

The Explicit Syntax of Implicit Arguments

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Abstract

Although they participate in control relations, implicit arguments are standardly viewed as unprojected θ -roles, absent from the syntax. We challenge this view and argue that implicit arguments are syntactically represented. The argument rests on the observation that implicit arguments can exercise partial control, and the claim that partial control must be encoded in the syntax (given plausible assumptions on the limits of lexical relations). We further argue that the syntactic constitution of implicit arguments is more impoverished than that of *pro*, explaining their differential visibility to various syntactic processes.

1. Introduction

Sentences whose phonetic form contains more or less information than their logical form are a constant source of wonder to linguists.

- (1) a. Mary does not know how to swim.
b. [____ to know how to swim] is important.

The word *does* in (1a) is superfluous, from a semantic point of view. It adds no information and its sole function seems to be to mark tense and agreement, which are directly marked on the main verb in the absence of negation (*Mary knows how to swim*). Indeed, in most languages it is absent from the equivalent of (1a). Hence, its presence in English is a linguistic puzzle; at the same time, it confirms our belief in the reality of formal syntax. In a similar vein, the understood subject of *to know* in (1b) is not pronounced, although it is clearly part of the semantic interpretation of the sentence (compare *For Mary to know how to swim is important*). Further evidence confirms that this subject participates in formal syntactic relations.

Among the cases in which the phonetic form appears to underdetermine the logical form, a notable category is that of implicit arguments. A sample of familiar examples is given in (2). In each case, I indicate a potential interpretation for the implicit argument in parentheses, located where that argument, had it been overt, would have occurred.

- (2) a. The shark was spotted at once (*by our cameras*).
- b. It was upsetting (*to Mary*) to watch these old photographs.
- c. James helped (*them*) reach the shore.

The central theoretical question concerning implicit arguments is how, and where, they are represented. An entire spectrum of possibilities exists. Implicit arguments could be completely abstract entities, pragmatically inferred in specific situations; they could be elements of conceptual structure; argument positions, or θ -roles, in argument structures (θ -grids); or they could be bona fide null syntactic categories, pronominal or variable-like in nature. In fact, each of these positions has been proposed (see, among others, Epstein 1984, Williams 1985, 1987, Rizzi 1986, Chomsky 1986, Roeper 1987, Brody & Manzini 1987, Jackendoff 1987, Safir 1991).

Given the vast amount of work on the topic, it is perhaps surprising that there is yet no accepted answer to the foundational question—what *are* implicit arguments. In a recent illuminating survey, the authors prudently summarize their conclusions as follows:

That implicit arguments are syntactically active was shown to be the case... The evidence concerning the question of whether implicit arguments are syntactically realized or not is, however, more equivocal. Unlike Williams (1985, 1987), we are unable to conclude that implicit arguments are not projected syntactically. However, we are also unable to conclude that the environments discussed in sections 2-6 must involve syntactic projection of the implicit argument.” (Bhatt and Pancheva 2006:581).

As Bhatt & Pancheva observe, part of the problem is no doubt due to the fact that the label ‘implicit arguments’ applies to a heterogeneous class of entities, which exhibit significant differences in distribution and interpretation. At the same time, it is not clear what grammatical processes are truly diagnostic of syntactic projection (in the sense that they cannot access lexical or pragmatic information) and which are not.

The lack of decisive arguments in this area is unfortunate. Bhatt & Pancheva remark, and I fully concur: “We find the existence of elements that are syntactically active but not syntactically projected conceptually problematic” (p. 581). This discontent is, in fact, my point of departure. The main part of this paper develops an argument to the effect that (certain) implicit arguments *are* syntactically present—and not just syntactically active. At the same time, their syntactic constitution is more

impoverished than that of the better known null categories, explaining why they are not as syntactically active as the latter. Thus, this paper attempts to go beyond the familiar phenomenological distinctions between the two types of ‘understood arguments’ and derive them from the underlying natures of different null categories. Ultimately, this is a study in the ontology of null categories, a topic of much interest from the early days of GB to the present.

2. A contrast between control and predication

The theoretical interest in implicit arguments lies in the fact that they appear to constitute a grammatical type of their own, irreducible to either the theoretical construct ‘null category’ or the commonsense term ‘understood participant’. A simple illustration of this fact is given in (3), adapted from Chomsky 1986:120-1.

- (3) a. It is impossible [PRO to visit me together].
- b. It is impossible [for me to be visited (*together)].
- c. They expected [PRO to leave the room angry].
- d. The room was left (*angry).

Secondary predicates like *together* and *angry* can be predicated of the understood subject of infinitives but not of the understood agent of passive.¹ This contrast has led Chomsky and others to posit that the former type of argument is syntactically represented (as PRO) but the latter type is not. We will see below that this conclusion was premature. However, the facts do present a split, which can be described as follows.

- (4) a. *Strong implicit argument* (SIA): PRO, pro.
- b. *Weak implicit argument* (WIA): passive agent, implicit object.

- (5) An implicit argument must be *strong* to license a secondary predicate.

Languages not licensing an object pro would show the effects of (5) for objects as well. English is such a language, although it hardly ever allows implicit direct objects, even in the absence of secondary predicates. Still, contrasts like (6)-(7) are expected ((7) is adapted from Chierchia 1989:152).

¹ See Roeper (1987:297-8) for a different view.

- (6) a. John ate (the meat raw).
 b. John ate *(the meat) raw.
- (7) a. I am now hiring (people [for John to work with]).
 b. I am now hiring *(people) [for John to work with].

