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Robin Clark
UCLA

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PRO in NP*

Robin Clark

UCLA

In this paper, I will consider a construction where, by first principles, we must posit the existence of an empty category. Prima facie, this empty category does not fit into the current typology of empty categories (PRO, pro, variable and trace). When, however, the construction is analyzed in light of a theory of binding and movement, the empty category fits comfortably into the current framework and the construction itself has some interesting consequences both for the definition of government and for the relationship between thematic (θ) theory and the theory of movement.

The Binding Theory partitions NPs according to their ability to be syntactically bound (i.e., coindexed with a c-commanding antecedent) within a local domain:

- (1) The Binding Theory
 - A) Anaphors must be bound in their governing category.
 - B) Pronominals must be free in their governing category.
 - C) R-expressions must be free.

(2) Governing Category

A is the governing category for B iff:

- i) A contains B and a governor of B
- ii) A contains a SUBJECT accessible to B.

Given the types of nominal elements mentioned in the Binding Theory, we can mark NPs as being [+anaphor, +pronominal]. There will be a direct relation between these features and the nominal's behavior with respect to the Binding Theory. Thus, an NP marked [+anaphor] must obey condition (A), an NP marked [+pronominal] must obey condition (B) and an NP marked minus for both features must obey condition (C).

The feature system outlined above predicts the existence of four types of nominals depending on the value given to the features [pronominal] and [anaphor]. Overt NPs, in fact, come in three varieties, corresponding to the conditions of the Binding Theory. The fourth possibility, an anaphoric pronominal, is unrealized for reasons of case and government. Empty categories, however, come in all four types:

(1) PRO--marked [+anaphor, +pronominal]

Since PRO is both a pronominal and an anaphor it must obey conditions (A) and (B) of the Binding Theory, since this leads to a contradiction, PRO must be ungoverned (the PRO theorem) since it must not have a governing category.

(2) pro--marked [-anaphor, +pronominal]

Since pro is marked [+pronominal], it falls under condition (B) of the Binding Theory and must be free in its governing category.

(3) NP-trace--marked [+anaphor, -pronominal]

Since NP-trace is marked [+anaphor], it falls under condition (A) of the Binding Theory and must be bound in its governing category.

(4) Variable--marked [-anaphor, -pronominal]

Since variable has a negative specification on both features, it patterns with R-expressions and must fall under condition (C) of the Binding Theory.

We can begin by considering sentences of the following type:

- (3)a. John could use [a good talking to [e]].
 N"

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- b. These ideas merit [some working on
N"
[e]].
- c. This problem bears [some thinking about
N"
[e]].
- d. My room needs [a little cleaning up [e]].
N"

Notice, first, that the "ing" nominals in these examples are clearly NPs as evidenced by the fact that they take determiners and adjectives. By the Projection Principle:

Lexical requirements must be satisfied at every level of representation.

we must hypothesize the existence of an empty category object of a preposition (as in examples 3a-c)) or a verb-particle construction (as in example 3d)). Given the existence of empty categories in these examples, we are in a position to consider their properties.

The type of verbal that allows NPs of the above sort is limited to a semantic class that I will refer to, here, as "valuatives"; it is not the case that any arbitrarily selected verb or adjective allows the above construction:

- (4)a. *John likes some talking to.
b. *My room looks cleaning up.
c. *This problem appears thinking about.

Some of the verbals in this class are could use, bear, merit, deserve, could stand, need and, in some dialects, want. It is a plausible assumption that the ability of a verbal element to be followed by one of these NPs is tied in with the verbal's argument structure.[1]

Notice that the empty category in question is plausibly A(rgument)-bound by the subject of the sentence. Furthermore, it seems to be true that the subject position in these sentences is θ -marked:

- (5)a. *It could use a good talking to John.
b. *It merits some working on these ideas.
c. *It bears some thinking about this problem.
d. *It could use some cleaning up (of) my room.

since pleonastic "it" is barred from this position. Given that the empty category is A-bound by an element with an independent θ -role, the most reasonable assumption is that the empty category is PRO. If, however, the empty category in question were PRO, we would expect it to occur in environments where arbitrary PRO may occur. Any proponent of the PRO analysis must account for:

- (6)a. *Talking to [e] is often necessary.
- b. *Thinking about [e] would be good.
- c. *Some working on [e] is needed.

