ON CONTROL AND BINDING THEORY *

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1. Binding Theory and Control

In Manzini (1983) control is subsumed under a reformulation of Chomsky's (1981) theory of binding. In Brody (1985) a revised version of this theory is presented. In this revision the binding conditions of Chomsky (1981) are assumed, as in (1); a notion of g-governor is introduced, as in (2), and the notion of governing category is defined as in (3):

(1) A. An anaphor is bound in its governing category
B. A pronominal is free in its governing category

(2) β is a g-governor for α iff β is a governor for α or β is a governor for the c-domain of α

(3) γ is a governing category for α iff
γ is the minimal category that can have a subject, or has a subject β, $\beta \neq \alpha$, if α is anaphoric, that contains α and a g-governor for α; if β is accessible to α

Under the theory in (1)-(3) PRO's in the subject position of object sentences must be bound in the first sentence which contains the control sentence; PRO's in the subject position of subject sentences can (co)refer freely. Furthermore, anaphors and pronominals in the subject position of subject nominals can (co)refer freely; anaphors in the subject position of object nominals must be bound in the first sentence which contains them,

while pronominals in the same position (co)refer freely. The same holds of anaphors and pronominals in the object position of subject and object nominals respectively, if the nominals are subjectless.

Now, the theory in (1)-(3) makes crucial use of a disjunction between pronominals and anaphors in the definition of governing category. Chomsky (1985), however, suggests that the theory of binding should contain no disjunction between pronominals and anaphors but the disjunction between binding principles A and B. The first question we will address, then, is whether this result can be obtained in a theory with the empirical consequences of (1)-(3).

Suppose we assume Chomsky's (1985) formulation of the binding conditions in terms of BT-compatibility, as in (4). It is easy to show that the empirical results of the theory in (1)-(3) follow under (4) if the notions of BT-compatibility and governing category are defined as in (5) and (6) respectively:

(4) Given a tree Σ with indexing I,
if α is an anaphor or pronominal in Σ
and γ is the governing category for α,
I is BT-compatible with (α, γ)

(5) The indexing I is BT-compatible with (α, γ) iff
(A) α is an anaphor and is bound in γ under I
(B) α is a pronominal and is free in γ under I

(6) γ is a governing category for α iff
γ is the minimal Complete Functional Expression
(S, NP, s.c.) containing a g-governor for α
such that there is an indexing I BT-compatible with (α,γ);
if I is wellformed

A Complete Functional Expression (CFE), as in (6), can of course be defined to be in general any category that can have a subject, hence any S or NP or small clause.

Consider then (7), where a control sentence is embedded in object position:

(7) a. Mary wanted [$_S$ PRO to behave herself]
b. *Mary wanted [$_S$ PRO to behave oneself]
c. *John thought that Mary wanted
[$_S$ PRO to behave himself]

In (7) the governing category for PRO is the sentence S^* which immediately contains the control sentence. For, S^* is the minimal CFE containing a g-governor for PRO, *want*, such that there is an indexing BT-compatible with it and PRO - say the indexing under which PRO is bound by *Mary*; and, crucially, the indexing is wellformed. By binding condition A, it follows that in all of (7) PRO must be bound in S^*. Hence (7a), where PRO is bound in S^* by *Mary*, is predicted to be wellformed; (7b) and (7c), where PRO is respectively not bound at all and bound outside S^*, are predicted to be illformed.

Consider on the other hand (8), where a control sentence is embedded in subject position:

(8) a. John thought that [S PRO to behave herself] was important to Mary
b. John thought that [S PRO to behave oneself] was important to Mary
c. John thought that [S PRO to behave himself] was important to Mary

In (8) PRO does not have a governing category. For, the minimal CFE containing a g-governor for PRO such that there is an indexing BT-compatible with it and PRO is again the sentence S* which immediately contains the control sentence - if we take the Infl of S* to be the g-governor, and the BT-compatible indexing to be the coindexing of PRO and Infl. But the coindexing of PRO and Infl is not wellformed under the i-within-i condition, as defined in Chomsky (1981). Hence PRO does not have a governing category. Binding condition A is then vacuously satisfied by PRO, and PRO is predicted to (co)refer freely.