Consider also the following contrast in Hebrew, a language more tolerant of implicit arguments than English. Although *le'hagiš kar* 'serve cold' is a conventionalized idiom that violates (5) (also in English), any attempt to extend its use beyond the convention fails. Notice that the context in (8) selects plural agreement on the secondary predicate, as distinct from the idiomatic, default 3sg agreement.

- (8) A: ma im ha-tutim?
 what with the-strawberries.3pl
 'What about the strawberries?'

B: higašti (otam karim).
 I.served them cold.3pl

B': higašti *(otam) karim.
 I.served them cold.3pl

In this context, it is interesting to note that control, unlike predication, is satisfied with a weak implicit argument (as a controller). We will discuss implicit control in sections 5.4-5.5 at length, but the following pairs should serve to illustrate this point.

- (9) a. It was decided [PRO to leave].
 b. * The issue was decided unassisted.
- (10) a. The game was played [PRO wearing no shoes].
 b. * The game was played shoeless.

Consider also the adverbial *at the same time* (in its distributive sense, not the discourse-anaphoric sense). Although not strictly a secondary predicate, its felicitous use depends on individuating events by reference to an overt plural argument (11a). Leaving the optional benefactive argument implicit is not allowed in the presence of the adverbial (11b). Nevertheless, this benefactive argument, when implicit, can still exercise control in (11c) (which is ambiguous between agent and benefactive control).

- (11) a. Rice was bought for them/*John at the same time.
 b. John & Mary heard that rice was bought *(for them) at the same time.
 c. Rice was bought (for John and Mary) [PRO to cook and eat].

What is the linguistic content of the term “strong” in (5)? In section 5.1, I will propose an explicit characterization of this term. At the moment one can appeal to the traditional conception of predication. For a linguistic object to saturate a syntactic predicate, it must qualify as a syntactic argument. A prevalent view holds that only DPs can serve that function; in fact, it is the D head which maps an NP predicate to an argument denotation (Longobardi 1994). Given that, (5) can be restated as (12).

- (12) A secondary predicate must be predicated of a DP.

Correspondingly, we take SIAs (4a) to be DPs, and WIAs (4b) not to be DPs.² We return below to the effects of this distinction in the realm of anaphoric binding. At this point one is tempted to conclude (as is common) that WIAs are not projected in the syntax, perhaps being already discharged in the lexicon. The main empirical argument of this article is that this conclusion is unwarranted, and that WIAs are in fact syntactic animals, albeit more impoverished than normal DPs. This argument is constructed step by step in sections 3.1 through 3.5.

3. Implicit control is syntactic: A deduction

The argument that implicit controllers are represented syntactically proceeds in five steps.

First, it is argued that lexical relations are strictly local, restricted to predicate-argument or co-argument pairs.

Second, it is noted that the only viable lexical analysis of OC compliant with the locality of lexical relations is the predication analysis (where the infinitive is a predicate of the controller).

Third, it is shown that partial control does not fall under predication, hence must be a syntactic relation.

² Notice, incidentally, that the contrasts in (9)-(11) provide a compelling argument against the view that obligatory control (OC) reduces to predication (Bach 1979, Williams 1980, Chierchia 1984, 1989, Dowty 1985, Clark 1990). The binding-control contrasts reviewed in section 4 make a parallel case against the reduction of OC to binding (Manzini 1983, Bouchard 1984, Koster 1984, Borer 1989, Sag and Pollard 1991). To my knowledge these are among the most powerful arguments against these approaches. For additional arguments, see Landau 2000.

Fourth, it is demonstrated that implicit arguments (in OC contexts) can exercise partial control.

Hence, it follows that implicit controllers are syntactic objects.

3.1 *The locality of lexical relations*

A prevalent assumption in modern linguistic research holds that lexical relations are subject to severe restrictions. Although the *content* of lexical information may vary quite extensively, specifying thematic roles, aspectual distinctions, selectional restrictions, presuppositions etc., the syntactic *domain* over which lexical relations are permitted to reign is highly constrained. Informally, a lexical relation can hold only between a predicate and its argument, or between arguments of the same predicate (coarguments). Less direct relations (e.g., between arguments of distinct predicates) are handled by the syntax. For example, lexical relations (of any sort) could hold between the underlined pairs in (13), but not between those in (14).

- (13) a. Bill danced.
b. Helen felt uneasy.
c. Jay stuffed the pillow with feathers.
- (14) a. Bill noticed that Larry danced.
b. It was felt that Helen was uneasy.
c. Jay stuffed the pillow with soft cloth decorated with feathers.

Likewise, while local binding may be determined either lexically or syntactically, long-distance binding must be syntactic.

- (14) a. The detective asked himself many questions. *syntactic or lexical*
b. The detective promised Bill to disguise himself. *only syntactic*
(via PRO)

As far as I am aware, this tacit assumption concerning the limited scope of lexical relations is shared by most strands of generative grammar (though not all of them, see below).

Let us state this assumption more formally. The domain we need to define is the set consisting of a predicate and its arguments.

(15) *Argument Structure Domain (ASD)*

- a. For an n-place predicate $P\langle x_1, \dots x_i, \dots x_n \rangle$:
 $ASD(P) = \{P, x_1, \dots x_i, \dots x_n\}$.
- b. For an argument x_i of an n-place predicate $P\langle x_1, \dots x_i, \dots x_n \rangle$:
 $ASD(x_i) = \{P, x_1, \dots x_i, \dots x_n\}$.