The above sort of example is normally accounted for by invoking the PRO theorem--PRO may never be governed and since it occurs in a governed position in the examples, it is out. But if PRO is governed in the examples in (6), it must be governed in the examples in (3). The apparently inevitable conclusion is that the empty category in question can't be PRO.[2]

Assuming that the empty category in question can't be a pronominal anaphor, let's assume that it is a pure pronominal (pro). Recall, however, that the empty category is A-bound by the subject. By the definition of governing category, the subject of the sentence is in the same governing category as the empty category. When we try to put the empty category in a different governing category than the subject's (e.g., by putting an accessible SUBJECT inside the NP), then the examples are ungrammatical:

- (7)a. *John could use a competent psychiatrist's talking to.
- b. *These ideas merit Bill's working on.
- c. *This problem bears John's thinking about.
- d. *My room needs the janitor's cleaning up.

Notice that the NP is quite capable of allowing an element marked with an agent θ -role, just so long as that element does not act as an accessible SUBJECT for the NP:

- (8)a. John could use a good talking to by a competent psychiatrist.
- b. These ideas merit some working on by Bill.
- c. This problem bears some thinking about by a good linguist.
- d. My room could use a thorough cleaning up by the janitor.

Since pro obeys condition (B) of the Binding Theory and since the empty category must be A-bound in its governing category--in violation of condition (B) of the Binding Theory, the empty category cannot be pro.[3]

We saw, above, that the empty category must be in the same governing category as its antecedent; in other words, the empty category in question must be A-bound in its governing category. This last is exactly condition (A) of the Binding Theory, so it would be fair to assume that the empty category is NP-trace. The argument against this solution is based on the observation that both the empty category and its binder receive independent θ -roles and on the θ -criterion of Chomsky (1981):

θ -Criterion

Each argument bears one and only one θ -role, and each θ -role is assigned to one and only one argument.

We saw above that the subject position which binds the empty category is in a θ -position. Since both the empty category and its binder bear θ -roles, they will form an A-chain which bears two θ -roles; an A-chain marked with two θ -roles is exactly what is excluded by the θ -criterion. The empty category, therefore, cannot be NP-trace.

The last possibility is that the empty category is a variable. We might posit an empty operator occupying a COMP position inside the NP as in:

9) John could use [_iOp [_ia good talking to e]]

The operator and the subject position might be coindexed at some level of representation by predication. One would expect, however, that the empty operator could move successive cyclically as in:

- (10)a. *John's paper merits some convincing (of) people that they should read [e].
 b. *My room needs some conning (of) the maid to clean [e] up.
 c. *Chomsky's articles deserve some encouraging (of) the students to discuss [e] over beer.

Given that successive cyclic movement of the operator is impossible, it will require some extra constraint to rule it out. Since the construction is of rather

limited distribution, it would be singularly unexplanatory to place an ad hoc constraint on wh-movement simply to capture the locality between the antecedent anaphor relation found in this case.

We have seen, then, that no matter what type we choose to identify the empty category in question with, we run either into some violation of first principles or an otherwise unmotivated constraint on rules:

- (1) A governed PRO.
- (2) Violation of condition (B) of the Binding Theory and the "identification" constraint on *pro*
- (3) Violation of the Θ -Criterion.
- (4) Ad hoc constraint on movement.

