive way to form nominalized clauses. However, the first definite article in the second example is not a clause nominalizer, but

belongs to the immediately following nominal *máska*. Crucially, *ti máska* is unambiguously an accusative NP, hence both with respect to its position and with respect to its case it would seem to be the object of the preposition. In addition, Joseph shows that the putative raised NP cannot be separated from the preposition by intervening material. These facts together with the synonymy between the raised and the unraised construction and the regular alternation between the two strongly suggest that a raising analysis is indeed appropriate. That we are not dealing with a variety of equi instead of raising is made plausible by the fact that subjects of clausal idioms can appear in the apparent derived prepositional object position, which shows that there is no semantic relation between the preposition and the following NP. This is illustrated by the following example from Joseph (1990: 267), which involves a clausal idiom literally translated as "the knot is reaching the comb" and meaning "things are coming to a head":

233. *me ton kómbo na ftáni s to xténi étsi, i lísi faneronótan*  
 with the comb SBJ arrive-3.Sg at the comb thus the solution manifested  
 "With things coming to a head in this way, the solution was becoming evident."

Joseph also notes that passivization of the clause in the construction under discussion does not lead to a change in meaning, which is again expected under a raising analysis. It must be admitted that the facts cited so far are also consistent with an analysis in which the putative raised NP is simply an exceptionally case marked subject, but while Joseph does not explicitly argue against such an analysis, it is easy to see that it would lead to several problems. First of all, accusative subjects occur only in putative raising to object constructions in Modern Greek. This alone of course is not conclusive, because all of these might be exceptional case marking rather than raising constructions. However, while verbs may take arguments of various syntactic categories in Modern Greek, only NPs can appear as objects of prepositions if we disregard the putative raising cases; hence the latter would be an unexplained exception to this generalization if they did not involve raising, because then they would involve a non-nominalized clause serving as the object of a preposition, whereas the facts fall into place under a raising analysis because then the clause is not the object of the preposition (I will address the question of what grammatical relation it does bear later in this chapter). Hence I take it as established with a reasonable degree of certainty that Modern Greek has a construction characterizable as raising to prepositional object which is parallel in all relevant respects to the more widely attested construction involving raising to the object position of a verbal predicate. I now turn to the other language apparently allowing raising to prepositional object, Modern Irish.

McCloskey (1984) describes a construction in Modern Irish which the author analyses as involving raising to prepositional object. This exceptional raising construction is illustrated in the following example from McCloskey (1984: 450) (unusually for a raising construction, it does not seem to alternate with a plain sentence-embedding construction, but according to the other standard diagnostics, it clearly is a raising construction):

234. *b' éigean do-n-a ainm a bheith i mbéal na ndaoine*  
 Cop (Past) to-his name be (-Fin) in mouth the people (Gen)  
 "His name must have been in the mouth of the people."  
 ="He must have been very famous."

The main predicate of the matrix clause in this example is the item *meigean*, which is not glossed in the original but could be translated as "must". The raising relationship obtains between the prepositionally marked NP "his name" and the unexpressed subject of the non-finite complement clause. Controllers in the exceptional raising construction are marked either by the preposition *do*, as in the example above, or by the preposition *le* "with", the choice between the two being in part determined by the governing predicate. Unlike what we found in Modern Greek, the preposition does not seem to play a semantic role in this construction, its interpretation being parallel to that of raising to subject constructions in English and similar languages. The predicates which govern this raising construction are apparently intransitive verbs and adjectives with meanings of the kind expressed by modal auxiliaries in English. There are, according to McCloskey, about ten such predicates; in addition to these, the language also has predicates governing ordinary subject-to-subject raising. I will not run through McCloskey's argumentation showing that the putative controller NP is indeed a constituent of the matrix clause and that there is a control relation of the raising kind between it and the unexpressed subject of the non-finite complement clause, since both points are established using standard diagnostics and the results are unambiguous and have not been challenged. However, I want to say a few words concerning his argumentation to the effect that the controller NP is indeed contained within a PP and that neither it nor the PP containing it is the subject of the matrix clause. For the first of these claims McCloskey gives two main arguments. The first is based on the fact that the putative prepositions preceding raised NPs agree with their object if the latter is pronominal, in which case it is necessarily phonetically unrealized, as one would expect from prepositions in Irish (incidentally, this is also one of the arguments for the main clause status of the controller NP). The second is based on the observation that sequences consisting of *do* or *le* plus NP can be clefted (this being one of the arguments for assuming that they are indeed constituents), and that they behave unlike NPs in cleft sentences in that they are not accompanied by a doubling pronoun. Given these arguments, we can take it as established that the controller is embedded in a PP in the exceptional raising construction, but it might still be argued that this PP is the subject of its clause. McCloskey's arguments to the effect that this is not the case include the observation that it can be separated from the verb, whereas ordinary subjects must immediately follow the verb in finite clauses, and the observation that neither the PP nor the NP contained within it can be controlled in equi or raising constructions. The latter argument is particularly interesting because there is a construction in Irish in which an object of a preposition which is, in McCloskey's terms, a notional subject can be controlled, so that it is not possible to argue that the prepositional marking as such is responsible for the failure of control. This construction is exemplified in the following example from McCloskey (p.476):

235. *caithfimid Gaeilge a bheith á labhairt againn an t-am ar fad*  
 we-must Irish be (-Fin) its speaking at-us all the time  
 "We must be speaking Irish all the time."

McCloskey and Sells (1988) argue that this construction does not involve direct control of the prepositional object, but still the fact remains that some prepositional objects can be controlled in Irish, if only indirectly. If this is so, and if the matrix PPs in the exceptional raising construction are indeed subjects, the NPs contained in them should be prime candidates for control, hence the fact that they cannot be controlled casts doubt on the subject status of the PPs containing them. McCloskey's last argument against the idea that the controllers in the exceptional raising construction

are or are contained in subjects is based on the semantics of the predicates governing the construction. He observes that their meanings strongly suggest that they are unaccusatives and that the arguments of those putative unaccusatives in the language which do not take clausal complements are realized within PPs just as the controllers in the exceptional raising construction are. It must be admitted that none of the arguments for the non-subject status of PPs containing exceptional raising controllers is as conclusive as the arguments for the existence of the raising relation, but still the available evidence favours this view, and we will see further below that perfectly straightforward analyses embodying it are available both within APG and within HPSG.<sup>78</sup>

#### 4. 4. Raising of non-subject nominals

Perhaps the most serious challenge to existing analyses of raising constructions comes from constructions involving raising of non-subjects. More precisely, what is at issue are **primary raising constructions** involving non-subjects. A primary raising construction is simply one which can raise at least intransitive subjects (in most languages, primary raising affects all subjects, but there may be some ergative languages where the absolutive rather than the subject is the only candidate for primary raising); the term is thus to be understood similarly to the term "primary relativization strategy" introduced in Keenan and Comrie (1977), on which it is modelled. The restriction to primary raising constructions is necessary because so called "Tough-Movement", the construction instantiated in English by sentences like *Grizzlies are tough to get along with* and by similar examples in many other languages, could also be analyzed as a kind of raising, and in this case even English would be said to have non-subject raising. However, it is quite clear that ordinary raising and Tough Movement are distinct constructions, first because they are governed by distinct (in fact disjoint) classes of matrix verbs, and second because only subjects can undergo ordinary raising and only non-subjects Tough Movement.<sup>79</sup> Given that the two constructions are distinct and only ordinary raising applies to subjects, only the latter construction qualifies as a primary raising construction in English. Let me note right here that the fact that primary raising and Tough Movement are distinct in English does not mean that every language which has one of the constructions also has the other or that the same predicates will govern one or the other in every language. For

<sup>78</sup> As far as I know, the conclusion that the Irish construction described by McCloskey is a genuine raising construction has not been disputed in print, but Stowell (1989), while accepting that it is a raising construction, disputes that the raised element is contained within a non-subject PP and maintains instead that it is a subject exceptionally marked with oblique case. In my view, Stowell does not succeed in showing that such an analysis is superior to one taking the raisee to be within a non-subject PP. In particular, his main argument in favour of his analysis, presented in section 3.2.3., namely that raising to non subject positions is disallowed under GB assumptions and that this explains why the exceptional raising construction is only found with intransitive matrix predicates, is almost circular. Obviously, if the standard GB assumption that only raising to subject can exist universally is correct, the Irish construction must be a case of raising to subject if it is a raising construction at all, but if that assumption is incorrect, as seems likely in view of the rather solid evidence for raising to object in various languages, the claimed explanatory advantage of Stowell's analysis of the Irish construction disappears. Putting it slightly differently (and more pointedly), Stowell essentially claims that his analysis is superior to imaginable alternatives because it is the only possible analysis under orthodox GB assumptions, hence his case can be no stronger than the evidence on which these assumptions rest, a point which he completely fails to take into account.

<sup>79</sup> In some languages, the analogue of English Tough Movement obeys even stricter conditions, as is shown in detail for French in Legendre (1987).

instance, in Imbabura Quechua, Moose Cree, and Niuean predicates corresponding to English *easy* and *difficult* govern primary raising; in the former two languages, there is apparently no distinct rule of Tough Movement, whereas in Niuean predicates of the "easy"-class do govern a rule somewhat analogous to Tough Movement, called Oblique Copying by Seiter (1979), differing in this respect from other raising triggers, but only if the element raised is neither a subject nor a direct object in the embedded clause. It should also be pointed out before we proceed that languages may have more than one primary raising construction governed by different classes of predicates. In many cases, the only difference between these is the target relation, as in English, where raising to subject and raising to direct object are alike in all respects except the class of triggering predicates and the grammatical relation of the raised element in the matrix clause, but in Blackfoot only raising to object may apply to elements which are non-subjects in the complement clause, and in Samoan only one class of raising to subject triggers allows both complement subjects and complement non subjects to be raised. Hence when I claim in what follows that a language has non-subject raising, this does not mean that all varieties of raising in that language can apply to non-subjects, though for obvious reasons I will focus my discussion on the more "exotic", theoretically more interesting, cases of raising. As a final preliminary note, I want to stress that all kinds of raising constructions known to me, no matter how "exotic" they are otherwise, are governed by the matrix predicate, whereas the identity of the embedded predicate is irrelevant (except insofar as its subcategorization is concerned, of course; if the embedded predicate takes no direct object, no direct object can obviously be raised, but I know of no case in which the embedded predicate takes an argument of a kind eligible for raising and idiosyncratically keeps the latter from being raised). This observation is of some theoretical interest because it disfavors any account of non-subject raising which would ascribe an active role to the embedded predicate, for instance by affecting its subcategorization in a way not possible in non-raising constructions.

Non-subject raising constructions in the sense just clarified have not received much attention in the theoretical linguistic literature I am familiar with, perhaps because they are only attested so far in a few "exotic" languages. To my knowledge, at least the following languages have constructions of this kind: the Polynesian languages Niuean (Seiter (1979)), Tuvaluan (Besnier (1988)), and Samoan (Chung (1978)), Bauan Fijian (Massam (1984))<sup>80</sup>, Imbabura Quechua (Jake (1985))<sup>81</sup>, Ancash Quechua (Weber (1983)), Blackfoot (Algonquian) (Frantz (1981), (1991)), Halkomelem Salish (Gerds (1988)), Kunuz Nubian (Abdel-Hafiz (1988)), Moose Cree (Algonquian) (James (1984)), and perhaps Tagalog (Western Austronesian<sup>82</sup>) (Kroeger (1993), Dell (1981),

<sup>80</sup> Bauan Fijian is a dialect of Eastern Fijian, which is a close relative of the Polynesian Group within the Oceanic division of Austronesian but does not itself belong to the latter group (although I used to think it did). In contrast to all other sources I cite, Massam (1984) is a secondary source; the reason why I quote it nevertheless is that the primary source for Bauan Fijian on which it relies is a paper presented by L. Gordon at an LSA meeting, which has apparently not been published and is not directly accessible to me.

<sup>81</sup> I should mention once more that Jake describes a variety of Imbabura Quechua which is more liberal in certain respects than that described in Cole (1985), which apparently allows only raising of subjects. However, raising of non subjects in Quechua is attested by at least one other author for at least one other language in the group, namely by Weber (1983) for Ancash Quechua, and as we will see shortly there are other cases where only one of a pair of closely related languages allows non-subject raising, so this kind of variation is not as unlikely as it may appear at first sight.