Note that an argument can simultaneously participate in several ASDs insofar as it saturates more than one predicate (e.g., *the fish* in *Bill ate the fish cold*). We can define the superset of these domains as follows.

(16) *Set of ASDs (ASDS)*

$$ASDS(x) = \{z: z=ASD(x)\}$$

Let xLy denote some lexical relation holding between x and y . To be so related, x and y must be lexically represented. They could also be syntactically represented (through some form of projection), but minimally, xLy requires that its relata be lexical.

We can now express the restriction on the scope of lexical relations as follows.

(17) *Locality of Lexical Relations (LLR)*

$$xLy \rightarrow ASDS(x) \cap ASDS(y) \neq \emptyset$$

The LLR stipulates that two lexically related items must share at least one argument structure domain; in other words, they must either be a predicate and its argument or coarguments. This is precisely the intuition we want to capture.

Something like the LLR is widely assumed, though not always explicitly, both within syntactic and semantic schools of linguistics. Thus, it underlies much work within the Extended Standard Theory-Government Binding-Minimalism lineage, as well as work in Montague Grammar and Categorical Grammar. The LLR, however, is not universally accepted. Lexicalist frameworks like LFG and HPSG openly deny it. In these theories, it is quite common to encounter highly articulated lexical structures, in which arguments of distinct predicates are linked by some relation (like predication or coreference). A particularly pertinent case is the treatment of obligatory control (OC). In both LFG and HPSG, the lexical entry for a control verb (e.g., *try*) explicitly specifies that its subject and its complement's subject are coindexed (Bresnan 2001:197, Sag, Wasow and M. 2003:373). At the same time, the two arguments belong to distinct (minimal) argument structures. Such linking poses no difficulties within these theories, but would be inexpressible under the LLR.

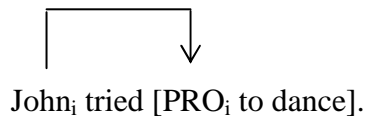
The implications of adopting or rejecting the LLR are far-reaching, and run deep into the fabric of any grammatical framework. It is not up to the present limited investigation to address these fundamental issues. It is my belief that a system incorporating the LLR affords insights into ‘core’ properties of syntax that are obscured within purely lexicalist theories. But again, this belief will not be defended here. Rather, I will simply align my arguments with the LLR, as much current work does, and see where they lead us.

3.2 Predication: The lexical analysis of OC

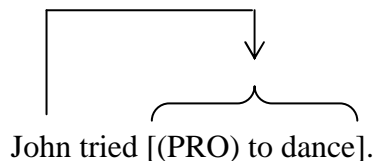
The previous section described two lexical analyses of OC that do not conform with the LLR. From this point on, I will assume that the LLR is in fact a true constraint on lexical relations. The question that arises, then, is what would an LLR-compliant lexical treatment of OC look like. As far as I know, there is only one possible answer: predication.

Logically, the OC relation can be conceived of as a relation between two individuals (the controller DP and PRO) or between an individual and a property (the controller DP and the entire infinitive).³

- (18) a. *OC as variable binding*



- b. *OC as predication*



It should be immediately evident that under the LLR, (18a) cannot represent a lexical relation, as it links arguments of distinct predicates.⁴ Thus, (18b) remains the only viable lexical analysis of OC.

³ Analyses of type (18b) differ on whether or not they posit a PRO subject in the infinitive. If they do, PRO is interpreted as a λ -abductor.

⁴ Even lexical theories in which such linking is semantically expressible may still prohibit (18a). This is because the controllee (PRO) has no designated semantic role and is only identified by its grammatical function, namely subject. Therefore, any theory in which grammatical functions are *not* directly encoded in the lexicon would exclude (18a) from the realm of lexical relations.

A major line of research, in fact, treats OC as a predication relation. Specifically, the infinitival complement is interpreted as a property, which applies to the matrix DP controller, possibly under some modal operator (Bach 1979, 1982, Williams 1980, Dowty 1985, Lebeaux 1985, Chierchia 1984, 1989, Clark 1990). To illustrate, consider the lexical-entailment analyses of Dowty and Chierchia.

- (19) a. $\forall x \forall P \Box [\delta(P)(x^*) \rightarrow \beta([P(x^*)])(x^*)]$ (Dowty 1985:299)
 b. $E(\beta_r [P]) \rightarrow E(\beta_r [P/P^*(\theta(\beta))])$ (Chierchia 1989:144)

In (19a), δ and P are the matrix and infinitival predicates, respectively, x is the DP controller, and β a relation between individuals and propositions associated with (and presumably derived from) the meaning of δ . For $\delta=\text{try}'$, $P=\text{dance}'$, $x=\text{John}'$, (19a) yields: ‘John intends that John’s action will bring about **dance'**(**John'**)’.

In (19b), β_r and P are the matrix and the infinitival predicates, respectively (the subscript r indicates type, where types are means of collapsing different guises of the same predicate under one label). θ is a partial function from eventualities to participants, selecting the matrix controller on the basis of some thematic hierarchy. The square brackets on the right-hand side notate standard substitution. Given this, (19b) reads: ‘Suppose that an r -eventuality β that has the property P as one of its constituents is the case; then an r -eventuality obtained from β by replacing P with the eventuality $\langle P, x \rangle$ (where x is the bearer of the role θ with respect to β) is also the case’.

