Small Clauses and the Projection Principle
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SMALL CLAUSES AND THE PROJECTION PRINCIPLE

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Analyses of complement small clauses like those in (1) reveal a logical gap in the argumentation for category assignment.*

1 a) Max considers Joe smart.
b) Sam expects Laura off the ship by midnight.
c) We feared Mo killed by the enemy.
d) They made their son a good lawyer.

The logical gap is a case of a wider gap in GB theory, which has to do with the question of what the syntactic possibilities are for realizing particular θ-roles. The special case of this question that appears in the case of small clauses is the problem of what can be the syntactic realization of the θ-role "propositional object."

It has been controversial whether small clauses like those in (1) are syntactic constituents, and if so what their syntactic category is. According to Stowell 1981 and 1983, Chomsky 1981 and 1986b, and Contreras 1987, each is a constituent whose category is that of the maximal projection of the head of its predicate. Under this analysis the small clause in (1a) is an AP, the one in (1b) is a PP, the one in (1c) is a Participial Phrase, the one in (1d) is an NP. According to Kitagawa 1985, they are constituents of the category $\bar{S}$. According to Safir 1983, they are "clausal" constituents; but Safir does not address the question of their category. And according to Williams 1983 they are not constituents, but instantiations of the subject-predicate relation, marked by co-indexing but not by shared constituency.

Answers to the category and constituent questions are not purely empirical, but depend partly on theory. One relevant theoretical constraint is the Projection Principle, which says that syntactic structure at all levels manifests lexically stated thematic properties. One such property of the matrix verbs in (1) is that they assign the θ-role of "propositional complement" or "propositional object" to their complements. But what is the syntactic realization of a propositional complement? In LGB Chomsky assumes it is $\bar{S}$. But Stowell, Contreras, and Chomsky (elsewhere in LGB) argue that propositional complements such as those exemplified in (1) are AP, PP, etc.

Suppose that $\bar{S}$ is taken to be the default realization of propositional arguments. The theory should have a way to capture this. The Projection Principle is the obvious candidate, requiring, as it does, preservation of thematic properties at all syntactic levels. Chomsky intimates in LGB that the distinction between lexically stated thematic and subcategorization information may be neutralized:

2 The requirement that subcategorization entails θ-marking..restricts the variety of lexical entries. It is minimally necessary that the lexicon provide, for each lexical head, information about θ-marking for this element. We are now assuming that it is also maximally necessary; that is, there is no independent subcategorization information, except, possibly, in the case of idioms, or with regard to the linking of θ-role and category (e.g., is an

> infinitival complement an NP or only an $\bar{S}$?). Even the latter may well be eliminable either on general grounds, or at worst, in terms of redundancy rules for the lexicon of a particular language. (Chomsky 1981.38) *[my underlining: JK]*

In the underlined portion, Chomsky leaves an opening to retaining the independent statement of subcategorization. As a way to eliminate it, on the basis of an idea of Grimshaw's (1981), in *Knowledge of Language* Chomsky proposes the principle of "Canonical Structural Realizations" (CSRs) of thematic roles. According to this principle, selectional properties stated in the lexicon receive a stipulated syntactic encoding, doing away with the need for a separate lexical statement of syntactic (i.e., categorial) selection, since it would be redundant:

3 Canonical Structural Realizations:

> Let us assume that if a verb (or other head) s-selects [i.e., semantically selects] a semantic category C, then it c-selects [i.e., categorially selects] a syntactic category that is the "canonical structural realization of C" (CSR(C)). [Chomsky 1986a.87)

The idea of CSRs is both an extension to the Projection Principle, since it formally relates semantic and categorial selection, and a way to formally execute it in a grammar.

In CSR terms, assuming that $\bar{S}$ is the default realization of propositional arguments means that we assume that CSR (Propositional Object) = $\bar{S}$. But if a CSR is canonical, there can be other, non-canonical, Structural Realizations of propositional objects, for instance NP-complements like those in (4):

4 a) We watched the enemy's destruction of the city.
b) We persuaded John of the importance of going to college. (= Chomsky 1986a (58)iii))

Propositional objects may, also, arguably, be encoded as other categories, e.g., as in the Stowell-Chomsky-Contreras analysis of small clauses. With $\bar{S}$ regarded as canonical, there are two possibilities for handling the other cases. One, obviously, is to distinguish formally between canonical encodings of propositions (e.g., as $\bar{S}^1$) and marked encodings (NP and possibly others). Let us call this the "strong" approach. A second, "weak," approach is to weaken the tie between s-selection and c-selection, and allow an s-selected proposition to be encoded as any constituent made up of a subject and a predicate, or possibly even any linked subject and predicate, regardless of whether they form a syntactic constituent.