<sup>82</sup> It is now generally accepted that the Austronesian phylum should be divided into at least two main branches, one or more branches for the Austronesian Languages of Formosa (Taiwan), and one branch comprising the rest of the languages, the vast majority both in terms of number of languages



de Guzman (1988)). Of these, Niuean, Kunuz Nubian, Ancash Quechua, and Moose Cree allow raising of subjects and direct objects, Halkomelem allows raising of subjects and passive agents, and the other languages except Tagalog allow raising of subjects, direct objects, indirect objects, and at least some obliques. Raising of an oblique dependent of the embedded clause is illustrated in the following Blackfoot example from Frantz (1981: 26), where a directional phrase is raised into the matrix clause, as evidenced by the second person singular agreement on the matrix verb which could not otherwise be justified:

236. *kits-iksstat-o n-ohko-wa m-ahk-itap-aapiksist-ahsi (kiistoyi) omi pokon-i*  
 2-want-(Tr)-1s:2s my-son-3s 3-might-toward-throw-4s 2s that ball-4s  
 "I want my son to throw the ball toward/to you"

Note that the item *kiistoyi* in this example is an optional pronominal copy of the raised NP and that the embedded verb carries agreement and mood inflection, an issue to which I will return (The gloss 4s stands for minor third person, called third person obviative by other sources on Algonquian languages, a deictic category which can very roughly be describe as "third person entity which is not maximally prominent among the third person entities mentioned in the sentence" (cf. Frantz (1991: ch. 2, sect. D)). Concerning the exact range of obliques which can be raised, Frantz (1981: 25) states explicitly that "...just about any dependent of the ds ["downstairs", i.e. subordinate] verb can raise", and on page 26 he even gives the following example in which one conjunct of a coordinate subject is apparently raised, though such examples could, and I assume should, be interpreted instead as involving raising of a comitative NP situated at the same level of embedding as the subject. Such an analysis will allow the otherwise well-supported generalization that raising does not apply "into" coordinate structures to be maintained:

237. *nits-iksstat-a-wa n-ohko-wa nits-oyi-hsinnaani*  
 1-want(Tr)-direct-3s my-son-3s 1-eat-1p  
 "I want my son and I [sic] to eat."

I cannot go deeply into the question of how the third person plural subject agreement on the embedded verb in the example above can be accounted for if the raised nominal is simply a comitative, but I assume that an analysis will be appropriate under which the subject triggering the unexpected agreement is a complex structure of roughly the following form:

238. 
$$\begin{array}{c} \text{NP[PRO]}_k \\ \swarrow \quad \searrow \\ \text{PRO}_i \quad \text{PRO}_j \end{array}$$

This is an adjunction structure in which both the head and the adjunct are pronominals, in the example above, non-overt ones, the adjunct pronominal is bound by the comitative phrase which is a sister of the whole construction, and the denotation as well as the agreement features of the mother are computed from those of the

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and in terms of the number of speakers, and it has also been proposed that Malayo -Polynesian, the former name of the whole phylum, should be reintroduced to name its major branch (see Clark (1987) for discussion). The group called Western Austronesian in the text would be called Western Malayo-Polynesian in the revised terminology. For detailed information on the Austronesian Languages and their genetic relation, cf. Tryon (ed.) (1995).

daughters, so that the latter has plural agreement features and semantics even when both daughters denote ordinary individuals. An analysis along these lines for apparent "conjunct union" structures is proposed in Aissen (1989).

In contrast to Blackfoot, Imbabura Quechua allows raising of instruments and beneficiaries in addition to terms, but not raising of other obliques. For Tuvaluan, Bauan Fijian and Samoan I have no explicit information concerning whether all or only some kinds of obliques can be raised. Nominals contained within a dependent of the embedded clause cannot normally be raised even in languages which are otherwise very liberal, though in Bauan Fijian possessors of primary raising candidates, at least possessors of subjects, can raise leaving a pronominal copy. I know of no instance of plain (non-copy) raising out of dependents of the raising host except Moose Cree, in which subjects and direct objects, but apparently not other nominals, can be raised to subject across more than one clause boundary, as illustrated in the following example from James (1984: 210) (ç stands for c with hacek in the original):

239. *a:lime:lihta:kosiw me:ri kihçito:tawiyan kihçita:pwe:htama:n e:a:hkosit*  
 hard-AI-3 Mary Sub-make-TA-2:1 Sub-believe-TI-1 Sub-sick-AI-3  
 "It is hard for you to make me believe that Mary is sick." (More literally: "Mary is hard for you to make me believe is sick.")

Evidence for raising in this example comes from the fact that the matrix verb has the Animate Intransitive (AI) stem, which is expected if *me:ri* is its subject but not if it has a sentential subject. That the putative raising dependency does indeed extend across more than one clause boundary is indicated by the fact that none of the intermediate predicates "make" and "believe" is in a form compatible with an animate third person subject or direct object, as they would have to be if *me:ri* had been raised successively from clause to clause.<sup>83</sup>

In all languages cited so far except Tagalog, elements with more than one grammatical relation are candidates for raising, although it is never possible to raise more than one raising candidate from the same clause. This immediately counters any criticism of the claim that there is non-subject raising in natural languages which might be based on the idea that the authors whose work I am relying on simply take the wrong nominal to be the subject, because if the putative raisable non-subjects were in fact subjects, there would still be another raising candidate which could not also be a subject (at least at the same syntactic level). The case of Tagalog is somewhat less clear, because according to the information available to me only the topic nominal is an unquestionable candidate for raising, whereas the data concerning non-Topic Actors are somewhat unclear.<sup>84</sup> Since the question whether the Topic is the (final) subject, as proposed in Bell (1983) for the closely related language Cebuano, the (final) absolutive, as proposed by de Guzman (1988) and others, or something else altogether

<sup>83</sup> Algonquian verb stems are subcategorized with respect to transitivity and with respect to the animacy of the absolutive (direct object or intransitive subject), which yields four classes glossed as AI (animate subject, intransitive), II (inanimate subject, intransitive), TA (transitive, animate object), and TI (transitive, inanimate object); for more detailed information, cf. Frantz (1991: ch.7).

<sup>84</sup> According to Kroeger (1993: 29f) and de Guzman (1988: 330) non-Topic Actors can only undergo copy raising, but Kroeger (1993: 29, fn 7) states that some speakers also allow plain raising of non-topic actors. I do not know whether this variation is purely idiolectal or whether it reflects different regional or social dialects. The sources are also not completely clear concerning whether non-copy raising out of finite (i.e. aspectually inflected) clauses is possible or not. Regardless of these uncertainties, however, plain raising of Topics out of non-finite clauses, that is, raising of the kind exemplified in the example which follows in the main text, is uncontroversially possible as far as I have been able to determine.

is not completely settled (though in my view the available evidence clearly favours the ergative analysis), it is possible that Tagalog does not after all instantiate non-subject raising. Nevertheless, I want to give an example from this language which would be an instance of non-subject (and absolutive) raising under the ergative analysis:

240. *inasahan ko ang pambansang awit na awitin ni Maria*  
 expect-COMPL-DF 1.sg.NT TOP national anthem LK sing-INF-OF NT Maria  
 "I expected the national anthem to be sung by Linda"  
 Kroeger (1993:173)

Under the ergative analysis, *Linda* is the subject of the complement clause and the raised nominal is the direct object (and hence the absolutive); Kroeger himself assumes the nominative-accusative analysis, so that for him the example would involve raising of a subject from a passive clause. Having clarified the nature of my claim I want to comment briefly on the nature of the sample of languages with non-subject raising given above. The reader may have noted that here is no obvious pattern in this sample in the sense that raising of non-subjects does not seem to be a feature of languages of a particular phylum, a particular area, or some obvious typological class. This impression may in part be due to the fact that there certainly are languages with this kind of raising construction which have not been described yet, or whose description has not come to my attention, but in at least one case I know positively that only one of two very closely related languages has non-subject raising, because Seiter (1979: 309) states explicitly that raising in Tongan, the closest relative of Niuean, is limited to subjects, whereas it applies to subjects and direct objects in Niuean. Similarly, Frantz (1981: 25) states explicitly that while Blackfoot raising to object is very liberal, Micmac, another Algonquian language, allows only subjects to raise in this construction. This suggests that the distribution of non-subject raising is indeed somewhat unpredictable and the catalogue of languages just given, while certainly incomplete, is not misleading in this respect. It should be noted in particular that non-subject raising is definitely not a feature of ergative languages, though some of the languages listed are definitely or at least possibly ergative. This is shown very clearly by the fact that Niuean, one of my prime examples, is ergative, but Kunuz Nubian, which has almost the same syntax as far as raising is concerned, is nominative-accusative, yet in both languages subjects and direct objects, but no other nominals can be raised. In ergative languages in which only nominals with one grammatical relation can be raised, this is sometimes the absolutive (direct object in transitive clauses or subject in intransitive clauses) rather than the subject, as may be the case in Tagalog, if it is indeed ergative, for those speakers which allow plain raising only for Topics, but this is not necessarily the case, as Tongan for instance allows only raising of subjects although it is ergative like its closest relative Niuean. Also, there does not seem to be any obvious correlation between word-order type and non-subject raising, except perhaps for the fact, if it is no accident, that none of the languages listed is of the SVO type. Finally, there is also no generalization to the effect that only languages without personal passive constructions have non-subject raising, although this would make sense because languages with passive obviously have the means, at least to some extent, to make a nominal not normally eligible for raising eligible by promoting it to subject in a passive construction. While it is true that Niuean, and Blackfoot, for instance, have no passive, and it is also interesting to note that Micmac, in contrast to Blackfoot, has a passive and has only subject-raising, both Imbabura Quechua and Ancash Quechua have personal passives, and this also holds for Bauan Fijian. Even more tellingly, in Halkomelem exactly subjects and passive agents can be raised (Gerdtz (1988: 5.2.2.)), so that in this language nothing is gained,

functionally speaking, by allowing raising of (final) non-subjects. This does not mean that diachronically loss of passive could not favour the development of non-subject raising, or that the development of a passive construction could not in turn favour the loss of non-subject raising, but these are at best tendencies and not necessary developments.

It has occasionally been suggested to me that the somewhat erratic distribution of non-subject raising and the fact that the vast majority of natural languages, or at least the vast majority of those on which sufficient information is available, only allow subjects to raise somehow diminishes the theoretical importance of the phenomenon. In my view, this kind of criticism has little force if what we are interested in is truly a theory of Universal Grammar. Crucially, while the languages with non-subject raising constructions may be few and far between, the arguments for raising of non-subjects internal to the languages which do have such constructions are of the same kind and quality as those used to establish raising of subjects in English and other familiar languages. In no case do I claim that a language has non-subject raising merely on the basis of an isolated example which just looks as if it could instantiate such a construction.

Having thus clarified the nature of the issue, I now want to illustrate the kind of data which motivate non-subject raising analyses in somewhat more detail. I will use examples from Niuean, because Seiter (1979) analyses the language very thoroughly and makes a very strong case for the raising constructions I am interested in, but I repeat that the existence of non-subject raising in the other languages I have cited can be supported by similar arguments, although the evidence available is not always as plentiful as in the case of Niuean.

Niuean is a VSO language with an ergative case marking system. It makes no distinction between finite and non-finite verb-forms, in fact it has almost no verbal morphology (apart from number agreement in a few verbs), temporal, modal and aspectual notions being expressed by particles (possibly a kind of auxiliaries) appearing either before the main predicate or between the latter and the subject. Niuean has raising to subject, raising to direct object, and raising to what Seiter calls the "middle object" relation (possibly to be identified with the indirect object relation), and both subjects and direct objects, but not middle objects, can be raised in all of these constructions. Because raising to middle object but not raising of middle objects is possible, raising to subject and rising to direct object but not raising to middle object can be iterated if a raising predicate of the relevant kind is embedded below another raising predicate of the same kind. All kinds of raising constructions alternate with apparently synonymous plain sentenceembedding structures in which the sentential complement bears the same grammatical relation as the raised NP in the raising variant, so that there are nine basic configurations to consider, which are illustrated in the following set of examples (note that a colon following a vowel indicates length and that the ergative marker for personal pronouns and proper names is homonymous with the absolutive marker for common nouns; the item glossed Sbj is described by Seiter as a subjunctive marker, although it is not a bound morpheme but a clause initial particle similar to a complementizer):

241. Intransitive sentential complementation (Seiter (1979: 158):

*to maeke ke lagomatai he ekekafo e tama e:*  
Fut possible Sbj help Erg doctor Abs child this  
"The doctor could help this child."

242. Subject-to-subject raising (Seiter (1979: *ibid.*)):

*to maeke e ekekafo ke lagomatai e tama e:*  
Fut possible Abs doctor Sbj help Abs child this  
(as above)

243. Object to subject raising (Seiter (1979: *ibid.*)):

*kua kamata e akau ke hala he tama*  
Perf begin Abs tree Sbj cut erg child  
"The tree has begun to be cut down by the child."