It would appear that the optimal case is one in which the structure had not one but two empty categories as in:

- (11) John could use [$\begin{matrix} \text{PRO} & \text{a good talking to } t \\ \text{N} & i \qquad i \end{matrix}$]

The trace in object position of the preposition would form a chain with the PRO in subject position of the NP; this would over-ride the violation of the Θ -Criterion noted above since PRO would break the chain between the trace and the subject of the sentence. Since, as we will argue, the subject position of NP is ungoverned, the PRO is in a legal position. The trace and the PRO would be coindexed by simple NP movement. Hence, we should consider passive constructions.

It is an old observation that NP and S show certain structural similarities; most importantly for our present purposes, NP and S both appear to have some version of passive:

- (12)a. John narrated the play.
b. The play was narrated by John.
c. John's narration of the play...
d. The play's narration by John...
- (13)a. John critiqued the play.
b. The play was critiqued by John.
c. John's critique of the play...
d. The play's critique by John...

- (14)a. The crowd heckled the candidate.
 b. The candidate was heckled by the crowd.
 c. The crowd's heckling of the candidate...
 d. The candidate's heckling by the crowd...

It is not true, however, that all passive sentences have a corresponding passive derived nominal:

- (15)a. Washington slept in this bed.
 b. This bed was slept in by Washington.
 c. Any sleeping in this bed might prove dangerous.
 d. Washington's sleeping in this bed was an act of treachery.
 e. *This bed's sleeping in t by Washington was an act of treachery.
- (16)a. Congress looked into this problem.
 b. This problem has been looked into by Congress.
 c. Any looking into this problem will be considered a violation of national security.
 d. Congress's looking into this problem embarrassed the administration.
 e. *This problem's looking into t by Congress embarrassed the administration.

Following recent work by Kayne, I will assume the following:

If A assigns a θ -role to B, then cosuperscript A and B.

Furthermore, I assume that, although verbs freely assign θ -roles to their complements, nouns may not, in the unmarked case, assign θ -roles to their complements; the θ -roles of nominal complements are assigned randomly and checked at LF. It follows that nouns will not normally be cosuperscripted with their complements. We can make the following descriptive generalization:

- (17) (In the core cases) A pure anaphor contained in a complement phrase, XP, may not be bound by an antecedent outside of XP unless XP is cosuperscripted with the head of the phrase containing XP.

In the case of sentential pseudo-passives, the head verb θ -marks the complement PP. The head verb and the complement PP are, by convention, cosuperscripted and, as a result, NP movement is possible. This movement

will leave an anaphor inside the PP. Since nouns do not θ -mark their complements, an anaphor inside a PP that is a nominal complement will never be licit.

The above constraint will, apparently, rule out the possibility that the empty category in the construction we are considering is an anaphor. Curiously, only "ing" nominals may occur with a stranded preposition:

- (18)a. *These diplomats could use some conversation with t.
 b. *Those t ideas don't merit any arguments about t.
 c. *The status quo needs some revolution against t.

If the above non-"ing" derived nominals are replaced by their corresponding "ing" nominals, the result is grammatical:

- (19)a. John could always use some conversing with t.
 b. These ideas don't merit any arguing about t.
 c. The status quo in this country don't bear revolting against t.

Notice that non-"ing" derived nominals can occur in this construction, just so long as a preposition is not stranded:

- (20)a. This scoundrel needs a prompt conviction by the jury.
 b. This body could use a rapid cremation.

Recall that, by hypothesis, nouns do not assign θ -roles to their complements. In general, "ing" nominals behave exactly like other nouns in that they are incapable of freely assigning θ -roles to their complements. "Ing" nominals are exceptional in that they may be licensed to assign a θ -role by a governing predicate. Specifically, θ -role assignment by "ing" nominals is licensed only when they are assigned a θ -role, call it " θV " by a predicate in the valuative class. It follows that an "ing" nominal that is governed by a predicate in the valuative class will be capable of assigning θ -roles to its complements. Hence, a PP that is a complement to an "ing" nominal in this construction may contain an anaphor. Finally, following suggestions by Horvath and Stowell, I will adopt the assumption that government is directional.