What is important from our perspective are the segments $P(x^*)$ in (19a) and $P^*(\theta(\beta))$ in (19b). These express the predication relation holding between the infinitival property and the DP controller. In one form or another, this ingredient lies at the heart of all the analyses mentioned above. To be sure, predication is not necessarily a lexical relation. Indeed, Williams (1980) and Clark (1990) characterize OC as syntactic predication. The ultimate semantics, however, is the same, regardless of the level where predication applies.

An important consequence of any predication-based analysis of OC is the *locality* of OC. Under the syntactic notion of predication, this follows from the mutual c-command condition between predicates and subjects. Under the lexical approach, this follows from the LLR: since only coarguments can be associated via a lexical

In fact, I believe that this tension underlies the failure of Jackendoff & Culicover 2002 to deliver a systematic account of OC. For J&C, OC is established at Lexical-Conceptual Structure (LCS), between notional elements such as INTENDER and ACTOR (and a few others). This is initially plausible for some OC verbs (e.g., *try*, *promise*, *persuade*), whose complement subject must be understood, in some sense, as an Actor. But it cannot extend to other verbs (e.g., *want*, *hate*, *claim*), where the complement subject is semantically unrestricted. The problem for J&C is that “Subject” is not a term of LCS representations. Being committed to the LCS-analysis, though, they end up with no account whatsoever for OC in the second class of verbs.

entailment, the controller must be a coargument of the infinitive. This consequence is fully recognized in the relevant works, although the role of the LLR in securing it is often unacknowledged, being a presupposition as it were.⁵

Let me stress, once again, the upshot of this section. A lexical analysis of OC that abides by the LLR is bound to converge on the predication analysis. This is stated in (20).

(20) If OC is a lexical relation, then it is a predication relation (assuming the LLR).

3.3 Partial Control: Non-predicative OC

Landau (2000) argued that the class of OC predicates breaks into two types: predicates that impose strict identity between the controller and PRO (Exhaustive Control, EC) versus predicates that allow PRO to be interpreted as a semantic plurality properly including the controller (Partial Control, PC). Each type consists of several verb classes, as illustrated below.

(21) EC verbs

- a. Implicatives: *dare, manage, bother, remember, condescend, fail, force*, etc.
- b. Aspectual: *begin, start, continue, finish, stop, resume*.
- c. Modal: *have, need, may, should, is able, must*.

(22) PC verbs

- a. Factives: *glad, sad, regret, like, hate, loath, surprised, shocked, sorry*, etc.
- b. Propositional: *believe, think, suppose, imagine, say, claim, declare*, etc.
- f. Desideratives: *want, prefer, plan, arrange, hope, afraid, promise*, etc.
- g. Interrogatives: *wonder, ask, contemplate, guess, grasp, understand*, etc.

The relevant contrast in tolerance to PC is seen in cases where the infinitival predicate requires a plural subject. The notation $DP_i \dots PRO_{i+} \dots$ stands for the PC reading.

- (23) a. We knew that Mr. Smith_i arranged [PRO_{i+} to meet after class].
 b. Mr. Smith realized that his wife_i hated [PRO_{i+} to kiss in front of the kids].
 c. I told Mr. Smith that I_i wonder [when PRO_{i+} to paint the fence together].

⁵ Wurmbrand (2002) (see especially fn. 6) follows Chierchia in reducing Exhaustive Control (EC) to lexical entailments, but differs from him in taking certain EC complements to be semantically propositional (since they evidence PRO). She is therefore forced to allow a lexical association between non-coarguments, in violation of the LLR. The alternative is to view PRO in EC complements as a λ -abstractor that turns the infinitive into a property.

- (24) a. * We knew that Mr. Smith remembered to meet after class.
 b. * Mr. Smith realized that his wife started to kiss in front of the kids.
 c. * I told Mr. Smith that I am able to paint the fence together.

As Landau (2000) indicates, PC is a subspecies of OC, not NOC. The controller must be local, arbitrary control is disallowed, PRO is interpreted *de se* and VP ellipsis yields only sloppy readings. The underlying factor behind the EC-PC distinction is semantic tense: The complements of the verbs in (21) are all untensed, in the sense that they form a single event with the matrix event; the complements of the verbs in (22) possess their own tense, although dependent on the matrix tense. Thus, only the latter allow mismatches in temporal modifications (e.g., *Last year, Mr. Smith hoped/*dared to write a novel next year*). In the account developed in Landau 2000, 2004, to appear, Tense plays a crucial role in mediating the PC dependency.

PC raises many interesting questions regarding the representation of tense and plurality. At present, though, I would like to focus on one of its corollaries, which is stated in (25).

- (25) Partial control is not a predication relation.

Observe that none of the embedded collective predicates in (23) can be sensibly predicated of the controller DP.

- (26) a. * Mr. Smith met after class.
 b. * His wife kissed in front of the kids.
 c. * I painted the fence together.

At the same time, propositions obtained by such predications would figure in the lexical entailments of (23), if they were to fall under the analyses in (19). Given that collective predicates are undefined for individual arguments, the entailments in (19) would either yield anomalous readings in (23) or provide no basis for the control interpretation.⁶

One response to this problem would be to say ‘well, perhaps predication is the wrong theory of OC’. This, however, would be an overstatement of the issue; predication can handle EC quite well. It is PC that seems to be beyond its reach.