244. Transitive sentential complementation (Seiter (1979: 196):

*to na:kai toka e au ke kai he pusi e ika*  
Fut not let Erg I Sbj eat Erg cat Abs fish  
"I won't let the cat eat the fish."

245. Raising of subject to direct object (*ibid.*):

*to na:kai toka e au e pusi ke kai e ika*  
Fut not let Erg I Abs cat Sbj eat Abs fish  
"I won't let the cat eat the fish."

246. Raising of direct object to direct object (*ibid.*):

*to na:kai toka e au e ika ke kai he pusi*  
Fut not let Erg I Abs fish Sbj eat Erg cat  
"I won't let the fish be eaten by the cat."

247. Sentential complement as middle object (*ibid.*):

*ne manako a mautolu ke lagomatai e Lemani e kuli:*  
Pst want Abs we Sbj help Erg Lemani Abs dog  
"We wanted Lemani to help the dog."

248. Raising of subject to middle object (*ibid.*):

*ne manako a mautolu ki a Lemani ke lagomatai e kuli:*  
Pst want Abs we to Pers Lemani Sbj help Abs dog  
(as above)

249. Raising of direct object to middle object (ibid.):

*ne manako a mautolu ke he kuli: ke lagomatai e Lemani*  
 Pst want Abs we to dog Sbj help Erg Lemani  
 (as above)

Even this limited set of examples contains several pieces of evidence for a raising analysis. Most obviously, since the language is predicate-initial, the preverbal position of the putative raised NPs would have to be explained by some special mechanism if they were in surface constituents of the complement clause, whereas it is regular if they are constituents of the matrix. As far as case marking is concerned, it can be seen that the distribution of ergative and absolutive is as expected under a raising analysis. The last of the examples is particularly instructive in this respect because it shows that the NP meaning "dog" is in a sense both a constituent of the main clause and a constituent of the embedded clause: It has oblique case, as is expected if it is the middle object of the higher clause, but the embedded subject is nevertheless marked ergative, showing that the embedded clause counts as transitive for the purposes of case assignment (analogous remarks hold for the example showing direct object-to-direct object raising). In addition, the case-marking facts also confirm the generalization that the matrix clauses in raising to subject constructions are intransitive insofar as the subject appears in the absolutive. Note also that by the same criterion the matrix clauses in the examples for raising to middle object are also shown to be intransitive. Together with the regularity of the alternation between putative raised and unraised structures and their apparent synonymy, these facts would already be sufficient to make a raising analysis plausible. Yet Seiter (1979: ch. 3) is able to produce a number of additional arguments for a raising analysis, only some of which I am going to review here. For instance, he shows that idiom chunks can appear as controllers in the putative raising construction, as in the following example involving the idiom *veli e tau matahui* "get drunk", literally "oil the knees" (Seiter (1979: 191):

250. *kua kamata tei e tau matahui ke oeli e lautolu*  
 Perf begin Perf Abs Pl knee Sbj oil Erg they  
 "They have begun to get a little drunk."

Facts such as these argue strongly against an analysis which would take these constructions to be equi rather than raising constructions, and Seiter also shows that Niuean equi, which is governed by predicates like *lali* "try" and *tala* "tell" (in the sense of "order"), differs in several other respects from the putative raising rule. In particular, only complement subjects but not direct objects can be removed by equi, while on the other hand controlled non-subject nominals in equi complements are pronominalized, which is not possible in raising constructions; in contrast to ordinary pronouns, which can be non-overt, pronouns controlled in equi constructions must be overt, which indicates that the relation between equi controllers and the arguments they bind is different from ordinary pronominal binding. The following two examples from Seiter (1979: 137) illustrate equi control of a subject and of a non-subject, respectively:

251. *ne manako a laua ke mamate*  
 Pst want Abs they Sbj die  
 "They wanted to die."

252. *kua lali lahi e kapitiga haau ke sake e au a ia*  
 Perf try really Abs friend your Sbj sack Erg I Abs he  
 "Your friend is really trying to get me to sack him."

The examples show that in contrast to the situation in K'ekchi illustrated earlier, the matrix clause in subject-controlled equi constructions in Niuean is intransitive. Seiter does not comment on this, but I think we may at least tentatively assume that the clausal complement is a middle object in these cases, as the unraised counterparts of raising to middle object clauses suggest that clausal middle objects, as opposed to middle object NPs, are unmarked. Returning to raising, another strong argument for this construction adduced by Seiter is the fact that floated quantifiers can be stranded by raised NPs, whereas quantifier float is strictly clause-bounded outside of putative raising structures. This is illustrated in the following example (Seiter (1979: 168):

253. *kua kamata tuai e tau tagata na: ke fia-momohe oti*  
 Perf begin Perf Abs Pl person that Sbj want-sleep all  
 "Those people have all begun to get sleepy."

Finally, while Niuean has no productive verbal agreement, some verbs optionally agree in number with subjects or direct objects, and such agreement can also be triggered by raised NPs on the verb of the clause in which they originate, as shown in the following pair of examples (Seiter (1979: 200):

254. *to na:kai toka e au a koe ke mohe e timeni*  
 Fut not let Erg I Abs you Sbj sleep Abs floor  
 "I won't let you (Sg.) sleep on the floor."  
 255. *to na:kai toka e au a mutolu ke momohe e timeni*  
 Fut not let Erg I Abs you-Pl Sbj sleep-Pl Abs floor  
 "I won't let you (Pl.) sleep on the floor."

Given the facts just reviewed and the additional arguments put forward by Seiter, we can, I believe, take it as established that Niuean allows raising of non-subjects. As stated already, arguments of a similar kind establish the existence of non-subject raising in the other languages cited at the beginning of this section, though the particular inventory of available tests of course depends on the concrete inventory of rules sensitive to grammatical relations which characterizes each particular language and hence the evidence is not in all cases quite as spectacular as in the case of Niuean. Nevertheless, I think we can take it as established that there are phenomena in natural languages for which an analysis in terms of non-subject raising appears well motivated. It will be the job of the last two sections of this chapter to show that such analyses can indeed be made available without unduly weakening the theory of Universal Grammar. Before doing this, however, I want to introduce one more kind of unusual raising construction, copy raising.

#### 4. 5. Copy raising

In all the cases of raising constructions we have looked at so far, an element of a complement clause (usually, but as we have seen not invariably, the subject) is as it were removed from that clause and raised into the matrix clause. There is a second

kind of raising construction in which the raised element leaves behind a pronominal "copy" (hence the name). Whereas in plain raising constructions, the verb of the embedded clause appears in some non-finite form in most languages where such a contrast can be made, the verbs of clauses containing raising copies are usually finite (again to the extent that such a distinction makes sense in the language under consideration). Apart from this and the differences directly connected with the pronominal copy, however, in at least some languages copy raising is like plain raising with respect to all of the diagnostics we have encountered so far. To judge from the references in Dubinsky and Rosen (1987), Copy raising appears to be quite widely attested in the languages of the world. However, many of the languages cited as having copy raising are pro-drop languages in which the existence of raising copies is merely inferred from the fact that the verb is inflected to agree with it. This situation holds for instance in Modern Greek. This language has raising to subject and raising to object constructions which are exactly parallel to those found in many other languages except for the fact that the embedded verb is not an infinitive but an ordinary finite verb whose subject agreement morphology reflects the person and number of the raising controller. This is illustrated for raising to subject in the following pair of examples from Joseph and Philippaki-Warbuton (1987: 116):

256. *fénete na íne edhó tóra i kléftes*  
 seem-3.Sg. Prt be-3.Pl here now the thieves  
 "It seems that the thieves are here now."

257. *i kléftes fénonde na íne edhó tóra*  
 the thieves seem-3.Pl Prt be-3.Pl here now  
 "The thieves seem to be here now."

Since *íne edó tóra* "they are here" by itself would be a perfectly good sentence, to the extent that it is reasonable to analyse pro-drop sentences as containing phonetically empty but syntactically and semantically visible pronominals it is also natural to assume that the complements in raising constructions are ordinary clauses with subject pro-drop. However, an analysis in which the emptiness of the subject position in raising clauses is not of the kind found in pro-drop clauses but of the kind found in plain raising constructions is obviously not directly excluded by data of the kind just presented, and it might even be preferable if all cases of potential copy raising involved a gap in the complement clause, because one could then deny that there is a copy raising construction to be accounted for by the theory of grammar. Fortunately, there are languages which have copy raising constructions involving overt pronominals. At the time of writing, I know of work establishing the existence of such constructions in seven languages, namely Blackfoot (Frantz (1981)), Haitian Creole (Deprez (1992)), Tagalog (Kroeger (1993)), Javanese (Davies (1990)), Bauan Fijian (Massam (1984)), Tuvaluan (Besnier (1988)), and Samoan (Chung (1978)), and it is likely that a more complete search of the literature than I have been able to undertake would turn up several more. In Samoan and Tuvaluan, raising involving an overt copy alternates with what is either plain raising or copy raising with pro-dropped copies in the case of subjects and direct objects, but the copies are always overt when more oblique NPs are raised. This situation is illustrated for Samoan by the following three examples from Chung (1978: 199-201), the first of which involves raising of a subject leaving an overt copy, the second raising of a subject leaving no overt copy, and the third raising of an oblique leaving an overt copy (the gloss "uns" is explained as "unspecified tense-



aspect-mood" in the table of abbreviations and symbols of Chung (1978), and a colon following a vowel (corresponding to a macron in the original) marks length):

258. *pe 'e te ma:sani 'ona 'e kuka-ina mea'ai?*

Q you uns usual      Comp you cook-Trans food

"Do you usually cook dinner?"

259. *pe 'e te ma:sani 'ona kuka-ina mea'ai?*

Q you uns usual      Comp cook-Trans food

"Do you usually cook dinner?"

260. *e ma:sani luga o le fata 'ona tu'u ai e ia ipu*

uns usual      top of the shelf Comp put Pro Erg she cup

"She usually puts the cups on the shelf."

A situation similar to that found in Tuvaluan and Samoan may hold in Bauan Fijian, where the examples cited in Massam (1984) involve overt copies in the cases where indirect objects and more oblique nominals are raised, but gaps or possibly empty pronominals in the case of subject and direct object raising. In addition to languages like those just discussed in which copy raising applies most uncontroversially to non-subjects, there are also languages in which it more closely parallels familiar types of plain raising. This is the case in Haitian Creole and Javanese, where copy raising is restricted to subjects and cannot apply across more than one clause boundary, as argued in detail in Deprez (1992) and Davies (1990), respectively. The Javanese copy raising construction is illustrated in the following example from Davies (1990: 95):

261. *Musa ngômôngnô Amir nang Siti [lè' dè'é jojor]*

Musa report      Amir to Siti COMP he honest

"Musa reported to Siti that Amir is honest."

The most obvious piece of evidence for raising in such constructions is the position of the putatively raised NP. Javanese being an SVO language, raising to object could be string-vacuous, as it usually is in English, but the example shows that an element of the matrix clause can intervene between the suspected raisee and the clause to which it belongs semantically, and Davies even notes (p.99) that the construction is most natural in the case of such discontinuity. Since the intervening element is not an adverbial but an argument of the matrix verb, there can be no question of its belonging to the matrix rather than the subordinate clause. Therefore, an analysis which would take the putative raisee to be merely a topic occupying a position in front of the complementizer but still within the embedded clause and the copy pronoun to be not a raising copy but a resumptive pronoun in a wh-construction would not explain the position of the former correctly (this point is apparently so obvious that Davies does not even mention it). Even apart from this, however, Davies shows that there are crucial differences between topicalization and the putative raising rule. In particular, topicalization can apply not only to subjects but also to possessors of subjects, whereas the putative raising rule applies strictly only to subjects, and topicalization can move an element across several clause boundaries, whereas raising cannot, as shown by the ungrammaticality of the following example (Davies (1990: 102):

262. \*Siti ngarepnô Amir [lè' Musa ngômông [lè' dè'é matèni asu né]]  
 Siti expect Amir COMP M. say COMP he kill dog the  
 (Siti expects Amir that Musa said that he killed the dog.)

Finally, the putative raisees can be reflexive pronouns bound to the matrix subject, which should not be possible for phrase topicalized within the embedded clause (Davies (1990: 99):

263. *Musa ngarepnô awa'é déwé wingi lè dè'é di-apusi Siti*  
 Musa expect himself yesterday COMP he PASS-cheat Siti  
 "Yesterday Musa expected himself had been cheated by Siti."