Since English is a head initial language, the directional parameter of government is set from left to right. A consequence of this assumption is that the subject position of NP is ungoverned by the head noun and may, therefore, contain PRO.

In order to see how the various constraints conspire to give us the right results, it would be helpful to do some sample derivations. Consider, for example, (3a), repeated here for convenience:

(21) John needs a good talking to.

The d-structure associated with (3a) is (irrelevant details omitted):

(22) John needs [\bar{e} a good talking to PRO]
N"

The matrix verb, "needs", assigns the θ -role, θ_V , to the complement NP, "a good talking to PRO". Once the "ing" nominal receives this θ -role, it may assign a θ -role to its complement as in:

(23) John needs [\bar{e} a good talking to PRO]
N" ^{k k}

Since the "ing" nominal and the complement PP are now cosuperscripted, the PRO in object position of the PP may now legally move to the subject position of the entire NP as in:

(24) John needs [PRO a good talking to \bar{t}]
N" _i ^{k k}

The anaphor inside the PP is licensed because the PP is cosuperscripted with the head of the NP. Finally, control applies, coindexing the matrix subject with the PRO subject of the NP:

(25) John _i needs [PRO _i a good talking to \bar{t}]
N" ^{k k}

Now consider the ill-formed:

(26) *John needs Mary's talking to.

The d-structure associated with the above sentence is:

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- (27) John needs [Mary's talking to PRO].
N"

Although the "ing" nominal is assigned a θ -role by the evaluative predicate and may, in turn, assign a θ -role to its complement, the PRO inside the complement PP has no landing-site and is, therefore, trapped inside the PP. As a result, the PRO is in a governed position and the sentence is ruled out, as desired.

Finally, consider:

- (28) *Thinking about is often necessary.

The corresponding d-structure is:

- (29) [thinking about PRO] is often necessary.
N"

Here, the "ing" nominal is not governed by the evaluative predicate and, therefore, may not be assigned a θ -role by the evaluative. Thus, θ -role assignment by the "ing" nominal to its complements is not licensed. Movement out of the "ing" nominal's complement is blocked by constraint (17) and the PRO is, once again, trapped in a governed position and violates the Binding Theory (see above).[4]

If the approach taken in this work is correct, then thematic relations have a strong relationship to structural conditions and the distribution of empty categories is restricted by an interplay of structural and thematic relations. Finally, this analysis supports the hypothesis that government has a directional component.

Footnotes

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1. At first glance, "worth" is part of the class of verbals that allow the relevant nominal. While nominal complements of worth do, in fact, follow the pattern discussed here, worth may also take a gerundive with rather different properties. For some discussion,

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see Safir (1984) and Hantson (1984).

2. Recent work, especially that of Bouchard (1984) and Sportiche (1983), has suggested that controlled PRO may be a pure anaphor if it is governed. A full discussion of this possibility with respect to the construction under consideration here would take us far afield. If this approach is correct then the examples in (6) are ruled out because the PRO, although governed, lacks an antecedent. It is less clear how such an approach would handle the Specified Subject Condition violations discussed below. For more discussion, see Clark (in preparation).

3. A plausible assumption on the distribution of pro is that it must be locally identified by sufficiently rich agreement (as assumed in Chomsky, 1982), by being coindexed with a clitic or by coindexation with a topic (as in Huang, 1984). Notice that the putative pro in this construction meets none of the above criteria.

4. The "passive" nominal found in this construction may be the vestige of a construction that was quite common at an earlier stage of English. Visser (1973) notes examples like the following from Dryden:

(i) those, that escape, shall avoid killing...

where killing is taken as a passive; namely, those that escape shall avoid being killed. This fact may, in turn, be related to the "passive" form exemplified in (ii) which was widespread in English until about a century ago:

(ii) The house was building.

A full discussion of this would take us well beyond the scope of this paper; see Clark (in preparation).

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