⁶ The problem is actually much broader, not confined to inherently collective predicates, since even sentences like *Mary agreed to leave* can be easily construed with partial control, provided a suitable context (e.g., after exhausting themselves at the party, Mary’s boyfriend was dying to get some sleep, so Mary agreed to leave).

Nevertheless, the problem is serious enough, since PC predicates, in fact, outnumber EC predicates within the class of OC predicates.

A potential attempt to rescue the predication analysis of OC in face of examples like (23) could modify the lexical entailments in (19). One could propose, for example, that the entity forming the subject of the embedded proposition on the right-hand side is not an argument of the control predicate, but some contextually determined set that merely includes it. For example, (19a) could be modified along the following lines.⁷

- (27) For δ a PC predicate: $\forall x \forall P \Box [\delta(P)(x^*) \rightarrow \beta([P(c_x)])(x^*)]$
 where $x^* \in c_x$ and $c_x\{x^*\}$ is contextually salient.

This formula would work technically; presumably, one can write into meaning postulates whatever one wishes. But there are at least three reasons for rejecting this as a general solution for the PC phenomenon.

First, (27) undermines much of the appeal of the predication analysis. The chief advantage of this approach, to recall, is the facility with which the controller DP is located and associated with (the property denoted by) the infinitive: The infinitive and its subject are coarguments of the main verb, end of story. In PC, however, they are *not* coarguments, since the set c_x is not an argument of the control verb at all.

Second, a question arises why there is a residue, and a necessary one at that, of the denotation of the matrix argument x inside the set c_x . Once context is allowed to intervene in lexical entailments, it is not clear how this intervention can be curbed. Put differently, it is not clear why PC does not ‘slip into’ non-obligatory control (NOC) under this analysis. (27) *guarantees* it will not, but does not *explain* why.⁸

Third, there is no reference in (27) to Tense, which is the defining feature of PC complements. Conceivably, one can restrict the class of predicates δ with which (27) is lexically associated by stipulating that these are all and only those predicates that license Tense on their complements. Again, this restriction would amount to a diacritic, not explanation. The link between the presence of Tense and the expansion of x to c_x would remain opaque.

I conclude, then, that PC cannot be analyzed as an instance of predication. Still, PC is an instance of OC. Putting together (20) and (25), we obtain (28).

- (28) Partial control is not a lexical relation.

⁷ For simplicity, I ignore here any type-shifting that may be required for collective predicates.

⁸ More generally, why can c_x not substitute for x in other lexical entailments? A lexical entailment of the verb *fill* allows us to infer from *The water filled the bucket* that the bucket is a container – and *not* that it belongs to a contextually salient set of containers.

The implication is that PC is a syntactic relation.⁹ Given that the relata of syntactic relations must be syntactic elements themselves, (29) follows.

(30) The controller and controllee (PRO) in PC are syntactically represented.

This conclusion bears on the subject matter of the next section - the status of implicit arguments.

3.4 Implicit controllers

Since Kimball 1971, it is known that the controller in OC need not be expressed overtly. The conditions under which controllers are legitimately left implicit are quite complex and vary across languages. It is fair to say that the topic has produced much intriguing observations and few solid generalizations (see, among others, Bresnan 1982, Epstein 1984, Williams 1985, 1987, Manzini 1986, Rizzi 1986, Brody and Manzini 1987, Roeper 1987, Lasnik 1988, Chierchia 1989, Clark 1990, Petter 1998, Higginbotham 1999, Landau 2000, to appear, Sichel 2007).

Some common examples of implicit OC are given in (31).¹⁰ Note that when the controller is left out, PRO assumes “arbitrary” reference, yet this is quite different from NOC, as the reference of PRO is strictly linked to that of the implicit controller. Thus, (31a) for example, without *the kids*, is interpreted as “For some x, Mr. Jones helped x to bring about x’s cleaning the garden”.

- (31) a. Mr. Jones helped (the kids) to clean the garden.
b. Martha signaled (to Kevin) to stay away from the slope.
c. Paul said/shouted (to his son) to open the door at once.
d. It was amusing (to Fred) to watch the worm parade.

Familiar blocking effects show that implicit controllers always mediate what appears to be “long-distance” control into complements.

- (32) a. Mary hated it when we said to behave herself.

⁹ Exactly what type of relation PC is is an interesting question, though not directly relevant to the present concerns. Landau (2000) analyzes it as an instance of Agree, an abstract agreement dependency. The associated semantics is possibly analogous to the one involved in binding of inclusive anaphors, such as the Japanese *jibun-tachi* (Kawasaki 1989)

¹⁰ Implicit arguments rarely occur with verbal predicates in English (although adjectival and nominal predicates freely allow them). Other languages are considerably more favorable to implicit arguments, and exhibit parallel behavior in OC contexts. The source of these crosslinguistic differences is a mystery.

- b. *Mary hated it when we said to Jim to behave herself.

A central question in the study of implicit arguments is how they should be represented. Some scholars treat them as run-of-the-mill null pronouns, syntactically represented as pro/clitic (Manzini 1992); others view implicit arguments as thematic slots saturated in the lexicon but not projected to syntax (Rizzi 1986, Roeper 1987, 2000); others think of them as more abstract entities, present only at lexical-conceptual structure (Safir 1991); yet others view them as LF variables (Epstein 1984).