The evidence just sketched clearly indicates that the putative raisee in the construction under consideration is a constituent of the matrix clause controlling the subject of the embedded clause. This would still leave an alternative to a copy raising analysis, namely one where the controller would be not only a syntactic but also a semantic argument of the matrix verb, as in English examples like *I expect of you that you solve this problem*, but Davies shows that while such construction exists in Javanese, it is clearly distinct from the putative copy raising construction in that it cannot be formed with all of the matrix verbs governing the latter and also because it allows non-subjects to be controlled, as shown by the following pair of examples from Davies (1990: 105):

264. *Siti ngômông sôale Musa lè' bojo né ningkal dè'é*  
 Siti say about Musa COMP spouse the leave he  
 "Siti said about Musa that his wife left him."
265. \**Siti ngômôngnô Musa nang Amir lè' bojo né ningkal dè'é*  
 Siti report Musa to Amir COMP spouse the leave he  
 (Siti reported **Musa** to Amir that his wife left **him**.)

Summing up what has been said so far, I think it is fair to say that the case for a copy raising to object construction in Javanese is reasonably well established. As for the generalization concerning the finiteness of copy raising hosts, it must be said that lacking verbal morphology on which it could be based, Javanese makes no distinction between finite and non-finite verbs. However, Davies argues that clauses optionally introduced by the complementizer *lè'* shown in the example above should be considered finite and clauses which may not be introduced by a complementizer non-finite. The verbs governing the putative copy raising construction take complement clauses of the former kind, whereas clauses of the latter kind are selected by control verbs corresponding to English *try*, *persuade*, etc. If one accepts this proposal, Javanese confirms the generalization that copy raising only takes place out of finite clauses, and if the possibility of having a complementizer is not considered sufficient evidence for finiteness, it does at least not constitute a counterexample to it. The raising copies are only optionally overt, though they have been overt in all the examples cited, but this is to be expected because the language allows non overt pronominal subjects and objects also outside of control constructions, and the fact that they can be overt is sufficient to disconfirm the hypothesis that there is no genuine copy raising in natural languages. In Haitian Creole, which I will not discuss in detail, the facts are largely parallel to those of Javanese, apart from the fact that the construction involves raising to subject rather than raising to direct object and the copies are always overt if the complement clause is finite (like Javanese, Haitian Creole

has no verbal inflection, but Deprez argues that items like *te* in the following example are tense markers and that clauses containing them should be considered finite). This is illustrated in the following example from Deprez (1992: 201):

266. *Jan te sanble li te sot*  
 J. Pst seem he Pst stupid  
 "Jean seems he was stupid"

A situation similar to that found in Javanese and Haitian Creole but more complicated in certain respects holds in Tagalog, where both copy raising and plain raising is possible for Topics (in the technical sense of Philippine linguistics), whereas it seems that for some speakers only copy raising can apply to non-Topic Actors, and both plain and copy raising cannot apply to NPs which are neither Actors nor Topics (Kroeger (1993: 29f), de Guzman (1988: 330)).<sup>85</sup> Copy raising of a non-Topic Actor in Tagalog is illustrated by the following example from Kroeger (1993: 29):

267. *inasahan ko si Charlie na bibigyan niya ng pera si Linda*  
 expect-COMPL-DF 1.Sg-NT TOP Ch. Lk give-CONT-OF 3.Sg-NT NT money TOP Linda  
 "I expected Charlie to give Linda some money."

Note that the embedded verb in this example is finite (i.e. inflected for aspect), while that in the plain raising example given earlier was non-finite, which is consistent with the generalization expressed at the beginning of this section.<sup>86</sup> In addition to the languages cited so far Blackfoot allows overt copy raising of subjects if one may assume that the item *-hsaawa* in the following example from Frantz (1981: 27) is an enclitic pronoun rather than an agreement morpheme:

268. *iksipisata'pssi-yi n-oko's-iksi ot-ayo'kaa-hsaawa*  
 amazing (AI)-3.Pl my-offspring-3.Pl 3-sleep-3.Pl  
 "It is amazing that my kids are sleeping."  
 (literally: "My kids are amazing to be sleeping")

While Frantz does not comment on the status of *-hsaawa* in the context from which the above example is taken, the explanations given in chapter 9 of Frantz (1991) make clear that it indeed contains the enclitic third person plural pronoun *-aawa*, and this is also confirmed by the glosses of similar examples in Frantz (1979) and Frantz (1980). This is interesting because the stem of the matrix verb in the above example is of the class used in intransitive clauses with animate subjects, as indicated by the gloss AI, which is both additional evidence for raising and evidence that not only plain raising to

<sup>85</sup> Incidentally, this could be taken as one piece of evidence for the ergative analysis of Tagalog, because under that analysis the topic is either a (final) subject or a (final) direct object and actors are always (final) subjects, so that the generalization would be that raising applies only to nuclear terms (subjects and direct objects), as in Niuean, Kunuz Nubian, Ancash Quechua, and Moose Cree, with some speakers having an additional constraint in their grammars restricting plain raising to absolutes and hence to Topics. Under the nominative-accusative analysis, in contrast, raising of non-Topic actors would amount to raising of passive agents, which seems to be a somewhat more marked option, being otherwise attested only in Halkomelem, although the present catalogue of languages with unusual raising constructions is obviously too small to allow statistically significant statements to be made.

<sup>86</sup> It is possible that those speakers of Tagalog which allow apparent plain raising out of finite clauses in fact have copy raising with non-overt pronominal copies in these contexts, though I have not been able to investigate this possibility.

subject clauses but also those of the copy variety are (finally) intransitive despite the fact that they contain two dependents besides the predicate. Incidentally, Blackfoot clearly has copy raising in cases where a non-subject is raised, as shown by the example given earlier, but since non-subject raising is apparently only governed by raising to object verbs and not by raising to subject verbs, these constructions tell us nothing about the effect of copy raising on transitivity.

In addition to the "exotic" languages cited so far, copy raising may perhaps also be found much nearer home, as suggested by English examples like the following:

269. *It looks like Garfield has got Jon once more*  
 270. ***Jon** looks like Garfield has got **him** once more*

A raising analysis might be suggested by the fact that examples of the first kind systematically have counterparts of the second kind with which they are at first sight roughly synonymous. Also the anaphoric link in the latter between the matrix subject and the pronoun in the embedded clause seems to be obligatory, whereas binding of non-reflexive pronouns is otherwise optional. If such sentences really involve raising, then nonsubject raising of the copy variety is probably a very widespread phenomenon, but at the moment I do not have enough data to decide this issue, in particular I do not know whether idiom chunks can appear in such contexts, i.e. whether sentences like *Bill's goose looks like it's cooked* are grammatical under the idiomatic reading for native speakers of English. Also I suspect that pairs of examples of the kind just given are not really synonymous but that rather the "raised" version entails the "unraised" one but not vice versa, because the former seems to require that there is something about the referent of the potentially raised NP itself, for instance its appearance, which indicates that the situation expressed by the embedded clause holds. The fact that the copy pronoun can apparently have any grammatical relation which can be held by a pronoun and be separated from its antecedent by several clause boundaries also argues against a raising analysis, because the clear cases of copy raising obey syntactic restrictions similar to those which hold for plain raising, as we have seen. On the other hand, it has been noted by several authors that expletives can marginally appear "raised" in the construction at issue, i.e. that expressions like *there looks like there's going to be a riot* are not completely ill-formed, which would suggest a raising analysis. In sum, it is not clear to me at the moment whether English has a copy-raising construction, but the discussion certainly shows that one should not assume a priori that familiar languages (from a Western European point of view) cannot have copy raising.

#### 4. 6. Some descriptive generalizations

Summing up what has been said in the first five sections of this chapter, we arrive at the following descriptive generalizations concerning (primary) raising constructions in natural languages:

1. Matrix clauses in raising to subject constructions are intransitive
2. If a raising to subject construction alternates with a construction not involving raising, the clausal complement in the latter is a subject or an "extraposed" subject

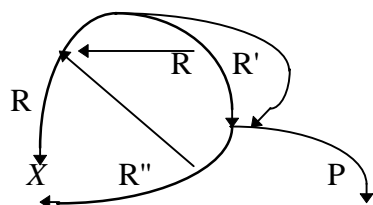
3. If a raising to object construction, including raising to prepositional object, alternates with a construction not involving raising, the clausal complement appears as a direct object in the latter
4. If raising to indirect object alternates with a non-raising construction, the clausal complement in the latter is an indirect object (this is probably instantiated by raising to middle object in Niuean)
5. No raising construction alternates with a non-raising construction in which the clausal complement corresponding to the raising host is not a subject, a direct object, or an indirect object
6. If direct objects can be raised in L, intransitive subjects can be raised
7. If indirect objects can be raised in L, direct objects and subjects can be raised
8. If obliques can be raised in L, all terms can be raised
9. If L distinguishes finite and non finite clauses, then plain raising is only possible out of non-finite clauses (if at all)

An adequate theoretical account of raising will have to allow all varieties of raising described in this chapter and should as far as possible express the generalizations just listed. The rest of the present chapter will be devoted to providing the beginnings of such an account within the theories of APG and HPSG.

#### 4. 7. The APG analysis of raising

I begin the theoretical discussion with the APG analysis of raising. In the terms of this framework, raising involves the following abstract configuration, where  $X$  is the raised element,  $R$  is a term relation,  $R'$  is 3 or 8 (chômeur), and  $R''$  is a central  $R$ -sign:

271.



Raising constructions may thus be characterized in APG terms as constructions which contain a term arc immigrant with a central arc foreign predecessor. From now on, I will refer to an immigrant arc which defines a construction as a raising construction as a **raising immigrant**. The foreign predecessor of a raising immigrant may be either erased by a replacer in the lower clause, yielding a copy raising construction, or else it is erased by its foreign successor, yielding a plain raising construction. The difference between plain and copy raising is thus minimal in the present account, although the fact that because of the coordinate laws, in particular the Locally Sponsored Graft Coordinate Law, the raised element does not head a final arc in the lower clause in copy raising constructions may be of some significance, as we will see later. Several crucial properties of raising structures are guaranteed by laws of RG/APG Universal grammar and hence need not be stated in the grammars of individual languages. In particular, the fact that  $R'$  is 3 or 8 follows from the Stratal Uniqueness Law and the Overrun Term successor law, which in addition jointly guarantee that  $R'$  must be Cho if  $R$  is 3. The fact that the  $R$  arc supporting the embedded clause sponsors the immigrant headed by the raised nominal is guaranteed by the Immigrant Local Sponsor Law and the Nominal Immigrant Local Sponsor Law, although it is not guaranteed by any law stated so far that the immigrant and its local sponsor have the same  $R$ -sign and that this

is a term R-sign. This will, however, be guaranteed by the following pair network law, which combines the effect of two time-honoured laws of RG (in fact the first of them is one of the earliest laws of RG, conceived before the theory even had a name), namely the **Relational Succession Law** (cf. Perlmutter and Postal (1983b), originally written (but not published) in 1972) and the **Host Limitation Law** (Perlmutter and Postal (1983):

**272. The Raising Immigrant Law**

If A is a nominal immigrant with Rsign R and B the local sponsor of A with R-sign R', then if either R or R' is a term Rsign,  $R=R'$

Note that this law does not exclude the situation where a non-term immigrant has a non-term local sponsor. This is correct in view of camouflage structures (cf. 2.6. above), which involve POSS or Marq immigrants with nonterm sponsors. However, there are apparently no cases of immigrants with nominal but nonterm R-signs (under the traditional RG/APG conception of Clause Union, there would be such arcs, which shows once more that adopting the Davies-Rosen analysis allows us to considerably tighten and simplify the theory). The following PNlaw is intended to entail this observation:

**273. The Nominal Immigrant Term Law**

If A is a nominal immigrant arc, A is a term arc

The laws formulated so far go quite some way toward properly constraining raising configurations, but they are still consistent with a number of structures which are apparently not attested. In particular, it would be possible for a nominal to raise out of an indirect object clause into a clause also containing a direct object and a subject. The result would be a kind of ditransitive analogue of raising to object with a thematic subject, a thematic direct object, a non-thematic raised indirect object, and the raising host, which would then have to be a *chômeur*. As far as I can tell, structures suggesting such an analysis are unattested and it seems therefore desirable to exclude them at the level of UG. The starting point for a law with this effect could be the proposal made in the appendix of Perlmutter and Postal (1984a) that intransitive predicates governing raising determine unaccusative initial strata. Elaborating on this idea, I propose the following two complementary laws:

**274. The First Raising Host Supporter Law**

If a term arc A locally sponsors an immigrant term arc B and there is no term neighbour C of A with the same first coordinate as A, then A is a 2 arc

**275. The Second Raising Host Supporter Law**

If a term arc A locally sponsors an immigrant term arc B, then every term arc C with the same first coordinate as A is absolutive in its first stratum