Whatever approach is taken, the problem must be confronted of how to know whether the Projection Principle's requirements are met by a particular syntactic description . As a way to check this, the CSR principle is a natural and long overdue addition to the theory, and the absence of it or something like it, in work on small clauses, is an obvious logical gap. This gap becomes noticeable with small clauses, but exists as well even with the syntactic realization of θ-roles like Agent as NPs.

Let us now turn to the competing analyses of the small clauses exemplified in (1). Stowell (1981, 1983) argues that complement small clauses function as predicate phrases with the categorial status of AP, PP, Prtcpl Phr, etc., rather than $\bar{S}$, because of the "locality" principle of subcategorization: "since subcategorization features are simply addenda to slots in thematic grids, the verb is unable to specify the categorial features of anything other than the entire complement" (1981.259). There appears to be selection between the matrix verb and the predicate of the small clause:

5 a) *I consider John off my ship.
*I consider John killed by the enemy.

b) *I expect that sailor very stupid.

c) *We feared John very stupid.
*We feared John off the ship already.

(Stowell 1981's (15), and his judgments)

(5a) shows, according to Stowell, that *consider* cannot be followed by a small clause whose predicate is a PP or Participial Phrase, (5b) that *expect* cannot take one whose predicate is an AP, and (5c) that *fear* cannot take one whose predicate is an AP or PP . But because of the locality principle, such restrictions cannot be stated. Rather, the entire small clauses in such examples must be assumed to have the categories of the heads of their predicates. Under this analysis the sequence *John off my ship* in the first example of (5a) would be a PP, the sequence *John killed by the enemy* in the second example in (5a) would be a Participial Phrase, and the sequence *that sailor very stupid* in (5b) would be an AP.

But how can PP, Prtcpl Phr, AP, etc., be considered propositional, and thus in accord with the Projection Principle? Referring to examples like (1), Stowell says

6 each [matrix] verb...takes a complement that is assigned the θ-role of Propositional Object. In each case, the "small clause"...is assigned exactly the same θ-role as the full infinitival clause [e.g., as in *I consider* $[_S$ *John to be very stupid]*]...As with the Exceptional Case-marking construction, THE CLAUSAL STRUCTURE IS IMPLIED BY THE PROJECTION PRINCIPLE *[my emphasis--JK]*, since the governing verb assigns just one θ-role (to a propositional complement) at LF...If the locality of strict subcategorization is to be maintained, then the clausal status of the complements..forces the conclusion that APs, PPs, and participial phrases may contain lexical NP subjects..." (Stowell 1981. 259)

Notice that "the clausal structure is implied by the Projection Principle" is the exigency of a theory, not an empirical argument. What licenses calling AP, PP, etc., "clauses"? Stowell's answer is that they are clauses because they have subjects and predicates; given his analysis, Stowell says "any syntactic position may project to include a subject position, THUS FORMING A CLAUSE" (1981, p. 261) *[my emphasis--JK]*. Stowell's 1983 paper has more to say on this:

7 Each of the matrix verbs [e.g., those in (1)] takes a complement which is interpreted as a clause at Logical Form..the interpretation of a constituent at Logical Form must be independent of its syntactic category label, if categories such as AP and PP may be interpreted as clauses. Any constituent which consists of a subject/predicate configuration may be interpreted as a clause at LF, although the clause may not function as a complete proposition if it lacks an internal tense operator. Naturally this generalization of the notion 'clause' is only possible if the subject position itself generalizes across categories (Stowell 1983.298).

Generalization from what? A reasonable guess would be, "from $\bar{S}$." If so, $\bar{S}$ is the assumed category for clauses, and Stowell's proposal here is to extend clause categories to include others.

Stowell, then, reads the Projection Principle as requiring that propositional objects be encoded syntactically as clauses, and proposes interpreting "clause" as any subject + predicate constituent. This is consistent with the "weak" interpretation of the Projection Principle/CSR principle, since, under Stowell's analysis, a propositional object can be realized as any subject + predicate constituent.