Obviously, the fact that implicit arguments can control establishes a dependency between theories of implicit arguments and theories of control. For example, if implicit arguments are radically absent from the syntax, then OC cannot be a wholly syntactic relation. Conversely, a pro-analysis of implicit arguments allows the OC relation to be syntactic. This is why the status of implicit arguments is so crucial to the theory of OC. In fact, it seems to me that no full understanding of OC is possible without a full understanding of implicit arguments.

Unfortunately, the latter is not forthcoming. Yet within a well-defined domain, one can advance specific claims as to the status of implicit arguments qua controllers. These claims can then inform conceptions of OC. An argument of this type is developed below.

3.5 Implicit partial control

If implicit arguments participate in OC, and PC is one type of OC, we may expect implicit arguments to participate in PC as well. Do they? The question has never been raised, as far as I know. Simple examples like (33), of course, are not informative.

- (33) The policeman signaled to gather behind the fence.

The implicit goal of *signal* could be a plural DP (e.g., *them*), which would exhaustively control PRO. To establish PC by an implicit argument, we need to make sure that this argument is singular.

The construction I will use involves extraposition of infinitival complements of psych predicates. As argued at length in Landau 2001, this construction exhibits OC (34a), as opposed to extraposition with non-psych complements (34b) or intraposition (34c) (the examples employ condition B effects in the infinitive to reveal the range of interpretations available to PRO).

- (34) a. Mary_i said it was upsetting/amusing to Bill_j
[PRO to show her_i/*him_j the ant collection].
b. Mary_i said it was helpful/damaging to Bill_j
[PRO to show her_i/him_j the ant collection].
c. Mary_i said that [PRO showing her_i/him_j the ant collection]
was upsetting/amusing to Bill_j.

PC is also allowed.

- (35) a. Bill realized it was embarrassing to Linda_i [PRO_{i+} to kiss in public].
b. We knew it was reassuring to the new chair_i [PRO_{i+} to gather very often].
c. I thought it was distracting to Bob_i [PRO_{i+} to work together in the same office].

These psych adjectives freely allow the experiencer argument to remain implicit. That it continues to exert OC, even when unexpressed, is shown by the following contrast.

- (36) a. Mary_i said it was upsetting/amusing [PRO to present herself_i
as a gravedigger].
b. *Mary_i said it was upsetting/amusing to Bill [PRO to present herself_i
as a gravedigger].

While the examples in (36) illustrate EC, it is possible to construct parallel PC examples. As noted, care must be taken to guarantee that the implicit controller is singular. One way of doing so is to link it to a unique singular antecedent. English provides a particularly apt construction for this purpose, namely *find it Adj to....* .

- (37) a. John found it amusing to watch the prisoners suffer.
b. Mary found it annoying to listen to that speech.
c. Bill found it embarrassing to discuss sex.

Note that the internal experiencer argument of the *-ing* adjectives here is necessarily anaphoric to the matrix subject, and furthermore, necessarily implicit.

- (38) a. John_i finds it amusing (*to him_{i/j}) to watch the prisoners suffer.
b. Mary_i found it annoying (*to her_{i/j}) to listen to that speech.
c. Bill_i found it embarrassing (*to him_{i/j}) to discuss sex.

These two properties are by no means intrinsic to psych adjectives or to this particular construction. When the adjectival predicate in the small clause is non-psychological, its internal argument is neither anaphoric nor implicit by necessity (39). Moreover, a psych adjective in a finite complement similarly fails to trigger necessary anaphoricity and implicitness on its internal argument (40).

- (39) a. Mary_i found it beneficial to her_{i/j} to listen to that speech.
 b. Bill_i found it damaging to him_{i/j} to discuss sex.
- (40) a. Mary_i found (out) it was annoying to her_{i/j} to listen to that speech.
 b. Bill_i found (out) it was embarrassing to him_{i/j} to discuss sex.

Whatever the precise explanation for the peculiar status of the anaphoric implicit experiencer argument in (37), the construction features just the right element for our purposes: An implicit controller which is necessarily singular (given a singular matrix antecedent).¹¹

With this background in mind, consider the following examples.

- (41) a. Mary found it exciting to meet on top of the Empire State Building.
 b. The chair found it frustrating to gather without a concrete agenda.
 c. Rachel found it embarrassing to kiss in public.

The *find it Psych-Adj* construction in (41a-c) guarantees that the implicit (experiencer) controller is identical to the matrix subject, which is singular. The infinitival collective predicate indicates that PRO is semantically plural. These are the defining properties of PC.

Another context where implicit PC can be isolated involves verbs of saying (cf. (31c), (32)).

- (42) I told Mary that my brother in law has recently been cold to me.
 She said to meet and talk things over.

The context in (42) makes it plain that the implicit addressee of Mary's suggestion (the goal of *said*) is me—namely, a singular DP. The PRO subject of *meet* is plausibly ‘me and my brother in law’—a semantic plurality which is partially controlled by the implicit goal. Again, we have a PC situation.

¹¹ Once again, the relevant infinitival complements display OC, not NOC, as evidenced by familiar intervention effects (e.g., *John thought that Mary found it annoying to have discussed herself/*himself*).

Examples such as (41)-(42), then, establish (43).

(43) The controller in PC can be implicit.

The last step of the argument is delivered by the conjunction of (30) and (43).

(44) Implicit argument controllers in PC are syntactically represented.

(44) is forced by the series of considerations developed in sections 3.1-3.5. Although a broader statement about the status of implicit arguments in general is not similarly forced, it would seem to be the null hypothesis. Thus, it is hard to think of any principle that would *restrict* the syntactic expression of implicit arguments to just PC contexts, preventing it in EC (as in (36a)). Uniformity considerations, then, and the absence of any counterevidence, suggest the following generalization of (44).