These two laws allow exactly three configurations of term arcs in a stratum "preceding" an instance of raising: the local sponsor of the nominal immigrant may

have no term arc neighbour with the same first coordinate, in which case it must itself be a 2 arc, it may have a 2 arc neighbour with the same first coordinate, in which case it must itself be a 3 arc, or it may have a 1 arc neighbour with the same first coordinate, in which case it may itself be a 2 or a 3 arc. The first case is that of raising to subject, the third that of raising to direct object or indirect object (the latter probably attested in Niuean raising to middle object).<sup>87</sup> I know of no evidence for the second configuration, but I will not try to exclude it for the time being. It should be clear that in those cases where the local sponsor of the nominal immigrant has no term neighbour which starts its career in the same stratum, the immigrant will either have to have a 1 arc local successor or else to sponsor a ghost 2 arc (a stable ghost according to our definitions) which in turn has a 1 arc successor, yielding a kind of impersonal counterpart of raising to subject. According to Postal (1986), the latter kind of structure is attested in the Irish raising to prepositional object construction described in section 4.3. above. Speaking somewhat metaphorically, Postal proposes that the initial stratum of clauses instantiating this construction is unaccusative, with the complement clause heading the 2 arc. The complement subject raises to become a 2 in the matrix and pushes the complement clause into *chômage*. Then, instead of advancing to 1 as in the more familiar case which yields what is descriptively called raising to subject, the raised element sponsors a ghost 2 arc and demotes to 3 to avoid a violation of the stratal uniqueness law. The dummy then advances to satisfy the final 1 law and the final 1 arc self erases, leaving the clause without a visible subject, while the demoted raisee is embedded within a PP in a camouflage structure of the kind described in section 2.6. in chapter 2 above. Apparently this last aspect of the structure need not be stipulated either, because McCloskey (1984: 481) states explicitly that the prepositions *do* and *le* which mark the raised nominal in this construction are used elsewhere (i.e. outside the exceptional raising construction) to mark arguments which correspond to indirect objects in other languages. As Postal points out, the only difference between the apparent raising to prepositional object construction and ordinary raising to subject thus lies in the fact that the raised element does not advance to become a subject in the former but instead sponsors a ghost 2 arc with a 1 arc local successor. Most interestingly, under this analysis Irish does not really have raising to prepositional object, because the raised nominal is embedded in a PP only "after" it has been raised. Given the availability of this analysis, it seems desirable to exclude the alternative of directly raising the embedded subject into the prepositional object position at the level of UG. Intuitively, what seems to be required is a law ensuring that if the predecessor of a pioneer is not supported by the latter's companion, it is a neighbour of the arc which immediately supports both the pioneer and the companion, in other words, a law preventing both raising and long-distance lowering into pioneer-companion structures in which the companion does not support the pioneer's predecessor. The following PN-law has this effect:

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<sup>87</sup> Actually the term "raising to subject" is not quite accurate, because the raising immigrant must be a 2 because of the First Raising Host Supporter Law and the Raising Immigrant Law. In most cases, such immigrant 2 arcs have 1 arc local successors, but as we will see in a moment they may fail to have one if the final 1 arc law is satisfied in some other way. It should also be noted in this connection that because the First Raising Host Supporter Law effectively requires intransitive raising predicates to be unaccusative, there can be no passives based on raising to subject constructions for the reasons outlined in section 3.4. of the preceding chapter.

## 276. The Lower Pioneer Predecessor Law

If A is a pioneer, B its companion, C its predecessor, and D an arc which immediately supports A and B, and if B does not support C, then C is a neighbour of D

Summing up what has been said so far, we have seen that there is a plausible APG analysis of the Irish raising to prepositional object construction under which it reduces to ordinary raising out of an unaccusative host, and we have imposed a law which in fact prohibits raising out of a sister of a PP into that PP. What is not excluded by anything said so far is for an element to raise out of the object of a preposition to become a sister of that preposition (and the raising host). This kind of analysis is apparently required for the Greek variety of raising to prepositional object also described in section 4.3, because there the preposition clearly is semantically a functor which applies to its clausal complement, hence both should head unsponsored arcs under present assumptions. In addition, though Joseph (1990) is not explicit about this, it appears that the preposition forms a constituent not only with its raised object (which he does show) but also with the clausal remnant (at least this is the strongest assumption consistent with the data he provides). Hence it seems that we must countenance an analysis for these cases in which the raising indeed happens within the PP.<sup>88</sup> Actually, the APG laws formulated so far do not preclude an analysis in which the nominal raises out of the clausal Marquee, but they also fail to say anything about which grammatical relation either the raised element or the raising host should assume "after" the raising. For instance, they do not preclude an analysis in which the raising immigrant is a Marq arc and the raising host continues to bear the Marquee relation, yet the data suggest that the raised element takes over the role of prepositional object from the host (for one thing, the clause is nominalized by means of the definite article in the unraised version and the latter shows that it bears accusative case, but in the raising construction the clausal remnant is not nominalized and marked instead with the preverbal "subjunctive" particlen*a*). It would obviously be desirable to make these observations follow from principles of UG to as large an extent as possible. Note that while we have assumed a Flag-Marquee structure for all PPs so far, we have not in fact ensured that this is the only lawful option. Let us now consider the possibility that at least semantically contentful prepositions are in fact predicates and that prepositional objects are indeed objects, i.e. heads of 2 or 3 arcs. Joseph (1990) actually considers an analysis along these lines, but he sees a problem in the fact that a preposition functions as a predicate, suggesting that there will have to be some kind of "conversion" from predicate to preposition proper (apparently what he means by this is that the preposition should bear some relation other than P (Predicate) in the final stratum, not that its syntactic category should change from verb to preposition or something of the kind). This may indeed be necessary, but as far as I can see nothing harmful follows from simply continuing to admit the possibility that a PP contains a prepositional predicate and an object, though it remains to be worked out whether this possibility should be allowed freely or only subject to certain restrictions and what role is left to

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<sup>88</sup>Joseph himself suggests both an analysis in which the nominal is raised within the PP and one where the nominal raises into the main clause and is only afterwards flagged with a preposition. The latter analysis entails that the raising host is outside the PP, which may or may not be a problem, but in any event it has the undesirable property of making a special oblique grammatical relation CIRC(UMSTANTIAL) necessary to account for the semantics of the construction.



play for the traditional Flag-Marquee structure.<sup>89</sup> Assuming that contentful prepositions are predicates and their complements objects, we can analyse the Greek raising to prepositional object construction as a perfectly straightforward case of raising from an unaccusative host, the only difference between it and so called raising to subject being that the Final 1 Law does not apply to prepositional phrases but only to clauses and the raised nominal can therefore surface as a direct object if it raises into a PP.

I conclude this section with a few remarks on connectivity effects in raising constructions. As I will show in more detail in the next section, In Icelandic idiosyncratic or, as it is often called, "quirky" case marking is preserved on raised subjects, whereas equi controllers and raised subjects of predicates which do not assign quirky case simply bear the case which is appropriate for their surface position. In partial analogy to the HPSG account to be developed in the next section, this can be accounted for by assuming that structural case is assigned only to heads of surface arcs, whereas idiosyncratic cases are associated with the relational valency of a predicate. Since in the RG/APG account of raising the very same element heads an arc both in the embedded clause and in the matrix clause, no special mechanism is needed to transfer properties, on the contrary, it must be ensured that no properties which are not compatible with all the grammatical relations it bears are assigned to elements which head more than one arc. In this connection a note on the distinction between plain and copy raising is warranted. In both constructions, the raised element heads an arc both in the embedded clause and in the matrix clause. However, unlike the case of plain raising, the downstairs arc is not a final arc in copy raising, because it is locally erased by the replacer headed by the copy pronoun. This means that conditions which assign specific properties to heads of surface arcs will not apply to the heads of copy raisees in their lower clause function. This seems to be a correct result as far as case and similar properties are concerned. However, agreement properties are shared in both plain and copy raising constructions, and nothing said so far formally guarantees this. What is apparently needed is a general condition requiring agreement between the head of a replaced arc and the head of the replacer. To this effect, I propose the following law:

#### **277. The Replacer Agreement Law**

If A replaces B, the head of A is coindexed with the head of B

It is a slightly unpleasant aspect of the theory that agreement between replacers and replacees must be explicitly stipulated, but at least the stipulation can be made at the level of UG rather than at the level of individual grammars.

### **4. 8. Toward an HPSG analysis of raising**

The standard HPSG analysis of raising outlined in chapter 3 of Pollard and Sag takes raising predicates to be simply predicates which subcategorize for an almost saturated complement, i.e. complement with a SUBCAT value of length one, and identify the

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<sup>89</sup>In the system of Johnson and Postal (1980), there would be a problem, because according to their PN-law 28 every constituent containing a P arc with no predecessor would have to be a clause, but little if anything seems to be lost by dropping this restriction.

unique *synsem* object on the controlled complement's SUBCAT list with a less oblique members of their own SUBCAT value. In other words, raising to subject predicates are characterized by SUBCAT values of the following form:

278. **Universal Template for SUBCAT Values of Raising Predicates**

$$\langle \dots (1) [ \dots [ \text{LOC} [ \text{CAT} [ \text{SUBCAT} \langle (1) [ \dots ] \rangle ] ] ] \dots \rangle$$

The template for raising to object predicates is identical except that the *synsem* object corresponding to the raised constituent occupies the second rather than the first position in the list. This analysis of raising has several virtues. For one thing, it does not require the introduction of any primitives specifically to account for raising, both the SUBCAT list and the notion of structure sharing being independently motivated. In addition, since the Subcategorization Principle ensures that members of SUBCAT values are "used up" from right to left (i.e. from more oblique to less oblique), if a phrase has a SUBCAT list of length one, then the sole member of that list necessarily represents the subject valency of the embedded predicate, hence it follows automatically that only subjects can be raised, as is indeed the case in many languages. The analysis also predicts that raising is local, since the SUBCAT values cannot be passed up beyond the maximal projection of the word on which they originate. The connectivity effects which show up in raising constructions are also automatically accounted for, because the structure-sharing specified by the raising template involves *synsem* objects, which contain information about case, syntactic category, etc. In this connection, moreover, the adequacy of the theory of lexical and default case of Sag, Karttunen, and Goldberg (1992) can again be demonstrated. As has been noted by various authors (for instance Zaenen, Maling, and Thráinsson (1990), and Andrews (1990)), in Icelandic raising constructions the raised element receives the case associated with its function in the superordinate clause if the embedded verb does not assign quirky case to its subject, but if the embedded verb assigns quirky case to its subject, that case is inherited by the raised element, as is shown by the following pair of examples from Zaenen, Maling, and Thráinsson (1990), the first of which shows a subject with quirky dative while the second shows that this case is preserved under raising to object:

279. *Henni hefur alltaf þótt Ólafur leiðinlegur*  
 her(D) has always thought Olaf(N) boring(N)  
 "Olaf has always seemed boring to her."

280. *Ég tel henni hafa alltaf þótt Ólafur leiðinlegur*  
 I believe her(D) to-have always thought Olaf(N) boring(N)  
 "I believe her always to have found Olaf boring."

The regular case of raising to object, in which the raised subject is marked accusative, is illustrated by the following example from the same source and involving the same matrix verb (the embedded verb *sakna* assigns quirky case to its object but takes an ordinary nominative subject):

281. *Ég taldi Guðrúnu í barnaskap mínum sakna Haraldar*  
 I believed Gudrun(A) in foolishness my miss Harold(G)  
 "I believed Gudrun in my foolishness to miss Harold."