Consider now (9), where a lexical anaphor, *each other*, is embedded in the object position of a subjectless nominal:

(9) a. The boys thought that the girls would like [pictures of each other]
b. The boys thought that [pictures of each other] would please the girls

In (9a) the governing category for *each other* is the embedded sentence. For, the embedded sentence is the minimal CFE to contain a g-governor for *each other* such that there is an indexing BT-compatible with it and *each other*, and the indexing is wellformed - taking it to be, for example, the coindexing of *each other* and *the girls*. Hence *each other* in (9a) is predicted to be bound in the embedded sentence. In (9b), on the other hand, *each other* does not have a governing category. For, the minimal CFE containing a g-governor for *each other* and such that there is an indexing BT-compatible with it and *each other* is the embedded sentence again - if the indexing is taken to be the coindexing of *each other* with Infl. But the indexing itself is illformed. Not having a governing category, *each other* in (9b) is then predicted to (co)refer freely.

There is however one difference between PRO's and lexical anaphors in examples of the type of (8) and (9b) respectively. In (8) and (9b) the lexical anaphor and the PRO can both be long-distance bound by the matrix subject or corefer with the non c-commanding embedded object. But only the PRO in (8) can receive arbitrary interpretation; the lexical anaphor in (9b) cannot. To solve the problem posed by this asymmetry, Manzini (1983) assumes that it is a property of lexical anaphors but not of PRO's that they must have an antecedent. If so, a PRO not subject to binding conditions, as in (8), can have no antecedent at all; a lexical anaphor not subject to binding conditions, as in (9b), must

still have an antecedent. Hence the PRO in (8) can be arbitrary in reference, but not the lexical anaphor in (9b). The property of needing antecedents, in turn, can be associated with lexical anaphors as part of their lexical entry. Obviously PROs, as in general empty categories, are not associated with a lexical entry; hence it can be automatically excluded that they are associated with such a lexical property.

Finally, the theory of phrase structure in Chomsky (forthcoming) potentially undermines all of the versions of the theory of binding and control presented so far. Indeed in the definition of g-governor we have implicitly assumed that if α is a PRO the c-domain of α is the control sentence. This is so if the PRO in subject position is dominated just by one maximal projection, S'; but not if it is dominated by two maximal projections, IP and CP, as the theory of Chomsky (forthcoming) requires.

Once more, it is easy to show that there is a formulation of our theory compatible with these proposals. Suppose we were to formulate the notion of g-governor in terms of the notion of subjacency, as in (2'):

(2') β is a g-governor for α iff β is a governor and
α is subjacent to β

In all of the examples considered so far the definition in (2') gives the same results under the revised theory of phrase structure as the definition in (2) under the traditional theory. Indeed if α is governed, the closest g-governor will be its governor; if α is a PRO, its g-governor will be the governor of the control sentence, to which the PRO is subjacent.

Now, it is not clear to us that the phrase structure theory in Chomsky (forthcoming) is in fact to be accepted. On the contrary, if Manzini (in preparation) is correct, a phrase structure theory positing just one sentential maximal projection is still to be preferred. Even so, however, it can be that a definition of g-governor in terms of subjacency, as in (2'), is the correct one. Here we will not pursue the issue further, limiting ourselves to notice its potential interest.

Similarly, Chomsky (1985) suggests the possibility of a version of binding theory under which anaphors are subject to LF movement, and binding condition A holds of the anaphor-trace relation rather than of the antecedent-anaphor relation. Obviously, such a theory of binding cannot subsume control, or else the complementary distribution of PROs and traces must be abandoned. This could in principle count as another argument against the unification of binding and control. However it could count as well as an argument against Chomsky's (1985) idea. Here we will tacitly assume that the argument cuts the second way.

