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Projection Principle

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On the Conceptual Link between Clauses I and II  
of the Extended Projection Principle

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Chomsky (1982) presents the Extended Projection Principle (EPP) as a postulated principle of Universal Grammar. It consists of the two clauses set out in (1):

- (1) I. the Projection Principle
- II. the stipulation that clauses have subjects.

The Projection Principle states that

- (2) All theta-marking properties of a head must be represented categorially at each syntactic level.

This means that the arguments assigned thematic (i.e. theta) roles by a lexical head must be expressed by either lexical or empty categories at each level of representation. The Projection Principle thus ensures that lexical heads obligatorily appear in certain syntactic configurations. Clause II replaces the phrase-structure rule

- (3) S ----> NP INFL VP

ensuring that all clauses have subjects <fn 1>.

Chomsky argues that (1.II), which stipulates the obligatory nature of the subject, cannot be subsumed under the Projection Principle despite the fact that subjects are frequently theta-marked constituents. There are two reasons for this. First, non-theta-marked arguments can occupy [NP,S] position, and in fact must do so in e.g. it is raining. Second, (Chomsky 1982, p10) the theta-marked subject is not obligatory for heads, whereas subcategorized complements are, as can be seen from passives and from nominal constructions where the simple determiner can replace the external argument, for example the belief that S.

Chomsky states that the two clauses are linked conceptually. The apparent link between them is that both take the place of phrase structure rules in accounting for certain syntactic facts. However, the link between principles (I) and (II) can be stated much more strongly, and in a way which will give insight into the nature of structural representations. If we analyse a sentence as a hierarchical arrangement of maximal projections, the XPs in terms of which it is represented divide naturally into two classes, argument XPs and non-argument, or predicative, XPs. We shall see that, properly stated, the two clauses of the EPP

are complementary; clause (I) accounts for the distribution of the argument XPs, and clause (II) for the distribution of non-argument XPs. Furthermore, these two principles can be stated in parallel fashion, and thus the conceptual parallelism will be reflected formally. We will examine each principle in turn, and show that each can be restated in a more explanatory manner, and that this makes the conceptual link between them clear.

Since the Projection Principle is related to the theta-criterion, it will clearly be a simplification of the grammar if we can derive it from the latter rather than stating it as an independent principle of the grammar. The theta-criterion is formulated in (4):

(4)i. Each theta-role that a lexical head obligatorily assigns must be assigned to a unique argument.

ii. Each argument must be assigned a theta-role. <fn 2>

The Projection Principle follows this up with the additional criterion that (i) must hold at every level of syntactic representation. Note that, as mentioned above, (4.ii) accounts for the distribution of argument XPs; a sentence will be ill-formed unless all arguments are theta-marked according to this condition. Now, we can view a lexical head as an open function, with the theta-roles indicating how many arguments the function requires to be complete and what the thematic nature of such arguments must be. Clause (i) of the theta-criterion can then be restated as the requirement that all lexical functions be properly closed (or 'saturated', to use Frege's term). This holds as the criterion of well-formedness on a representation of a sentence in terms of heads and arguments -- which is essentially what D-structure is. We can restate (4.i) as (5):

(5) All lexical functions must be properly saturated at D-structure.

From this (4ii) should follow automatically. If a well-formed structure must be analysable as a properly saturated function, then it follows from the notion of a function that there can be no 'unattached' arguments floating around. Note that this clearly implies that the theta-criterion properly holds at D-structure and not, as is usually argued, at LF. For the purposes of this paper, we may assume this to be the case -- it makes no empirical difference which way the rule is stated. However, Rothstein (1984) proposes a theory of semantic interpretation in which it is natural to state it this way.

To derive the Projection Principle from (5) we need only assume that rules mapping between levels respect the assignment of structure at a given level. Thus if a condition holds at level  $n$ , it should also hold at level  $n+1$  or level  $n-1$ , unless specifically broken by the mapping rules. In the general case, therefore, if lexical functions are satisfied at one particular level of structure then it should follow that they are satisfied at all levels of structure. It might be argued that this informally stated condition is equivalent to the Projection Principle, so that we have not gained anything by our reformulation. However, the point is that the Projection Principle can now be seen as an instance of a general condition on rules mapping between levels of representation, and should not be stated as an independent condition on the realisation of lexical argument structure.<fn 3>

Moving on to (1.II), the condition that clauses have subjects is, in its initial statement, a stipulation. The presence of [NP,S] follows from (5) just in case the head of the VP requires a thematic argument which is assigned to that position, but where this is not so (1.II) or (3) is needed. Subjects which are not accounted for by (5) may be D-structurally internal arguments, for example the subjects of passive or inchoative verbs as in (6):

- (6) a. The cake was eaten.  
b. The door closed.

or they may be 'raised' subjects, as in (7):

- (7) John was believed to have left.

or they may be pleonastics as in (8):

- (8) a. It snowed.  
b. It was obvious that Mary would win.