In order to see how the case theory of Sag and colleagues accounts for these facts, recall that they assume that raising verbs do not specify anything about the case of the raised element, i.e. they neither specify a particular value for CASE nor identify the values of CASE and DCASE. Hence if the embedded verb idiosyncratically casemarks its subject, i.e. if it specifies its first SUBCAT element as receiving a particular value for CASE, that specification is inherited and determines the morphological case of the raised element. Likewise if the embedded verb regularly casemarks its subject, i.e. specifies that the CASE and DCASE values of its first SUBCAT element are identical, this specification is likewise inherited by the raising controller. What has to be ensured in the latter case is that the rule which actually fixes the DCASE value treats the raised element as a direct object although its SYNSEM value also corresponds to the embedded verb's subject valency. The obvious conclusion to draw from this is that although DCASE is an attribute of SYNSEM values, DCASE values are fixed for whole signs and not for *synsem* objects in isolation. That is, languages like Icelandic with nominative-accusative case marking will have default case rules of the following form:

**282. Nominative Default Case Rule**

If a sign X is a subject (i.e. its SYNSEM value is the first member of the SUBCAT value of its head sister) the DCASE value of X is *nominative*

**283. Accusative Default Case Rule**

If a sign X is a direct object (i.e. its SYNSEM value is the second member of the SUBCAT value of its head sister and the TRNS value of the latter is +) the DCASE value of X is *accusative*

Likewise, languages like Niuean with ergative case marking will contain default case rules like the following:

**284. Absolutive Default Case Rule**

If a sign X is an absolutive (i.e. the first argument of its head sister if the latter is intransitive and the second otherwise), its DCASE value is *absolutive*

**285. Ergative Default Case Rule**

If a sign X is an ergative (i.e. the first argument of a transitive head sister), its DCASE value is *ergative*

What the analysis does not predict is the fact that raising to subject constructions are necessarily intransitive. In fact, in standard HPSG there is no way of keeping raising predicates from counting as transitive because they necessarily subcategorize for at least two elements, but in the present system it would be easy to formulate a law which ensures that predicates with SUBCAT values corresponding to the raising template receive the TRNS specification-.<sup>90</sup> Likewise, the analysis does not predict that exactly

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<sup>90</sup>Actually, within standard HPSG it would be possible to say that a constituent which is the second argument of its head sister counts as a direct object only if it is saturated, i.e. has an empty SUBCAT

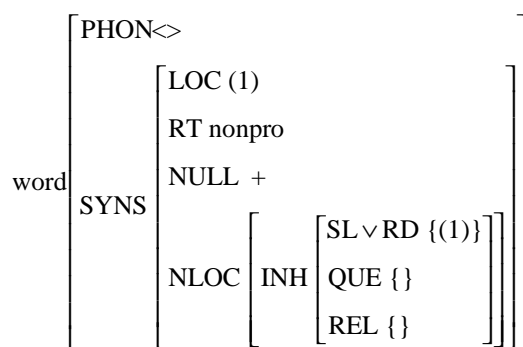
those predicates which are raising predicates according to the semantic criteria specified in section 4.1. have SUBCAT values corresponding to the raising template, but again a constraint on lexical entries ensuring this could easily be formulated. The true inadequacy of the standard HPSG analysis of raising lies in the fact that, as it stands, it allows neither non-subject raising nor copy raising, and unfortunately this property of the analysis follows from the very nature of the mechanism used and not from some easily detached side condition. If nonsubject raising were the only problem, one might try to tamper with the Subcategorization Principle in such a way that argument positions could be saturated in an order which differs from that given by the SUBCAT list, keeping the idea that raising involves structure sharing of SUBCAT elements intact. However, even such a move would not be unproblematic because it would be necessary to prevent the mechanism from being used outside of raising constructions, for instance in order to allow an object to be realized outside the constituent containing the subject. This is perhaps no reason for too much worry, because the languages with non-subject raising constructions in my sample all appear to have relatively free clause-internal verb order, hence allowing the argument positions of a head to be saturated in any order would probably not produce non-occurring word orders. In a language like English, such a move would of course be disastrous, but maybe this simply shows that it is no accident that English and languages with similar word-order properties do not have non-subject raising, and under the hypothesis that non-subject raising is possible only if the argument slots of a head can be saturated in an order which does not correspond to their position on the obliqueness hierarchy a correlation between free word order and non-subject raising is indeed expected. However, even if non-subject raising can indeed be accounted for along these lines, we still have no account of copy raising constructions. One way to account for these would involve a more far reaching modification of the Subcategorization Principle than the one just hinted at. Essentially what would be required is that pronominals can match a SUBCAT element without the latter being cancelled from the SUBCAT list. From a purely technical point of view, such a modification of the Subcategorization Principle could be carried out, but the modifications required clearly go against the spirit of the original formulation. There might be some motivation to pursue an approach complicating the theory of subcategorization if the alternative were that of postulating a completely new mechanism specifically for raising constructions, but fortunately this is not the case. The ingredients of an alternative account of raising which can deal with nonsubject raising and copy raising as easily as with raising of subjects are in fact available within standard HPSG and also, in a slightly different form, within the present version, and they have already been put to use in previous work in the analysis of a construction similar to raising, namely Tough-Movement. Pollard and Sag (1994: 4.3.) propose to analyse this construction in terms of lexical selection for a SLASH specification, and a similar analysis involving a new unbounded dependency feature GAP distinct from SLASH is proposed within GPSG by Hukari and Levine (1991). Common to both approaches is the idea that predicates which govern Tough-Movement select for a clausal complement which contains a trace coindexed with their subject, although the actual technical implementation is different because of the different mechanisms used for subcategorization in GPSG and HPSG. Implementing the same idea within the present system, we can say that Tough-Movement predicates select a clausal complement with a bound UDF specification in the sense specified in section 1.7. in

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value. However, such a move would obviously not generalize to cases where a saturated argument corresponding to the second SUBCAT position must be prevented from counting as a direct object.

chapter 1 and that the RI value of their first SUBCAT element is structure-shared with that of the bound UDF specification. Semantically, sentential complements with a bound UDF specification are interpreted as one place predicates, more specifically lambda-abstracts formed by abstracting on the variable corresponding to the bound UDF specification. Hence Tough-Movement and raising predicates must have types of the form  $\langle \dots \langle a, \langle \langle s, Q \rangle \dots, t \rangle \rangle \rangle$ , where  $a$  is the type of one-place predicates, i.e.  $\langle \langle s, Q \rangle, t \rangle$ , and  $\langle s, Q \rangle$  abbreviates the type of generalized quantifier intensions, as in earlier examples (the dots abbreviate additional occurrences of  $\langle s, Q \rangle$ , such as are required for the types of raising to direct object and raising to indirect object predicates). This means that semantically the account of raising to be proposed here is equivalent to one in which bare VPs are embedded, and hence the semantic characterization of raising predicates outlined in section 4.1. above continues to be applicable. Likewise, the syntactic governing the behaviour of nonlocal feature specifications which were introduced in section 1.7. in chapter 1 need not be modified in order to account for raising constructions. The only addition to the theory which is needed concerns the actual inventory of nonlocal features. The reason for this is that the locality conditions on raising are in general different from those which hold for nonlocal dependencies of the *wh*-movement type. In all languages in my sample except Moose Cree, raising is local, i.e. a nominal can only be raised into the immediately superordinate clause. This can be accounted for by assuming that raising dependencies are not mediated by the feature SLASH but by a new nonlocal feature RD (for "raising dependency"), whose value is a set of *local* objects as in the case of SLASH but which is subject to different locality conditions. In order to be able to use this feature, of course, we must assume that traces and resumptive pronouns can terminate not only SLASH dependencies but also RD mediated dependencies, that is, the universal templates for traces and resumptive pronouns must be revised as follows

## 286. Universal Template for Traces (revised):



287. **Universal Template for Resumptive Pronouns (revised):**

$$\left[ \begin{array}{c} \text{PHON } \alpha \\ \\ \text{SYNSEM} \left[ \begin{array}{c} \text{LOC} \left[ \begin{array}{c} \text{CAT } \beta \\ \text{RI (1) [ ]} \end{array} \right] \\ \text{RT pers - pron} \\ \text{NULL bool} \\ \text{NLOC} \left[ \begin{array}{c} \text{INH} \left[ \begin{array}{c} \text{SL } \vee \text{RD } \{(1)\} \\ \text{QUE } \{ \} \\ \text{REL } \{ \} \end{array} \right] \end{array} \right] \end{array} \right] \end{array} \right]$$

Given these revisions, the characteristic SUBCAT specification of a raising predicate can be given as follows:

288. **Second Universal Template for SUBCAT Values of Raising Predicates (first version)**

$$\left\langle \dots \left[ \text{LOC (1) [ ]} \right], \left[ \begin{array}{c} \text{LOC } \alpha \\ \text{NLOC} \left[ \begin{array}{c} \text{INH} \left[ \text{RD } \{(1) [ ]\} \right] \\ \text{TO - BIND} \left[ \text{RD } \{(1) [ ]\} \right] \end{array} \right] \end{array} \right], \dots \right\rangle$$

I propose that each predicate which is a raising predicate according to the semantic characterization of section 4.1. has a SUBCAT value conforming to this template **if the controlled complement is a full clause, i.e. has the SUBCAT value <>**. This means that the standard HPSG mechanism for the analysis of raising is not abolished but only supplemented by the new mechanism which involves the feature RD, and in fact this could hardly be otherwise because the old raising template is in fact an instantiation of the auxiliary SUBCAT template introduced in section 3.2 in chapter 3 above. Hence ordinary subject-raising constructions will be analysable in either the standard HPSG way or in the way proposed here, whereas copy raising and non-subject-raising constructions can only be analysed via the new mechanism. The availability of two analyses in a number of cases may appear aesthetically somewhat unsatisfactory, but as far as I can see no harmful consequences follow from it. It must be pointed out in this connection that grammars of individual languages may well contain rules which restrict one or the other of the two raising constructions to specific syntactic contexts, or the lexicon of a language may be organized in such a way that SUBCAT-mediated raising is governed by one class of predicates and raising dependencies established via the RD feature are governed by a second disjoint class of predicates. It may also be that the availability of two mechanisms for subject raising helps to explain the cross-linguistic predominance of subject-raising constructions, because it may be that the mechanism involving SUBCAT is in a sense "cheaper" or less marked than the one which involves the nonlocal feature RD, though this can be no more than a plausible suggestion in the absence of a serious theory of markedness for HPSG grammars.

While the new raising mechanism just proposed functions in a manner largely analogous to the SUBCAT-based standard HPSG mechanism, there are a few points of divergence which need to be discussed. The first of these concerns connectivity effects of the kind discussed in connection with quirky case in Icelandic. Since the elements of RD values are feature structures of sort *local* and hence contain both CASE and DCASE specifications, the same information about case is transferred with both mechanisms. However, the new mechanism, unlike the old one, crucially involves constituents, either traces or resumptive (copy) pronouns, in the embedded clause. For instance, in the case of plain (non-copy) subject raising the subject position of the embedded clause is occupied by trace if the raising dependency is mediated by the feature RD, whereas under the standard HPSG analysis there simply is no embedded subject constituent. This is important because I have suggested earlier in this section that default case-marking rules should apply to constituents (i.e. signs) rather than to SUBCAT elements. Now if there is an embedded subject- albeit an invisible one- in raising constructions, the default case rules will apply to this and fix a DCASE value which may conflict with that assigned to the raisee, i.e. the matrix constituent whose LOCAL value is structure shared with the bound RD specification. At first sight, this might be dealt with by further restricting default casemarking rules to apply only to overt constituents, but this cannot be the solution because fillers which bind a trace in an unbounded dependency construction of the wh-type do receive the case assigned to the trace. Another way out would be to ensure that case information is not transferred in raising constructions involving the RD feature. Under the latter view, the second raising template introduced above would have to be revised in such a way that only the RI value rather than the whole LOCAL value of the bound RD specification is structure shared with the corresponding value in the SUBCAT element corresponding to the raisee. Such an approach has been proposed by Pollard and Sag (1994: 4.3) to account for the lack of both case-connectivity effects and case conflicts in Tough-Constructions. While this may indeed be the correct account for these cases, it is not adequate for ordinary raising because it predicts that the raisee always bears the case which is appropriate for its function in the higher clause, which does not accord with the facts of Icelandic. One might counter the last objection by assuming that raising in Icelandic simply uses the SUBCAT-based mechanism, more generally, that all kinds of raising which show connectivity effects involve this mechanism rather than that based on the RD feature. This would mean that non-subject raising constructions, which can only be analysed in the latter way, should never show connectivity effects, and as far as I can see this is empirically correct. In the case of Niuean, for instance, case assignment in the embedded clause applies as if the raised element were present, that is, if a direct object is raised, the embedded subject is ergative as transitive subjects generally are, and analogously in other cases. Nevertheless, the raisee itself receives not the case which is appropriate for its function in the lower clause but that which is appropriate for its function in the higher clause. Assuming that raising constructions which must be analysed via RD indeed never show connectivity effects, one either could revise the second raising template in the way just hinted at, or alternatively it could be proposed that the values of RD are sets of referential indices rather than sets of *local* structures to begin with. The latter alternative would require either a revision of the template for traces or the assumption that all raising is copy raising. Since the consequences of the latter assumption are not sufficiently clear to me at present, I opt for the first strategy and propose the following revision of the second raising template:

## 289. Second Template for Raising Predicates (revised version)

$$\left\langle \dots [\text{LOC} [\text{RI} (2)]] , \left[ \begin{array}{l} \text{LOC } \alpha \\ \text{NLOC} \left[ \begin{array}{l} \text{INH} [\text{RD} \{ (1) \text{loc} [\text{RI} (2) \}]] \\ \text{TO-BIND} [\text{RD} \{ (1) \text{loc} [\text{RI} (2) \}]] \end{array} \right] \end{array} \right] , \dots \right\rangle$$

Note that Tough-Movement predicates are not necessarily covered by this template because it is not clear which of the nonlocal features is used in these constructions. Pollard and Sag (1994: 4.3.) assume that it is SLASH, i.e. the same feature which is also used in unbounded dependencies of the *wh*-type, whereas Hukari and Levine (1991) introduce a new feature GAP for this purpose. In any event, it seems clear that in those languages in which Tough-Movement and primary raising are distinct, the former cannot use the feature RD, hence they must use either SLASH or some additional feature like GAP.