2. Implicit Arguments

Consider now the examples in (10) and (11):

(10) Mary says that John shouted [PRO to leave]

(11) Mary says that the ship was sunk [PRO to get the insurance]

The PROs in (10) and (11) are essentially in the same configuration as the PRO in (7), and as the PRO in (7) are predicted to be bound in the sentence which immediately contains the control sentence, their governing category. It follows correctly that neither the PRO in (10) not the PRO in (11) can be bound by the matrix subject, *Mary*. However the PRO in (10) and the PRO in (11) are not bound by the embedded subject either. Rather, they receive arbitrary interpretation, providing what appears to be a class of counterexamples to the theory.

There is an obvious difference between examples of the type of (7) and examples of the type of (10)-(11). In (7) all the potential theta roles in the governing category for PRO are realized either lexically or as empty categories; while a potential dative theta role remains obviously unrealized in (10), and a potential agent theta role remains unrealized in (11). If so, one can maintain that the theory makes the correct predictions in (10) and (11) as in (7), by simply assuming that in (10) and (11) the PRO is bound in its governing category by an implicit dative and an implicit agent respectively. This is essentially the solution to the problem proposed in Manzini (1983).

Consider then examples of the type of (12) or (13):

(12) *The boats were sold in the presence of each other

(13) *Mary talked about each other

Both in (12) and in (13) the governing category for the lexical anaphor *each other* is the matrix sentence, hence by binding principle A *each other* must be bound in the matrix sentence. Now, both in (12) and in (13) *each other* cannot be bound by the subject. However if in (11) there is an implicit agent and in (10) an implicit dative, there is no reason not to believe that there can be an implicit agent and dative respectively in (12) and (13). But if the PRO in (10) and (11) can be bound by the implicit argument, why can't the lexical anaphor in (12) and (13) be bound by it? This is of course the problem raised in Chomsky (1985).

Let us consider first what an implicit argument is. We have seen above that in the wellformed examples in (10) and (11) the implicit argument is a dative and an agent respectively. Consider now (14):

(14) *Mary persuaded PRO to leave

In (14) there is no reason to believe that given an implicit direct object, this could not bind the embedded PRO. The ungrammaticality of (14) is then explained only if one assumes that there is no implicit direct object. If so, the generalization seems to

be that, among the major argument slots of a sentence, implicit arguments can correspond to agents and datives, but not to direct objects.

Consider now the Projection Principle, as introduced in Chomsky (1981). By the Projection Principle the properties of a lexical item, in particular its subcategorization properties, are projected from the lexicon to the syntax. Consider then a lexical item associated in the lexicon with a certain number of theta roles. By the Projection Principle, the theta roles will be associated with the lexical item in the syntax. Suppose next that the lexical item is associated in the lexicon with an optional theta role. This could mean in principle that the lexical item is associated with the theta role in the syntax only optionally. But let us assume that the optional theta role is mapped from the lexicon to the syntax along with the obligatory ones.

By the Projection Principle, the theta roles associated with a given lexical item are crucially mapped in the syntax to structural positions. Consider then an optional theta role again. We can now take the optionality of the theta role to mean that it is optionally associated with a structural position. Under this view, two different configurations can arise in the syntax, as in (15):

(15) a. θ+X ___
b. θ+X

If the theta role θ associated with the lexical item X is obligatory, only the configuration in (15a), where θ is associated with a syntactic position ___ is possible. If θ on the other hand is an optional theta role, the configuration in (15b), where the theta role is not associated with a syntactic position, is also possible.

Consider now the configurations in (15). In (15a) under Chomsky's (1981; 1985) Theta Criterion the theta position, hence the theta role, will eventually be associated with an argument. What happens with (15b)? Our assumption is that a theta role not associated with a position is in fact what an implicit argument is. If so, the implicit arguments in (10) and (11) are in fact a dative and an agent theta role respectively not associated with a position. What is more, there can be an implicit argument in (10) and (11) because the dative and agent theta role respectively are optional. In (14) on the other hand there can be no implicit argument because the direct object theta role is obligatory.