Consider now expressions like *the enemy's destruction of the city*. Are such nominalizations, with subjects and predicates, clauses? By Stowell's definition they may be. But are they "propositional," i.e., do they encode no more than a proposition? Some are ambiguous between an activity reading and a result reading. In

8 a) The enemy's destruction of the city amazed us.
b) We saw the enemy's destruction of the city.

both readings are available. The activity reading is propositional (and favored by a main verb like *watch* , as in *We watched the enemy's destruction of the city*), but the result reading, selected by a predicate like *lay before us,* is not:

9 The enemy's destruction of the city lay before us.

Other result-"nominalization" cases make the same point; they might be "clauses" under Stowell's characterization, but aren't "propositional":

10 Al's gift to the hospital of $3000 brings the total to $4 million.

If comprising a subject and a predicate means being a clause, then *Al's gift to the hospital of $3000* might be a clause. But it is not propositional, since it encodes not just the proposition GIVE (AL, $3000, THE HOSPITAL), but also a special focus on, or status of, the proposition's predicate (*give*).

The same problem could conceivably arise with "picture" NPs like *Bill's pictures of himself.* Surely such expressions are not clauses, but depending on how the notion "subject/ predicate configuration" is clarified, by Stowell's definition they might be. Yet they are not "propositional."

To summarize the problem, under Stowell's analysis small clause constructions with the category of AP, PP, etc. are clausal (because they comprise subject and predicate) and hence satisfy the Projection Principle's requirement that they encode

propositional arguments (on the tacit assumption, embodying the CSR idea, that "clauses" encode propositions). But there are constructions which seem to comprise subject + predicate which aren't propositional. So how are we to know that small clauses with the categories of AP, PP, etc., and comprising subject + predicate, satisfy the Projection Principle? For Stowell's analysis to work, a precise definition of subject and predicate would be needed, as well as a way to ensure that only propositional constructions are clausal. (To define clauses as subject + predicate configurations which encode propositions would not do, of course, because what can count as a realization of a propositional argument is precisely the question we are trying to answer.)

Kitagawa 1985 offers arguments for the "clausality" of small clauses, "clausality" being taken as "having the category of $\bar{S}$":

11 ..SCs are fully clausal, containing not only INFL but also COMP (i.e., SC =$\bar{S}$) (p. 210).

If a string has the category $\bar{S}$, a sub-string of it has the category S. Kitagawa argues as follows that small clauses are Ss. Given the Extension of the Projection Principle ("Clauses must have subjects" (Chomsky 1982)), if small clauses are sentential, the requirement that some of them need pleonastic subjects (as in *I prefer *(it) hot in summer*) is predicted. Stowell's 1983 claim that it is possible to extend the EPP from S to predicate phrases, Kitagawa says,

12 would require one to assume that NPs have an exceptional status on this matter, since NPs allow neither pleonastics nor extraposition except when they appear as SCs, as illustrated by the contrast between (16) and (17) below:

(16) a. *its hotness (with pleonastic reading)
b. *its unlikeliness that he will win

(17) a. I consider [*(it) a possibility that he will win]
b. I consider [*(it) a cinch (for him) to win] (1985.213-214)

That Kitagawa implicitly assumes the strong version of the Projection Principle/CSR principle is made clear by his conclusion to his argument that small clauses are $\bar{S}$s:

13 This conclusion, in fact, is quite reasonable in the light of the Projection Principle (Chomsky (1981)), since SCs clearly receive a clausal θ-role just as other clausal complements do (p. 215).

Kitagawa also offers an argument, *contra* Stowell, that the restrictions between matrix verbs and complement small clauses are semantic rather than categorial in nature. Kitagawa argues that *consider* requires a complement expressing a "state of affairs" but not a "change of state," while *expect* requires one expressing a "change of state" but not a "state of affairs." Thus, against Stowell's claim that *consider* subcategorizes for AP complements (e.g., *I consider him honest*), Kitagawa adduces the ungrammatical (14a) below, with an AP complement expressing a change of state; and against Stowell's claim that *expect* subcategorizes

for PP complements (e.g., *I expect that sailor off my ship by midnight*), Kitagawa adduces the ungrammatical (14b) below, with a PP complement expressing a state of affairs.

14 a) *The doctor considers that patient dead tomorrow.
b) *I expect that island off our route.