We can account for the presence of these subjects in a non-stipulative way if we represent S-structure in terms of functions and arguments, parallel to our representation of D-structure. At this level the function is not a lexical function, but is syntactically defined. This syntactic function, which we will call a predicate, is the maximal projection, or XP. This predicate is analysed as syntactically open and requires an argument for closure. The argument, its subject, must be in the appropriate syntactic relationship, which is defined by the rule of predicate-linking. For English, the rule can be stated in the following way:

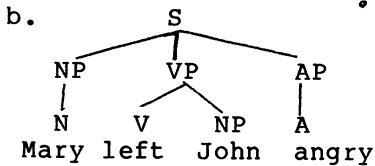
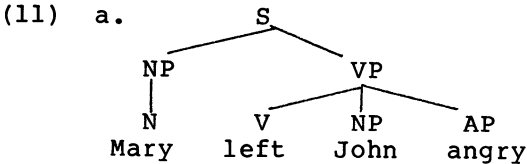
- (9)i. Every non-theta-marked XP must be linked at S-structure to an argument which it immediately c-commands, and which is immediately c-commanded by it.

- ii. Linking is from right to left (i.e. a subject precedes its predicate. <fn 4>

This rule clearly accounts for the paradigm case of predication in English -- the linking of [VP,S] to [NP,S]. It also accounts for the linking of secondary predicates to subjects in the so called 'small clauses' such as:

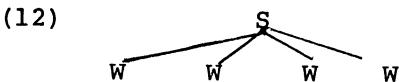
- (10)a. John eats carrots raw.  
b. Mary left John angry.

Note that the ambiguity of (10.b) is explained by the fact that there are two alternate structures allowed by (9):



In (11.a) angry must be predicated of John, whereas in (11.b) the only possible subject for the AP is [NP,S].

We hypothesise that (9.i) is a principle of Universal Grammar, while (9.ii) is clearly a parameter at which languages differ. It is clear that in non-configurational such as Warlpiri (9.ii) does not hold, whereas there is evidence that (9.i) can be substantiated. (Specifically, (9.i) ensures that subject and predicate are syntactic sisters. English has a hierarchical structure -- as (11) indicates. This means that subject and predicate are frequently adjacent, and if not, there are severe restrictions on what may separate them. Warlpiri is analysed as having a flat structure as in (12):



where 'W' designates simply 'word'. (See Hale (1980)). Maximal projections may therefore take subjects which

are separated from them by much syntactic material, but which still meet the the configurational criterion of (9.i).)

All XPs are monadic functions which require a single argument to close them in this way, with the exception that NPs and S's, while they may be predicates linked to subjects, can alternatively be closed without involving an argument. In such cases, they themselves are closed arguments, and their distribution is governed by (5). This is possible because of the internal structure of these constituents; for further discussion see Rothstein (1983). <fn 5>

(9), by ensuring that every maximal projection of V is linked to a subject guarantees that (1.II) -- or (3) -- is met. However, it is a more general condition than either of these, in that they concern themselves only with inflected predicates, whereas (9) accounts for small clause predicates as well, and thus ensures the grammatical distribution of all non-argument XPs.

Under this account, 'subject' is analysed as 'subject of a predicate' not 'subject of an S', thus allowing us to define S as a specific type of subject-predicate relation -- an instance of primary predication -- rather than requiring it to be a primitive of the theory. <fn 6>

A further advantage of representing S-structure in this way involves the derivation of a semantic representation. Given an analysis of S-structure in terms of syntactic subjects and predicates, it is possible for the semantic component to derive from the syntax a representation in which subject-predicate relations are expressed.

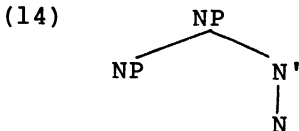
The conceptual link between the two clauses of the EPP can now be stated explicitly, and formally set out. The theta-criterion requires that a well-formed sentence be analysable in terms of properly saturated lexical functions, and the predicate-linking rule requires that it be analysable in terms of properly saturated syntactic functions. We can express this conceptual parallelism formally by restating the EPP in the following way:

- (13) For a sentence to be well-formed,  
 syntactic and lexical functions  
 must be properly saturated.