(45) Implicit argument controllers are syntactically represented.

The next obvious questions are: Is (45) true outside OC, as a general characterization of implicit arguments? And can implicit arguments be reduced to null pronouns? The next section addresses the former question, section 5 the latter.

4 Degrees of implicitness

Once we look outside OC, it becomes clear that “implicit arguments” are not a syntactically homogeneous class (Bhatt and Pancheva 2006). The mere fact that an argument is “understood” but not pronounced does not yet establish its representational status. Is it an unsaturated θ -role, an LF variable, a pronoun (*pro*) or something else? Choosing between these options is a delicate matter, involving data from a wide range of constructions. I will therefore have to restrict discussion to some central features of implicit arguments, which are relatively well-established, neglecting others that still await further investigation.

Within a surprisingly short period in the late 80s, most of the data on implicit arguments has been documented and classified (Williams 1985, 1987, Chomsky 1986, Rizzi 1986, Brody and Manzini 1987, Roeper 1987, Safir 1987, 1991). What emerges from this literature is that there are roughly three classes of implicit arguments that are grammatically represented. The easiest way to individuate them, prior to any claim about their grammatical status, is in terms of the processes to which they are visible.

The processes are: *predication, co-construal, control and binding*. Predication was discussed in section 2, so here I discuss the other three processes.

Co-construal is illustrated in (46) (the term and examples are taken from Safir 1991).

- (46) a. This idea merits further consideration.
b. This proposal deserves reconsideration for resubmission.
c. These reports could use our careful examination.

In these constructions, an explicit argument of the main predicate is associated with an implicit argument in its nominal complement.

Co-construal obviously involves lexical information, but cannot be strictly lexical. As Safir shows, non-coarguments may be linked, as in (46b) (cf. **This proposal deserves reconsideration for resubmitting*, where the retroactive gerund must be a coargument of the co-construed matrix argument; see Safir 1991 for details). Second, the co-construal reading is context-sensitive in ways that make a purely lexical account problematic.

- (47) a. John's proposal deserves study.
b. John's proposal requires study.
c. These matters require study.

While the implicit argument of the complement nominal must be co-construed with the matrix subject of *deserve* (47a), *require* allows it to be unspecified (47b) (e.g., John's proposal requires that something else be studied). When the subject does not imply agency (*matter* vs. *proposal*), the co-construal reading seems to be favored again (47c). The inferential character of co-construal is further brought out in pairs like (48).¹²

- (48) a. *Undine underwent surgery on Serge.
b. Undine underwent surgery on her spleen.

Safir also argues that the implicit internal argument of the nominal is not syntactically represented. The first argument to that effect uses the observation that agent-oriented secondary predicates are possible inside nominals only when the internal argument is also projected.

¹² Williams (1985) discusses *undergo* as a primary example of a verb that induces coindexation of θ -roles between its Actor and the Actor of its complement. Yet Safir (1987) shows this relation to be defeasible, citing examples like *John underwent Mary's egregious performance of the symphony*.

- (49) a. John's discussion *(of the issue) drunk did not clarify matters.
 b. Treatment *(of Mary) naked would cause a scandal.

In co-construal constructions, however, the nominal's agent cannot support a secondary predicate, suggesting that the implicit internal argument is not projected.

- (50) a. * Undine underwent John's investigation drunk.
 [Undine is drunk, not John]
 b. * This report will be susceptible to John's revision drunk.

Moreover, the implicit argument itself does not support a secondary predicate.

- (51) Oona underwent the operation after Andy's examination (*drunk).

To summarize, co-construal involves nonsyntactic implicit arguments, whose interpretation depends on the interaction of lexical and pragmatic knowledge. The present article has nothing to contribute to the study of these phenomena. We now turn to the more controversial role of implicit arguments in control and binding.

The visibility of implicit arguments to control and binding was a matter of some dispute during the 80s. Specifically, while most researchers agree that implicit arguments can control, their capacity to bind is not entirely clear. The most judicious statement of the facts, I believe, is found in Rizzi 1986, which I follow below.¹³

Discussing Italian, Rizzi observed a contrast between direct and indirect objects. Implicit direct objects must be generic (so called *pro_{arb}*), and as such can both control and bind. Implicit indirect objects may be specific (either deictic or discourse-anaphoric) and can control, but cannot bind unless they are generic.

¹³ The role of implicit arguments in control into rationale clauses has drawn much attention in the 80s (Williams 1985, Chomsky 1986, Manzini 1986, Roeper 1987, Lasnik 1988), the famous example being *The boat was sunk to collect the insurance*. Unfortunately, there is decisive evidence that the controller of rationale clauses need not be grammatically represented (either as the matrix agent or as the matrix event), invoking rather an abstract, context-dependent notion of "intentional causer" (Farkas 1988). Example (i) was picked from a web Blog describing a new student residence. Note that the PRO subject of *to find* can neither be the matrix subject nor the matrix event.

- i. The old room I would creep in at midnight and try to find an empty bed in the dark. Could have become a disaster. Now the bathrooms are down the hall so **the lights are on to find them**.
 [URL: <http://www.treah.com/?m=200604>]

For extensive discussion of the complex array of facts militating *against* the grammatical basis of control into rationale clauses, see Landau 2000:179-183. This basic property renders rationale clauses irrelevant to the important question of how argument structure is preserved/suppressed by morphological affixation (the passive *-ed*, adjectival *-able*, nominalizers, etc.).