Contreras 1987 counters this argument and supports Stowell's analysis against Kitagawa's, on the grounds that Kitagawa's finding that the restrictions between matrix verb and small clause complement are semantic rather than categorial is wrong, or at least incomplete, with some categorial restrictions remaining: *expect,* supposedly selecting only "change of state" complements, and indifferent to the category of its complement, cannot in fact occur with an NP small clause complement, even if it expresses a change of state:

15 *I expect [you an attorney by the end of the year]. (=Contreras (21))

Contreras concludes on the basis of this and other arguments that complement small clauses are predicate phrases of varying syntactic categories, in fact, just the sort of constituents that Stowell proposed.

Williams, both in his syntax textbook (van Riemsdijk and Williams 1986) and his 1983 article *Against small clauses*, denies that there is a clausal node dominating a small clause. Rather, the subject-predicate relation required (e.g.) to account for the reflexive--

16 John considers Mary_i proud of herself_i.

--can be established by co-indexing subjects and predicates, an approach Williams labels the "predication theory." An analysis such as

17 John considers $[_{NP}\ \text{Mary}]_i\ [_{AP}\ \text{proud of herself}_i]$.

violates the Projection Principle (Chomsky 1981.32-33); *consider* takes a "clausal" complement and by the Projection Principle can't have any other sort of complement at any level. Williams argues that with his new definition of subject it is possible to treat "clausal" in a new way:

18 [Why consider the complement of *consider* clausal?] [One reason] might be to reflect the intuition that the complement to *consider* is a semantic unit. But what is a semantic unit? Must it be a syntactic constituent? Suppose we take a subject and its predicate to be a semantic unit. THEN WE DO NOT HAVE TO INSERT AN S-NODE IN LF *[my emphasis: JK]* to reflect the unithood of a subject-predicate pair...Which is the primitive notion, the *subject-predicate relation* or the *clause* ? The predication theory takes the subject-predicate relation as primitive...Thus it appears that the Projection Principle can be maintained under the predication theory.

Williams' suggestion is consistent with the "weak" version of the Projection Principle/CSR principle. But the standard assumption he is reacting against is close to the strong understanding of it, as can be seen by the capitalized passage. That is,

Williams' working assumption is that a proposition (a semantic unit comprising subject and predicate) is standardly realized as an S.

However, the same problem that arose for Stowell's theory can be seen to arise for Williams' (the approach he wants to take, not the one he assumes as the standard position). If the Projection Principle is satisfied when a propositional argument is encoded as a co-indexed subject and predicate, the same linked subject and predicate expressions that were a problem for Stowell's analysis are a problem for Williams': result nominalizations and picture NPs. For these may have linked subjects and predicates, but are not propositional; hence the fact that an expression comprises linked subject and predicate cannot be taken to show that it encodes a propositional argument.

Let us see what Chomsky has to say on the subject. In LGB we read

19 Consider next such items as *seem, appear*. The lexicon specifies these as monadic predicates with a propositional argument to which they assign a θ-role. So far we have not introduced a notion corresponding to "proposition," but have kept to notions expressible in the syntax of LF. Let us see what happens if we persist in this vein. Consider..

(11) (i) it seems [that John hit Bill]
(ii) John seems [t to have hit Bill]
(iii) John seems sad

Suppose we assume (I) that there is a uniform entry for *seem* in the lexicon, while (II) persisting with the assumption that the projection principle holds..As (11i) indicates, *seem* takes a clausal argument and thus must have the lexical entry: __$\bar{S}$. (1981.105-106)

This passage indicates that for Chomsky $\bar{S}$ equals clause and is the sole realization of propositional arguments. Regarding complement small clauses, however, Chomsky accepts Stowell's analysis, so that *They consider John stupid* would have the structure

20 they consider [$_{AP}$ John [$_{A}$ stupid]]

Chomsky continues:

21 The verb *consider,* then, subcategorizes for AP, so that the selection of the complement...is no longer a problem..AP with subject is now regarded as a "proposition" in the sense required at LF, along with S. (1981.112)

Immediately, however, Chomsky adds

22 In the examples of (32), however, we continue to assume that the small clause is of the category S rather than AP, since there is not selection of AP by the main verb in this case, presumably.