Let us go back now to (10)-(11) and (12)-(13). As we have seen, the PROs in (10) and (11) must be bound in their governing categories by the implicit dative and agent respectively. This means that the implicit arguments in (10)-(11) must c-command the PROs; but it is not difficult to define c-command for implicit arguments in such a way as to produce the correct results. For example, we can simply accept the definition in Williams (1985), as in (16):

(16) An implicit argument α c-commands β iff
the head γ of which α is an implicit argument
c-commands β

Consider on the other hand (12) and (13). In (12) and (13), as in (11) and (10), there are an implicit agent and dative respectively. Hence there should be a wellformed derivation for (12) and (13) parallel to the wellformed derivation for (10) and (11), with the lexical anaphor bound in its governing category by the implicit arguments. Why are (12) and (13) illformed?

There is one difference between PROs and lexical anaphors such as *each other*, independent of binding theory, that we have already assumed interacts with it. This is of course that lexical anaphors are specified in the lexicon as needing antecedents, PRO is not; so that PROs without a governing category can have arbitrary reference, but lexical anaphors without a governing category still need an antecedent. Let us then consider again the contrast between (10)-(11) and (12)-(13) in the light of this difference. Consider for example (10) and (13). At s-structure (10) and (13) are essentially alike under our theory. In both cases the embedded verb is associated with an implicit argument and the implicit argument binds the PRO and lexical anaphor respectively, as in (17), satisfying the theory of binding:

(17) a. ... John θ_i+shouted [PRO_i to leave]
b. Mary θ_i+talked about each other$_i$

Now, suppose that though implicit arguments are indeed perfectly welldefined syntactic objects, as in (17), they have no associated interpretation. This means that while at s-structure (10) and (13) are indeed associated with structures of the type of (17), at the interpretive level of LF the implicit arguments are to all purposes inexistent, being by hypothesis uninterpreted. Under this hypothesis (10) and (13) are associated at LF with structures of the type of (18):

(18) a. ... John shouted [PRO_i to leave]
b. Mary talked about each other$_i$

Once more (18a) and (18b) are essentially identical structures; and both can be assumed to be wellformed with respect to the theory of binding, if it applies at LF, given that both the PRO in (18a) and *each other* in (18b) bear an index. Both in (18a) and (18b), however, the PRO and lexical anaphor lack an antecedent. In (18a) this has no consequence whatsoever for the grammaticality of the sentence. Simply the PRO, being antecedentless, will be interpreted as arbitrary in reference. But under our assumptions it is an inherent, semantic property of the lexical anaphor *each other* that it must have an antecedent. Hence we predict that (18b) is ungrammatical; for in (18b) *each other* is antecedentless.

There are then two additional sets of data pointed out in Chomsky (1985). First, Chomsky (1985) notices that implicit

arguments cannot be bound. For example, in (10) the implicit dative and the PRO it controls cannot be interpreted as coreferential with either *John* or *Mary*; in (11) the implicit agent and the PRO it controls cannot be interpreted as coreferential with *Mary*.

Obviously, that implicit arguments cannot be interpreted as coreferential with anything in the sentence follows immediately from our theory; for if implicit arguments are not interpreted, then in particular, whether they are bound in the syntax or not, they are not interpreted as having some antecedent or other. But this is not sufficient. For if in (10) the implicit argument could be bound by *John* or *Mary*, then there should be an interpretation under which the PRO is coreferential with *John* or *Mary*. Hence we actually need to exclude that implicit arguments can be bound in the syntax as well.

A solution to this problem is not difficult to find. Suppose we assume that the endpoint of a binding relation, the bound category, can only be one of the categories bearing the features ±anaphoric, ±pronominal. Then if we simply assume that implicit arguments do not come associated with any of these features, and in general with any features at all, we immediately predict that binding can never apply to them.

In our theory, the problem extends in fact to the treatment of the contrast between control and binding. Consider for example a sentence like (19):

(19) *They said that John talked about each other

If the implicit argument dative in (19) could be bound, for example by *they*, then, assuming that the implicit dative in turn binds *each other*, it would be possible for *they* to serve as the antecedent for *each other*. But if so, the sentence would be predicted to be wellformed. Obviously, the solution we proposed accounts now for this case as well.