It follows from their respective natures that syntactic predicate functions are always monadic, whereas lexical functions are of variable polyadicity, ranging from the zero-adic e.g. rains to the obligatorily triadic e.g. he put the book on the table. The syntactic structure

of the predicate dictates that it always requires a single formal argument, whereas the number of arguments required by a lexical function depends on its meaning, a quintessentially idiosyncratic property.

This analysis accounts for the presence of pleonastic subjects in [NP,S] position and also for the fact that these never occur in [NP,NP] position. When an [NP,S] position is empty, there is nothing for the [VP,S] to be linked to, and unless the position is filled with an appropriate syntactic argument the sentence will be unacceptable by (9) -- or (13). Usually, the [NP,S] position is filled by an internal argument moved by move- $\alpha$  from within the VP. Where there is neither a theta-role assigned to [NP,S] nor an internal argument, as is the case with weather verbs like rain, the subject position remains empty, but the VP, a formally defined syntactic function, still requires an argument. A pleonastic is thus inserted to act as subject. <fn 7> The impossibility of pleonastics in [NP,NP] position, e.g. \*it's rain, follows from this analysis. Prenominal NPs appear only in configurations such as (14):



Subjects being 'subjects of predicates', the [NP,NP] cannot be a subject because there is no predicate for it to be a predicate of, as it is the syntactic sister only of an N'. Pleonastics are inserted only to ensure that the predicate-linking rule is satisfied, and as there is no XP requiring the [NP,NP] as a subject, a pleonastic will never be inserted in that position.

### Notes

I should like to thank Ann Reed for discussion and criticism of an earlier draft of this paper.

1. Rule (3) is not entirely subsumed under the EPP because the statement of (1.II) makes no reference to the presence of INFL in clauses. The fact that the two rules do not have the identical effect is not a problem for this analysis, for we will show that the subject is not required by INFL but by the VP, or, more generally, by the XP. This is shown by the fact that non-inflected small clause XPs are also obliged to have subjects. The presence of inflection is due to separate constraints (see Rothstein (1983) and

forthcoming). Borer (1982) argues that the obligatory nature of the subject is due to properties of AGR, but it is not clear how her account can be extended to small clauses.

2. In its original statement (ii) also has a biuniqueness condition --each argument must be assigned one and only one argument. Schein (1982), as well as Rothstein (1983) give arguments for a weakening of clause (ii) to its present statement, while Williams (1983) reformulates the theta-criterion in terms of argument complexes, which has the same effect.

3. Note that there is evidence (Higginbotham (1983)) that there are cases where the Projection Principle does not hold, so that it should not, in any case be considered an inviolable rule.

4. Note that this definition of predication differs from Williams (1980). He defines predication as the relation between the external argument of a lexical head and the maximal projection of that head, whereas we define it in purely syntactic terms.

5. It is clear that some such mechanism of 'internal' closure is logically necessary. It is a theorem of X-bar theory that every projection of a lexical category at S-structure must be dominated by the maximal projection of that category (where domination is a reflexive relation). Thus, if S-structure can be represented as a hierarchical arrangement of maximal projections, and if (9) holds, then unless there is some possibility of 'internal closure' we would not be able to avoid a problem of infinite regress -- except, perhaps, by circular linking. Intuitively, we can see that neither is a rule of grammar.

6. Rothstein (1983) discusses the definition of S as an instance of predication where the subject is not an internal argument of another lexical head, and states as a condition on well-formedness that an S must be either inflected, or theta-marked.

7. Note that in pro-drop languages, pleonastics are inserted in [NP,S] position even when there is an internal argument available to be moved. This argument is then coindexed with the pleonastic and with AGR, as in (i) (where AGR is affixed to the V),

(i) *pro*<sup>i</sup> *arrivano*<sup>i</sup> *multi studenti*<sup>i</sup>  
and is understood as the subject, though structurally it is not the argument of the VP. This is possible because in these languages 'affix-hopping' is held to take place before case-assignment so that AGR (agreement) is available to assign nominative case to a post-verbal internal argument. In English this is not

so. A pleonastic can be inserted and coindexed with an internal argument only when that argument does not require case, for example:

(ii) it' was clear that she would win!

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