The "examples of (32)" contain adjunct small clauses:

23 (i) John [$_{VP}$ left the room] [PRO angry]
(ii) John[$_{VP}$ left the room] [PRO empty] (=Chomsky 1981 ex. 32)

So Chomsky's 1981 view was that propositional arguments are encoded as S or $\bar{S}$ in the default case, but as other categories when needed. This view embodies a logical gap, filled five years later by the CSR proposal. The gap, of course, is the question in (24C):

24 A. The Projection Principle requires syntactic encoding of lexical properties at all syntactic levels.

B. If a verb is lexically marked as selecting a propositional complement, the Projection Principle requires that at all syntactic levels the verb have a propositional complement.

C. But what determines whether a particular syntactic form encodes a propositional complement?

Summing up this literature survey, we see that the Stowell-Chomsky-Contreras analysis, however sound on other grounds, is at variance with the requirements of the Projection Principle, since in that analysis there is no way to know that those requirements are met by a syntactic description. Williams' analysis suffers from the same problem. Kitagawa's analysis, however, in a sense meets the requirements of the Projection Principle, since it is consistent with the strong version of the CSR idea, which provides a way to check for conformity with the Projection Principle.

There is a difference, of course, beween implicitly assuming a needed element in a theory, and overtly recognizing it and including it in argumentation and results arrived at within a particular framework. None of the research I have surveyed overtly recognizes the need for the CSR principle, except Chomsky 1986a, which is exploratory and non-technical, and which suggests, sketchily, a different approach to small clauses[2]. Thus, with that partial exception, all work to date on small clauses, as far as I can tell, suffers from a logical gap.

Let me sketch the way the interplay between empirical evidence and theoretical concerns should be interpreted with respect to the category question for small clauses. Given the Projection Principle, a formal device is needed within a grammar to ensure conformity with it. The CSR idea is suitable for this purpose. Let the Canonical Structural Realization of the θ-role of Propositional Argument be $\bar{S}$. This is needed for "fully clausal" propositional arguments: *that S* and infinitival structures. Verbs which s-select propositional complements, may, however, allow other categories to encode the θ-role of Propositional Object. Each such other subcategorization is, of course, non-canonical, and must be lexically stipulated as a marked Structural Realization of the θ-role of Propositional Object. This will permit the Stowell/Chomsky/Contreras description of small clauses, as well as one other kind of marked structural realization of Propositional Argument, the NP category of propositional complements of such verbs as *support, favor,* and *like*, e.g.,

25 a) support:

i) We support *Ron's firing Ollie.*
ii) *We support *that Ron fired/s Ollie.*
iii) *We support *it that Ron fired/s/Ø Ollie.*
iv) *We support *that Ron fire Ollie.*

b) favor:

i) We favor *Ron's firing Ollie.*
ii) *We favor *that Ron fires Ollie.*
iii) *We favor *it that Ron fires/Ø Ollie.*
iv) *We favor *that Ron fire Ollie.*

c) like:

i) We like *Ron's firing Ollie.*
ii) *We like *that Ron fired/s Ollie.*
iii) We like *it that Ron fired Ollie.*
iv) *We like *that Ron fire Ollie.*

Such verbs are subcategorized for NP, and not for $\bar{S}$, except for *like,* which allows an $\bar{S}$ with extraposition. Taking $\bar{S}$ as the Canonical Structural Realization of the θ-role of Propositional Argument means that the subcategorization requirements of these verbs will need to be lexically stated (i.e., they are non-canonical), despite the NP category of their complements being in a sense "unmarked," since it is obligatory for these verbs.

In conclusion: A problem in GB theory is how to ensure that the Projection Principle is satisfied by a syntactic description. This problem is thrown into particular relief by complement small clauses. The CSR principle proposed in Chomsky 1986a, plus lexical marking for non-canonical realizations, is offered as a solution for this problem.

FOOTNOTES

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1. Or as S; see comments below by Williams and by Chomsky.
2. Chomsky suggests that a "more complex mode of s-selection" (1986a.91-92) may be involved with small clauses, in which the direct-object-like behavior of small clause subjects might be accommodated by letting the main verb s-select proposition, while allowing JOINT selection by both the main verb and the embedded predicate of the small clause subject. However, Chomsky points out that such an idea is not without problems, e.g., it would predict that small clauses could not have expletive subjects, which are sometimes possible (*We consider IT obvious that John is intelligent*).

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