Finally, Chomsky (1985) points out that implicit arguments cannot be predicated of. Consider for example (20); in (20) there is an implicit argument agent, but the predicate *mad at Bill* cannot be predicated of it:

(20) *The game was played mad at Bill

Here our discussion is constrained by the lack of a theory of predication as reliable as the theory of binding. But, if we assume as before that implicit arguments are not interpreted, there will be no implicit argument at LF of which *mad at Bill* can be predicated. Hence, if we only assume that predication is at least in part a semantic phenomenon, (20) will be correctly predicted to be illformed.

In summary, then, the central feature of our solution to the problem of the control/binding asymmetry with respect to implicit arguments is the assumption that implicit arguments are

uninterpreted. This together with the assumption that lexical anaphors but not PROs require antecedents, an independently motivated assumption, correctly predicts the contrast between (10)–(11) and (12)–(13). Under these assumptions the contrast is entirely compatible with a theory under which control is subsumed under binding.

In this respect our proposals run right against the trends of other current research. So the idea in Chomsky (1985) seems to be that the contrast between examples such as (10)–(11) and (12)–(13) can ultimately be attributed to the different nature of control and binding theory. Indeed the idea seems to be that implicit arguments cannot satisfy the theory of binding because they are essentially semantic entities and binding theory an essentially syntactic theory; while they can satisfy the theory of control because again they are essentially semantic entities and control theory is essentially a semantic theory. By assuming that implicit arguments are in fact well defined syntactically, but not semantically, we go against these conceptions in a direct and obvious way.

The question next is whether there is any evidence that can be brought to bear on the issue. Consider then a sentence like (21):

(21) Money must be deposited to be able to lend it

Our theory, under which implicit arguments are not semantically realized, assigns to (21) an interpretation roughly of the type "Money must be deposited for x to be able to lend it"; the competing theory, under which implicit arguments are semantically realized, assigns to (21) roughly an interpretation of the type "Money must be deposited by x for x to be able to lend it". Now, it is part of our competence that in general depositors and lenders belong to distinct sets. Hence to the extent that (21) is wellformed, it cannot have an interpretation under which the implicit agent is semantically realized; for, this means that the agent of the depositing, the implicit argument, and the subject of the lending, the PRO, are identified. Consider on the other hand the interpretation our theory associates with (21). Under this interpretation, quite trivially, there is no identification of depositor and lender; hence no problem arises in predicting the wellformedness of the sentence.

Evidence of a less direct kind can also be presented in favor of our theory. Consider for example a sentence of the type of (22):

(22) Mary said that the house was hit before rolling down the hill

The control properties of (22) essentially parallel those of (11). In (11), as in (22), our theory predicts that the PRO is bound in the sentence which immediately contains the control sentence. Hence the prediction is that the PRO cannot be bound by the matrix subject; and that on the contrary it can be bound by the

embedded implicit agent and interpreted as arbitrary in reference.

Now, both in (11) and in (22) the PRO is associated with a +human feature. In (11) however it could be argued that the +human feature on the PRO depends on the semantics of the embedded verb or on the semantics of the purposive sentence, and so on. In (22) there is nothing in the nature of the adjunct sentence, nor of the embedded verb, that could possibly induce a +human feature on the PRO. So for example (23) is perfectly wellformed with *the avalanche* taken as the antecedent for PRO:

(23) The avalanche hit the house before rolling down the hill

In (22) then, if not in (11), given a theory under which implicit arguments are interpreted, the +human feature must be inherent to the implicit argument, since obviously the PRO takes on all and only the features of its antecedents. Given our theory, on the other hand, under which implicit arguments are not interpreted, the +human feature is simply inherent to the PRO_{arb}.

Consider then a sentence like (24):

(24) The house was hit

Obviously, under our definition of implicit arguments, in (24) there is an implicit agent. Now, in a theory in which implicit arguments are interpreted, they must be interpreted as +human; if not, the +human interpretation of the PRO in examples like (22) does not follow. Hence the implicit dative in (24) is predicted to be interpreted as +human. But this is the incorrect prediction, since (24) is true whether the house was hit by somebody or by something (not under human control) such as an avalanche. Needless to say, no problem arises if implicit arguments are not intepreted, as under our theory; for, trivially, they will in particular not be interpreted as +human.