The next point I want to discuss in connection with the new raising mechanism is locality. Unlike the SUBCAT-based raising mechanism, the new one has no built-in locality restriction because RD is a nonlocal feature and the principles governing the distribution of nonlocal feature specification which I have formulated in section 1.7. in chapter 1 allow such specifications to percolate over arbitrary distances until they are bound. It may be that this is the proper way to handle things at the level of UG, because although raising is local in most languages it is nonlocal in Moose Cree and hence non-local raising appears to be an option sanctioned by UG. Alternatively, it might be suggested that the feature RD is indeed subject to special locality constraints in addition to the principles governing the behaviour of nonlocal features in general. One would then have to claim that raising in Moose Cree uses not RD but the same feature as Tough-Movement, i.e. either SLASH or GAP. Now as I have pointed out already raising and Tough-Movement indeed appear to one and the same construction, and this observation is of course compatible both with the assumption that both involve RD and with the assumption that both involve some other non-local feature. In any event, it is clear that structures with the appearance of unbounded raising are possible in natural languages, and I must leave open the question whether these involve a raising construction instantiating one of the two templates assumed here.

In most cases of raising, however exotic they appear in other respects, the raisee is unquestionably an argument of the matrix predicate and hence the lexical entry of the latter can specify the structure sharing which establishes the raising dependency in accordance with one of the two templates. However, my sample contains a construction which does not fit this pattern, namely the Irish raising to prepositional object construction described in section 4. 3. above and in more detail by McCloskey (1984). In this construction, the raisee is not a direct argument of the raising verb but rather the object of a preposition selected by the latter. Unlike APG, HPSG must take this situation at face value because it has no mechanism to "create" prepositional phrases around argument NPs. However, the problem is fortunately not as serious as it looks because the prepositions in the Irish exceptional raising construction are clearly semantically empty. The usual assumption within HPSG and other monostratal theories like GPSG is that prepositions which only serve a marking function and have no semantic content are semantically interpreted as identity functions on NP denotations.



Suppose now that heads which are interpreted as identity functions have the same RI value as their argument, as is stated a bit more formally in the following new principle:

**290. The Index Copying Principle**

If a sign  $X$  with SUBCAT value  $\langle Y \rangle$  translates as  $\lambda x[x]$ , with  $x$  a variable of the type appropriate for constituents with the SYNSEM value  $Y$ , then the RI value of  $X$  is token-identical to the RI value of  $Y$

This principle ensures in particular that PPs headed by semantically empty prepositions have the same referential index and hence the same agreement features as the NP they contain. Given this, the analysis of the Irish construction no longer poses a problem because technically the whole PP rather than the NP contained in it can be taken to be the raisee. Interestingly, both the APG and the HPSG analysis of the Irish exceptional raising construction converge on the assumption that it does not instantiate true raising to prepositional object, though the mechanisms involved are quite different.

I conclude this section by coming back to an issue which has repeatedly been touched on in the course of this study, namely the fact that raising to subject constructions appear to be universally intransitive. Within HPSG, this can most easily be guaranteed by imposing a constraint on lexical entries such as the following:

291. If a lexical entry  $E$  has a translation  $P$  such that  $P$  has a type of the form  $\langle \dots \langle \langle s, Q \rangle, t \rangle, \langle \langle s, Q \rangle, t \rangle \rangle$  and is a possible value for  $\alpha$  in the meaning postulate schema
- $$\forall P_1 \forall P_2 \forall Q_1 \forall Q_2 [[P_1(\wedge Q_1) \leftrightarrow P_2(\wedge Q_2)] \rightarrow [\alpha(\wedge P_1)(\wedge Q_1) \leftrightarrow \alpha(\wedge P_2)(\wedge Q_2)]],$$
- then the TRNS value of  $E$  is -

This constraint is intended as part of UG, and since it appeals directly to the semantic characterization of raising to subject predicates it applies indifferently to predicates conforming to either the first or the second raising template.

## **Chapter 5**

### **Conclusion**

#### **5. 0. Introduction**

In this concluding chapter, I want to do essentially two things. First I want to try to tentatively assess the strengths and weaknesses of the theories of APG and HPSG, both relative to each other and relative to GB theory, and second I will outline the beginnings of a synthesis which combines some of the strengths of the two theories and avoids some of their respective weaknesses. The discussion will largely be based on that of the preceding four chapters, but the focus is not on elaborating the suggestions made there, though this would be possible and indeed desirable in many cases, but rather on bringing out which of the fundamental properties of the two theories seem to have desirable consequences, i.e. to facilitate the formulation of optimally revealing analyses of grammatical phenomena- and should hence be preserved in an eventual synthesis - and which of them seem to have negative consequences, i.e. preclude the formulation of optimally revealing analyses, and should hence be discarded. It should be clear that many of the properties of the two theories are neither here nor there, i.e. they constitute more or less arbitrary choices from among a number of logical possibilities. This holds in particular for certain aspects of the formalizations chosen, for instance the decision to use the natural numbers as coordinate names in APG or the decision to treat sorts as sets of nodes in HPSG. Such matters will not be called into question in what follows except insofar as they interact with more substantial issues. It should also have become clear that both theories are powerful enough to provide an analysis of some kind for almost any imaginable kind of grammatical phenomenon, either as they are or with modifications which do not affect their basic architecture. Indeed, most existing grammatical theories are powerful enough in this sense, the only exception known to me being standard GPGS as formalized in Gazdar et al. (1985), whose context-free character demonstrably excludes the analysis of certain construction types found in natural languages, for instance the verbal complexes of certain continental West Germanic languages and dialects and the instances of multiple wh-extraction attested in the Scandinavian languages (cf. Shieber (1985) for the former and Engdahl (1986) for the latter). Hence assessing the strengths and weaknesses of generative theories of grammar is in general not a matter of a theory's being able to handle some chosen phenomenon in some way or other, but rather a question of the potential offered by the theories concerned for formulating optimally elegant and revealing analyses of the data deemed relevant.

#### **5. 1. Strengths and weaknesses of HPSG and APG**

As I see it, the main strengths of APG are its multistratal architecture and its provision for multiattachment, and the absence of these features from HPSG constitutes the main drawback of the latter theory. On the other hand, APG embodies only a fairly rudimentary theory of syntactic categories and syntactic features, and no systematic theory of subcategorization at all, whereas these aspects of HPSG are highly developed and confer the theory a significant advantage over its competitors in the analysis of phenomena such as case marking, agreement of various kinds, special clitics, etc., as

has in part been shown in chapter 1 of the present study. Given this assessment, a proper synthesis of APG and HPSG should combine the former theory's conception of clause structure with HPSG's apparatus for the representation of morphosyntactic features and perhaps - I will return to the reason for this hedge - the latter's subcategorization mechanism. It will be the business of the next section to sketch the beginnings of such a synthesis. In the remainder of the present section, I will try to justify the assessment of the basic strengths and weaknesses of the two theories which I have just given.

Let me begin by addressing the question of multistratality. What is at issue here is not mere the fact that, like RG, APG sanctions multistratal representations, but also the more specific fact that these two theories in principle allow not only upgrading but also downgrading revaluations and insertions of nominals in noninitial strata. While the former property distinguishes RG and APG from HPSG and similar monostratal theories such as GPSG and LFG (and also from most non-generative theories of grammar), the latter two properties distinguish them in addition from GB theory and related approaches, which are multistratal but allow only upgrading revaluations, e.g. promotion from direct object to subject status but not, for instance, demotion from subject to indirect object status, and which do not allow the insertion of nominals in non-initial strata.<sup>91</sup> In order to establish that not only a multistratal architecture, but more specifically a multistratal architecture of the kind instantiated by RG and APG, is called for, it must be shown that there are generalizations in the grammars of natural languages which cannot be captured without allowing for multiple strata of grammatical relations and for downgrading revaluations and insertions. One such generalization is precisely the RG/APG characterization of passive clauses. As we have seen, this crucially depends not only on the multistratal nature of RG and APG, but also on the possibility of inserting nominals in noninitial strata, because only the latter allows impersonal passive constructions to be characterized in the same way as personal passive ones. The fact that RG and APG allow downgrading revaluations is crucial for capturing generalizations uniting active subjects and passive agents of the kind that has been mentioned and in part illustrated in section 3.3. above. Likewise, phenomena involving nonnominative experiencers of the kind illustrated in footnote 57 (section 3.2.). In RG and APG, the partially subjectlike behaviour of such nominals is accounted for by assuming that they are initial subjects which undergo what is called **Inversion**, i.e. are demoted to the status of indirect object, and postulating rules which are sensitive not to final subjecthood but rather to notions such as **working 1**, where a working 1 (or more generally a working term<sub>x</sub>), is a nominal which is a 1 at some level and a final term (but not necessarily a final 1). More generally, the RG and APG literature abounds with arguments to the effect that grammatical rules in natural languages need to be able to refer not only to final subjecthood, final direct objecthood, etc., but also to notions like working term<sub>x</sub>, acting term<sub>x</sub>, or grammatical relation *x* without specification of level. It must be clearly understood that the point of such arguments is not that theories with a less elaborate conception of grammatical relations cannot account for the facts, but only that they fail to bring out certain generalizations which a multistratal theory like RG or APG can capture. This point is, I think, amply illustrated by the HPSG analyses of passive and raising constructions which have been outlined in the present study. While I think I have succeeded in

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<sup>91</sup> As a matter of fact, in standard GB theory the only revaluation allowed is that from direct object to subject, but one could imagine theories based on similar assumptions but allowing, for instance, promotion from indirect object to direct object.

providing viable analyses for the phenomena I set out to deal with, I had to introduce a number of devices specifically for the purpose of analysing constructions outside the range considered by standard HPSG, and in the case of passive constructions I still was unable to come up with a uniform characterization of the different kinds of passives. It must of course be made clear that the HPSG analyses I have presented are not the only ones or necessarily the best ones which are available within the general framework, but as far as generalizations referring to essentially multistratal notions are concerned, I find it difficult to imagine how a monostratal theory could capture these without, in some covert form, introducing multistratal notions itself. This assessment is supported by the observation that, to the best of my knowledge, there is not a single attempt on the part of practitioners of GB or of monostratal theories to systematically counter all or even a major part of the arguments that have been adduced in favour of the RG/APG conception of clause structure on the basis of a coherent set of premises, though alternative analyses of individual constructions are not lacking. It must be admitted that individual languages vary in the extent to which they provide evidence for multistratal analyses of the RG/APG kind, and it is true that many phenomena in many languages can be satisfactorily analysed without recourse to any of the specific devices of RG or APG. However, I think that the question how rich a theory of grammatical relations is required for the analysis of natural languages cannot be decided on a quantitative basis. Rather, as long as there are generalizations which cannot be captured in other ways, multiple strata, demotions, and insertions into non-initial strata must be made available by grammatical theory.

As mentioned at the beginning of this section, I take a second crucial strength of RG and APG to be the availability of the notion of multiattachment. Apart from providing a very straightforward representation for raising and wh-type dependencies, this notion, together with the availability of multiple strata and the APG mechanism of pronominal replacement, is crucial in providing a unified treatment of both copy and plain raising and wh-extraction on the one hand and of genuine and "false" reflexive constructions. Again there are surely other ways of analysing these phenomena in a monostratal framework than those I have proposed, and quite possibly better, ones, but again also I find it difficult if not impossible to imagine how, for instance, the generalizations concerning auxiliary selection and past participle agreement in Italian might be captured equally straightforwardly in a monostratal theory.

## 5. 2. Toward a synthesis

In the preceding section, I have shown why I think that APG is the more promising of the two theories that I have examined in this study. It has also, I think, become clear both that HPSG has certain virtues worth preserving and that neither HPSG nor APG is as yet an optimal theory of generative grammar; the latter holds both for the standard versions of the two theories and for the modified versions outlined in the present study. In the rest of this chapter, I want to sketch the outlines of a synthesis between the two theories which combines some of their strengths and avoids some of their weaknesses and thus may represent one small step towards the long term goal of developing an integrated theory of generative grammar. It must be stressed that what follows is really no more than a sketch, but still I think it is a more forward-looking and hence satisfactory way to end a work like the present one than a mere list of inadequacies and desirable improvements.