An obvious alternative for theories under which implicit arguments are interpreted is to deny that there is in fact an implicit argument in (24). This amounts to saying that an optional theta role can give rise to an implicit argument only in a restricted class of cases. The obvious generalization would be that implicit arguments can appear when they control a PRO, or eventually bind an anaphor, subject in the latter case to some further constraints, and cannot appear when they do not. So in (22) there is an implicit agent and the implicit agent is interpreted as +human; in (24), on the other hand, there is no implicit agent, hence no +human interpretation. But the problem with this last alternative is also obvious: the generalization itself is in effect a restatement of the facts. Again, if implicit arguments are not interpreted, as under our theory, all of the correct predictions follow without need for any such stipulation.

Summing up, then, if we are correct our theory of implicit arguments is supported both directly by the data, as in (21), and by theoretical considerations, as the data in (22) and (24)

illustrate. Obviously, this in turn lends indirect support to our unified theory of binding and control.

But suppose some independent piece of evidence proved fatal to our theory of implicit arguments. Even so, this would not prove that our theory of binding and control is inadequate. For example, there is at least one further difference between binding and control independent of implicit arguments. Indeed, in cases of obligatory control the choice of the controller within a given domain can be determined by the semantics or pragmatics of the lexical head of the domain. This is then another directions in which one can try to restrict the possible occurrences of implicit arguments. We have shown above that under a non unified theory of binding and control one needs the stipulation that implicit arguments can only appear in environments in which they serve as antecedents for some expression. In this case it is difficult to see how one stipulation would be better than the other.

In general, the choice seems to be between a general theory of implicit arguments which is compatible only whith a syntactic theory of control (a unified theory of control and binding) and various less general theories compatible, at least some of them, with both semantic or syntactic theories of control (unified with binding or not). If the more general theory, under which implicit arguments are not interpreted, is correct, then this lends support to a unified theory of binding and control. If a less general theory has to be postulated, then it is difficult to see how this could favor any one or other of the existing views on control.

3. Italian

Consider now Italian. In Italian it is possible to argue that there is a class of implicit arguments individuated by exactly the same properties as the English class. So one can argue exactly as for English that an implicit agent controls the PRO in (25); and that the implicit agent can neither bind an anaphor, as in (26), nor be predicated of, as in (27):

(25) La nave fu affondata per riscuotere l'assicurazione
The ship was sunk to get the insurance

(26) *I battelli furono venduti l'uno in presenza dell'altro
The boats were sold in the presence of each other

(27) *La partita fu giocata arrabbiati con Gianni
The game was played mad at Gianni

Similarly, one can argue that an implicit dative of the English type controls the PRO in (28); and that exactly as in English the implicit dative cannot bind an anaphor, as in (29):

(28) Gianni grido' di partire
Gianni shouted to leave

(29) *Gianni parlo' di se stessi
Gianni talked about oneself

In Italian, however, as Rizzi (1985) points out, there appears to be a second class of implicit arguments. This class has crucially different properties from the English class. Implicit arguments of the Italian class correspond to obligatory direct object theta roles, as in (30)-(32); they can not only control, as in (30), but also bind, as in (31), and be predicated of, as in (32):

(30) Un generale puo' costringere a obbedire
A general can force to obey

(31) Un bravo psicoanalista puo' restituire a se stessi
A good psychoanalyst can give back to oneself

(32) Quel famoso pittore ritrae vestiti di bianco
That famous painter portrays dressed(arb.) in white

Now, in a theory in which implicit arguments cannot bind or be predicated of at any level, it is easy to see that the gaps in (30)-(32) cannot in fact be implicit arguments. They must correspond to empty categories; according to Rizzi (1985), they correspond to pro's. This however implies a double revision of current theories of pro's.

First, current theories assume that pro's are licenced if and only if they are governed by a strong Agr. In Rizzi's (1985) theory pro's can be licenced in principle by any governor. By which governors they are actually licenced in a given language is determined by the setting of an ad hoc parameter. Under this theory pro's are licenced in Italian by Agr or V. Furthermore, current theories assume that pro's licenced by strong Agr's are also identified by them; and this in turn determines their interpretation, essentially that of a definite pronoun. In Rizzi's (1985) theory, once the range of licencing elements has been extended from Agr to V and potentially to other lexical categories, it is not possible to maintain that licencing elements are also identifying elements. Rather, it is assumed that pro's licenced by V's are identified by a rule roughly of the type of (33), the theta role transmitting its index to the pro; and this also correctly determines their interpretation as arbitrary elements:

(33) Assign *arb* to the direct object theta role

In summary, theories which assume that implicit arguments cannot at any level bind or be predicated of are forced to conclude that the gap in (30)-(32) corresponds to an empty category. If the empty category is taken to be a pro, as in Rizzi (1985), then the licencing and identification conditions on pro's need to be separated; and both need to be extended.

Consider on the other hand our theory of implicit arguments. Given our theory, nothing prevents us from assuming Rizzi's (1985) theory of (30)-(32) as it is. According to our theory, however, at s-structure implicit arguments can bind and presumably be predicated of. Hence, at least in this respect the

gaps in (30)-(32) can correspond to implicit arguments.

Consider then the contrast between (26) and (31). At s-structure both (26) and (31) are predicted by our theory to be wellformed, with the anaphor bound by an implicit argument. At LF (26) is predicted to be illformed under the assumption that the implicit argument is not interpreted, hence the anaphor is antecedentless. Obviously, for (31) to be wellformed at LF as well as at s-structure it is necessary and sufficient under our theory that the implicit argument be interpreted. Suppose then we adopt from Rizzi (1985) the rule in (33). The rule in (33) has the effect of interpreting the implicit argument in (31). Hence the implicit argument can serve as an antecedent for the anaphor at LF and (31) is predicted to be wellformed.

The contrast between (27) and (32) can then be dealt with like the contrast between (26) and (31). Under our theory (27) is syntactically wellformed, but illformed semantically in that the implicit argument predicated of is not interpreted. (32) differs then from (27) in that in (32) rule (33) applies, interpreting the implicit argument. Hence the implicit argument can be predicated of at LF as well as in the syntax and (32) is predicted to be wellformed.

Now, rule (33) is stated so as to apply to all and only the direct object implicit arguments; and this introduces at LF the correct distinction between the implicit arguments in (30)-(32) and the implicit arguments in (25)-(27) or in (28)-(29). But consider again what our theory of implicit arguments is at s-structure. We assumed above that only optional theta roles, such as the agent in (25)-(27) or the dative in (28)-(29), are allowed not to project to a position; hence only optional theta roles can correspond to implicit arguments. If an obligatory theta role is not projected to a position, we assumed that a violation of the Projection Principle arises; hence no implicit argument can correspond to an obligatory theta role. This means that our theory disallows implicit arguments in direct object position in examples of the type of (30)-(32).

Obviously, we not only need to makes sure that the implicit arguments in (30)-(32) are interpreted, but also that they are allowed there by the Projection Principle in the first place. What we have at this point is an interpretation rule, (33); what we are looking for is a rule licencing the implicit arguments syntactically. But in fact there is no reason not to assume that (33) is not the licencing rule as well. Suppose indeed we assume that (33) is first and foremost a licencing rule. We can now maintain that optional theta roles project optionally to positions, while under the Projection Principle obligatory theta roles must obligatorily project; except that we now effectively take the application of rule (33) to be an alternative way of satisfying the Projection Principle.

In summary, under our theory both the sentences in (25)-(29)

and the sentences in (30)-(32) involve implicit arguments; the implicit arguments in (25)-(29) are licenced by the optionality of the theta role, the implicit arguments in (30)-(32) are licenced by rule (33). The implicit arguments in (25)-(29), furthermore, are not interpreted, whence their inability to bind and enter predication. As an effect of rule (33), however, the implicit arguments in (30)-(32) are interpreted; whence their ability to bind and enter predication.