In developing a synthesis of two theories, there are essentially two options one can take. One may either take one of the two as a starting point and, as it were, graft the desirable features of the other onto it, or one may start from scratch. For obvious reasons, I will take the first option and, since I have found APG to be the more promising theory on the whole, I will use it as the basis. Sticking with the metaphor just used, I will graft certain features of HPSG onto the theory of APG, and I will also do some pruning, eliminating options which seem to me to make the theory too powerful and unnecessarily complex.

One crucial respect in which I think the theory of APG should be simplified concerns the inventory of oblique grammatical relations. Recall that standard APG (and standard RG, for that matter) employs a whole set of oblique grammatical relations such as Locative, Instrumental, Beneficiary, etc., yet it is not clear that this proliferation is empirically justified, and in any event the names of the oblique relations look suspiciously as if syntax and semantics were being mixed up here. A massive simplification of the theory can be achieved if, following Farrell (1994), we discard all oblique relations but one and also do away with the primitive *chômeur* relation. Crucially, this does not mean that the notion of *chômeur*hood, which is at the heart of many RG and APG analyses, is lost, but it can now be defined rather than having to be taken as primitive. The definition goes as follows:

#### 292. **Definition of *chômeur***

An arc A is a *chômeur* arc if and only if A is an oblique arc with a term arc local predecessor

Given this new characterization of *chômeur*hood, the Motivated Chômage Law can be reformulated as follows (cf. Farrell (1994: 34):

#### 293. **The Motivated Chômage Law**

If A is an Obl arc with a local predecessor B, then B is overrun

The *Chômeur* Advancement Ban of standard RG and APG can be subsumed by the following law, which quite generally excludes local successors of Obl arcs<sup>92</sup>:

#### 294. **The Inactive Oblique Law (IOL)**

If A is an Obl arc, A has no local successor

The IOL excludes the whole class of analyses in which some initially oblique nominal assumes a term relation and hence significantly reduces the number of analytical options available. It entails that those constructions hitherto thought to involve oblique to term advancement must involve either advancement from a term relation (often 3 (indirect object)) or else are monostratal. As Farrell shows, both cases seem to be attested, and some alternations, such as Dative Shift in English, involve both different initializations and different advancement patterns (cf. section 3.3. above).

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<sup>92</sup>This is formulated as a hypothesis rather than a law in Farrell (1994: 233); since I find his defence of this hypothesis very convincing, I have chosen to adopt it as a law.

Another respect in which the theory of APG can be considerably streamlined has to do with coordinates and the sponsor and erase relations in connection with non-structural arcs. While it is certainly in the interest of simplicity to represent both structural and non-structural grammatical relations within the same formalism, I know of no substantial evidence that non-structural grammatical relations are stratified in the same way as the structural ones are. This suggests that a law should be imposed which requires non-structural arcs to be outside the domain of the sponsor and erase relations. As far as the coordinate sequences of non-structural arcs are concerned, the simplest, though perhaps not the most elegant, way of ensuring that these cannot be appealed to in any undesirable way by rules of grammar is to stipulate by law that every non-structural arc has 1 as its first coordinate. Together with the coordinate laws already in place, this will ensure that all nonstructural arcs have 1 as their one and only coordinate. A more elegant alternative to these stipulations would be to assume that there can be arcs without coordinate sequences, that non-structural arcs are all of this kind, and that incomplete arcs are outside the domain of the sponsor and erase relations. Farrell (1994) in fact proposes that the arcs which represent thematic relations in his system have no coordinates (he says nothing about sponsor and erase because he does not appeal to these relations), and the idea can profitably be extended to the non-structural arcs. In order to implement these ideas, I must slightly modify the terminology used up to now. Let a **complete arc** be an arc as originally defined in section 2. 1., i.e. a structure of the form  $\langle\langle x,y \rangle, R \rangle, \langle c_m \dots c_n \rangle$ , let an **incomplete arc** be an object of the form  $\langle\langle x,y \rangle, R \rangle$ , i.e. a complete arc minus its coordinate sequence, and let the term **arc** refer from now on to both complete and incomplete arcs. Given this revised terminology, we can formulate the following two new laws of APG:

295. **The Non-Structural Arc Law**

If A is a non-structural arc, A is an incomplete arc

296. **The Incomplete Arc Law**

If A is an incomplete arc, A has no sponsor and no eraser

Note that the first of these laws requires that all non-structural arcs are incomplete but does not preclude the existence of structural incomplete arcs, a point to which I will return. However, I assume that arcs with any one of the structural R-signs used so far are necessarily complete.

Having pointed out two ways in which the theory of APG can be made more restrictive, I now want to turn to areas in which I think the theory should be elaborated, and it is here that certain aspects of HPSG will come to the fore again. The first possible elaboration I want to discuss involves introducing structural representations of thematic roles into pair networks analogously to the proposal made by Farrell (1994) for RG which was already mentioned in passing. Such an extension would bring APG closer to standard HPSG, though not to the version advocated in the present study, because the semantic representations of standard HPSG (the values of the attribute CONTENT within the value of LOCAL) specify the semantic roles of the arguments of predicates. The empirical question in connection with the structural representation of thematic roles is whether they play a role in determining wellformedness which cannot be reduced to their semantic content. What could such

evidence be like. It seems clear that what we need are examples whose illformedness is arguably due to some constituent having a specific thematic role and which can at the same time be argued to be structurally illformed rather than merely semantically deviant. To my mind, this criterion rules out as evidence for a syntactic representation of thematic roles many of the constructions which have been adduced as such. For instance, Farrell (1994: 2.3.3.) argues that the implicit subjects of infinitival purpose clauses in English can only be controlled by superordinate subjects which are also agents, so that, for instance, *John bought a new car to impress his girlfriend* is fine while *John likes Jazz to impress his girlfriend* is somehow deviant. Yet it is arguable that the deviance of sentences of the latter kind is purely semantic in nature (you cannot like with a purpose because liking as usually understood is not something one actively engages in), and the same holds for similar constructions in other languages. There do seem to be a few instances of constraints on wellformedness which make appeal to thematic relations and are yet arguably not purely semantic in nature. For instance, Alsina and Mchombo (1991) show that wh-extraction in the Bantu language Chichewa is subject to the condition that final direct objects can be extracted only if they are either themes or locatives. Since the constraint applies only to direct objects, whereas for instance subjects (including passive subjects) can be freely extracted, it is not possible to claim that the constraint is semantic in nature. Rather, we seem to have here a genuine instance of a thematic side condition on a structural constraint, and moreover one which arguably belongs to syntax proper and not to the lexicon. Accepting Alsina and Mchombo's arguments, then, we are lead to the conclusion that there are can indeed be thematic constraints on purely syntactic rules in natural languages, although it still seems that the interaction between syntax and thematic roles is only indirect, i.e. mediated by the lexicon, in the general case. Given this, there arises the problem of providing a structural representation for thematic relations. As already hinted at in passing, Farrell's proposal, which I will adopt, essentially involves the postulation of a set of thematic R-signs, including at least ag(ent), ben(eficiary), rec(ipient), th(eme), and loc(ative), and using incomplete arcs labelled by such Rsigns to represent the thematic relations of nominals and clauses. Although Farrell is not completely explicit about this, his idea seems to be that every constituent which heads, in our terms, an unsponsored term arc also heads a thematic arc. This idea is embodied in the following new law of APG:

#### 297. **The Thematic Arc Law**

A node *n* heads a thematic arc with tail *b* if and only if it heads an unsponsored term arc with tail *b*

Given this law, thematic arcs are always parallel to unsponsored term arcs. Hence nominals are represented as bearing thematic relations to the constituent which immediately contains them rather than to the predicate of the latter, which may seem a bit unintuitive. This could easily be changed if desired but for present purposes such a change is not necessary. Note that we have not yet guaranteed formally that thematic arcs are indeed incomplete arcs, but this can easily be achieved by a law like the following, which is complementary to the NonStructural Arc Law:

#### 298. **The Thematic Arc Incompleteness Law**

If *A* is a structural arc, *A* is incomplete if and only if *A* is a thematic arc

Note this law and the Incomplete Arc Law together guarantee that thematic arcs do not enter into successor chains and cannot be replaced.

Apart from the syntactic representation of thematic relations, another major way in which I think the theory of APG should be elaborated concerns the representation of syntactic categories and syntactic and morphosyntactic features. This is an area where HPSG and related theories have a decided advantage over their competitors. Fortunately, there is a fairly natural way to graft the relevant machinery onto APG. As I already hinted at in several places, it is possible to enlarge the inventory of non-structural R-signs of APG and use arcs with such R-signs to model roughly the same kind of information as is embodied in HPSG's SYNSEM values. This general idea will now be made more precise.

I want to begin by clarifying the relation between terminal and nonterminal nodes and between structural and non-structural arcs. I have already formulated laws which guarantee that non-structural arcs are necessary incomplete arcs, i.e. have no coordinates. I now want to ensure formally that structural arcs can support nonstructural ones but not vice versa. This is achieved by the following new law:

**299. The Non-Structural Arc Support Law**

If A is a non-structural arc, A does not support any structural arc

Next, I want to guarantee formally that terminal nodes can only appear as heads of arcs which do not support any other arcs (as their name would suggest anyway) and more specifically that they may only appear as heads of nonstructural arcs of this kind. This is done by means of the next new PN-law:

**300. The Terminal Node Law**

a node n is a terminal node if and only if n is the head of a nonstructural arc A which does not support any other arc

The last thing which needs to be guaranteed by law in order to ensure the proper relation between structural and non-structural arcs is that structural and non-structural arcs cannot overlap. This is achieved by the following law:

**301. The Overlap Limitation Law**

If two arcs A and B overlap, then either A and B are structural arcs or A and B are non-structural arcs

It should have become obvious by now that those substructures of a pair network which consist of non-structural arcs closely resemble HPSG feature structures. In particular, the R-signs of non-structural arcs can be taken to correspond to attributes in the HPSG formalism, and as in the latter, the values of an attribute (in present terms, the structure rooted in the head of the arc in question) can be either atomic (terminal nodes in the revision of APG just being outlined) or complex. In



addition, structure sharing of the kind relevant in HPSG is represented by overlapping non-structural arcs in the present system. The main difference between the present extended APG system and HPSG is that in the former the structures are not explicitly sorted (except to the extent that one may regard the distinction between terminal and non-terminal nodes and between individual terminal nodes as a kind of sorting). It should perhaps be stressed that some amount of parallelism holds not only between the substructures composed of non-structural arcs in the revised APG system and HPSG feature structures, but also between the latter and the substructures composed of structural arcs in the former. More precisely, the identification of attribute names with R-signs and structure sharing with multiattachment is valid quite generally, but in the case of structural arcs APG, the picture is complicated by the fact that HPSG has no analogue for the notion of a coordinate or the attendant notion of a stratum of grammatical relations and for the Arc Pair Relations sponsor and erase. Put still differently, the new APG system envisaged here is, as far as structural arcs are concerned, a proper extension of the HPSG system (with standard RG occupying an intermediate position, as it involves coordinates but not Arc Pair Relations), and as far as non-structural arcs are concerned it is almost isomorphic to the latter. Thus from a purely architectural point of view, the new theory is indeed a hybrid between standard APG and standard HPSG. In order to give more empirical content to this notion of a hybrid theory, of course, it is necessary to discuss which kinds of grammatical information should be represented in what might be called the APG subsystem of the new theory and which should be represented in the HPSG subsystem. Taking the architecture of HPSG signs presented in section 1.2.3. of the present study as a point of departure, I would like to argue that roughly the information embodied in SYNSEM values in HPSG should be represented by non-structural arcs in the revised APG system, whereas the information embodied in DTRS values should be represented by structural arcs. This apparently neat division of labour needs to be complicated in one crucial way, though. Recall that in HPSG the grammatical relation of a sign which is a constituent of a larger sign is specified by the position of the SYNSEM value of that sign in the SUBCAT value of the head. In other words, the hybrid theory does not embody the close link between subcategorization and grammatical relations which is characteristic of HPSG. Rather, as in standard APG (and RG), grammatical relations are directly represented as part of the structural arcs which also define constituency. The reason for this is that the stratification of grammatical relations and the dependencies between grammatical relations represented by sponsor and erase are more easily captured in such a system, although it would certainly be possible to devise a theory which would technically be more like HPSG than the one envisaged here and would yet embody these crucial features of APG. For instance, It would be possible to represent grammatical relations holding at different strata by endowing heads with more than one SUBCAT-like attribute and allowing the SYNSEM values of arguments to occupy different positions in the values of different such valency features. More generally, there are many ways in which a synthesis of the leading ideas of HPSG and APG could be executed, and the particular approach envisaged here would have to be developed in considerable detail to test its full potential. However, I hope at least to have shown in this study that both APG and HPSG have features worth preserving in the future development of generative grammar and that a synthesis of desirable features of different theories may indeed be feasible and a worthwhile topic for further research.

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