Thus, in order to deal with sentences of the type of (30)-(32), our theory necessitates the addition to the grammar of one only rule, (33). In Rizzi's (1985) theory, on the other hand, an account of sentences like (30)-(32) requires the addition to the grammar of rule (33) as an identification rule for pro's, the splitting of identification and licencing conditions on pro's, and the extension of licencing conditions on pro's. Hence, everything equal, it seems that our approach is to be preferred to Rizzi's (1985) on grounds of simplicity. If so, our theory of the implicit arguments in (25)-(29) and similar examples stands then indirectly confirmed.

Obviously, given our account of the contrast between (25)-(27) or (28)-(29) and (30)-(32), we predict that the *arb* interpreted implicit arguments of the type in (30)-(32), contrary to implicit arguments of the type in (25)-(29), are always associated with the feature +human. This is straightforwardly verified to be true. Consider for example (31); in (31) the context forces an interpretation in which the direct object implicit argument is taken to be +human. Consider then a context which forces a -human interpretation on its direct object; if an implicit direct object is always associated with the feature +human we expect it to be unacceptable in such a context. But this is precisely what happens, as in (34):

(34) *Un bravo restauratore puo' restituire al proprio originario splendore
A good restorer can give back to (x's) own originary splendor

There is then one last difference in behavior between the implicit arguments of the type in (25)-(27) and (28)-(29) and the implicit arguments of the type of (30)-(32), pointed out again in Rizzi (1985). Implicit datives and agents are compatible with any tense frame in a sentence, and in particular with historic tenses, as for example in (25) and (28). But implicit direct objects are only compatible with habitual tenses; so (30) is wellformed, but (35) is not:

(35) *Il generale costrinse a obbedire
The general forced to obey

Now, the restriction to habitual tense frames is familiar from other tensed contexts involving *arb* interpreted elements, for example middle constructions. Though the restriction itself is not

understood, under our theory of implicit arguments it is possible to explain why it is associated with the implicit arguments in (30)-(32) but not with the implicit arguments in (25)-(29) by simply maintaining that is associated with all and only the *arb* interpreted elements in the grammar, the strongest possible hypothesis. If so, indeed, the implicit arguments in (25)-(29) will not be associated with the restriction, correctly, because they are not interpreted, hence in particular not *arb* interpreted; the *arb* interpreted implicit arguments in (30)-(32) and (35) will be subject to the restriction, correctly again.

Finally, if our characterization of the contrast between the examples in (25)-(29) and the examples in (30)-(32) is correct, the analysis of the parametric variation between English and Italian with respect to implicit arguments is straightforward. English of course has implicit arguments of the type in (25)-(29) but not implicit arguments of the type in (30)-(32); in terms of our theory then the difference between Italian and English is simply that Italian but not English has rule (33).

The divide between English and Italian is not however completely clear cut, as is pointed out once more in Rizzi (1985). It is true that English has no productive direct object implicit arguments of the Italian type; English however does appear to have direct object implicit arguments in some highly restricted contexts. So for example (36) is a wellformed English sentence, even though (37) is not:

(36) This leads to the following conclusion

(37) *This leads to conclude what follows

In Rizzi (1985) the suggestion is that rule (33) actually is operative not only in Italian but also in English. But while rule (33) applies in the syntax in Italian, it applies in the lexicon in English. Once more, there is nothing within our theory so far which prevents us from accepting Rizzi's (1985) analysis. Here we will incorporate it as it is.

Footnotes

* M. Brody provided the stimulus to produce the first version of this paper. An early version was presented in April 1985 at the Conference on *Mental Representations and Properties of Logical Form* in Windsor Park, England; a full version was presented in September at the *International Round Table on Government-Binding Syntax* held at the Scuola Normale Superiore in Pisa. Thanks are due to the organizers of the two events, R. Kempson and P. Longobardi, and among the participants in particular to L. Rizzi in Pisa. This paper is a shortened version of Manzini (forthcoming) to which the reader is referred for further discussion.

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