(52) *Control*

- a. Un generale può costringere [a PRO obbedire ai suoi ordini].
a general can force to obey to.the his orders
'A general can force to obey his orders.'
- b. * Alle cinque il generale ha costretto [a PRO obbedire].
at five the general has forced to obey
'At five the general forced to obey.'
- c. Il generale ha ordinato (ai soldati) [di PRO partire].
the general has ordered (to.the soldiers) of to.leave
'The general ordered (to the soldiers) to leave.'

(53) *Binding*

- a. La buona musica riconcilia con se stessi.
the good music reconciles with oneself
'Good music reconciles with oneself.'
- b. * Il concerto di ieri ha riconciliato con se stessi.
the concert of yesterday has reconciled with onself
'Yesterday's concert has reconciled with oneself.'
- c. ?? Un buono psichiatra può restituire se stessi.¹⁴
a good psychiatrist can give.back oneself
'A good psychiatrist can give back onself.'
- d. * Lo psichiatra ha restituito se stessi/noi stessi.
the psychiatrist has given.back themselves/ourselves
'The psychiatrist gave back themselves/ourselves.'

Moreover, the generic null direct object can not only bind, but also saturate a predicate in argument or adjunct position.

- (54) a. Questa musica rende allegri.
this music renders happy.pl
'This music renders people happy'.

¹⁴ Indirect objects do not make good binders in Italian, even when overt, yet Rizzi indicates that the generic/specific contrast between (53c) and (53d) is independent of that fact.

- b. Di solito, Gianni fotografa seduti.
 in general Gianni photographs seated.pl
 In general, Gianni photographs people seated.

In section 5.4 we will see that the generic interpretation of null objects is in fact not universal. Clearly, the very availability of object pro is not universal. English has no productive procedure of licensing null direct objects, except in very restricted domains (see fn. 25).¹⁵ Implicit indirect objects, however, are more common, and as in Italian, can participate in control, though not in binding.

- (55) a. [Bill and Kevin]_i told us an incredible story.
 John said to them_i at each other's_i parties [PRO_i to take off their clothes].
 b. [Bill and Kevin]_i told us an incredible story.
 John said (*at each other's_i parties) [PRO_i to take off their clothes].

The same is true of Hebrew, where all kinds of indirect objects, including oblique ones, may function as implicit controllers.

- (56) a. Gil bikeš (me-itanu) [PRO la'azor lo].
 Gil requested (from-us) to.help him
 'Gil requested (us) to help him.'
 b. Rina civta (aleynu) [PRO lalexet habayta].
 Rina ordered (on-us) to.go home
 'Rina ordered (us) to go home.'

Rizzi's (1986) approach to this binding/control split distinguished three types of 'understood' objects.

¹⁵ This fact suggests that "Bach's generalization" ("Object control verbs do not detransitivize") is spurious (as noted in Williams 1991). Indeed, the direct object in (i) is obligatory regardless of its controller status, as seen in (ii).

- i. Mary convinced *(Bill) to become a vegetarian.
 ii. Mary convinced *(Bill) of her innocence / that he should become a vegetarian.

Rizzi's (1986) pair (iii)-(iv) suggests that control does restrict omissibility of arguments. Yet *lead* in (iii), unlike in (iv), could plausibly denote a two-place relation (analogous to *imply*), with no implicit goal.

- iii. This leads to the following conclusion.
 iv. * This leads [PRO to conclude what follows].

(57) *Types of understood objects (Rizzi 1986)*

- a. Lexically saturated θ -role
(Example: English object drop, nonproductive)
- b. Lexically unsaturated, syntactically unprojected θ -role.
(Example: English/Italian θ_{ind} , [+controller], [-binder])
- c. Lexically unsaturated, syntactically projected θ -role.
(Example: Italian direct object pro_{arb} , [+controller], [+binder])

Of present interest is case (57b), the implicit controller. Rizzi maintains that this is a ‘floating’ θ -role, unprojected in the syntax but nonetheless capable of exerting syntactic control. In fact, this view of implicit controllers is quite common, shared in one form or another by Williams 1985, 1987, Chomsky 1986, Roeper 1987, and Brody & Manzini 1987. According to Rizzi, this intermediate status is not available to direct objects, which must be syntactically projected as *pro*. The generic (*arb*) interpretation is a means of identifying (content-licensing) this empty category.¹⁶ Rizzi concluded that binding and control involve different structural requirements, although he did not attempt to explain this asymmetry.

This view of implicit controllers as unlinked θ -roles is theoretically dubious, however. A fundamental distinction in modern generative grammar is that between lexical and syntactic representations. Although theories differ widely on where exactly the borderline between the lexicon and syntax is, it is clear that the formal objects handled by these two systems are distinct. Equally clear, at least on the theories discussed here, is that θ -roles are lexical objects. How, then, can they simultaneously function as syntactic entities?¹⁷ Presumably, syntax can only access nodes in syntactic trees, or more narrowly, their labels (Chomsky 1995). Moreover, from the semantic point of view, a genuinely unsaturated θ -role cannot denote anything; it is simply an indication that the relevant predicate is still unsaturated. Sentences with unsaturated θ -roles should not be truth-evaluable.

In short, I submit that the description ‘lexically unsaturated and syntactically unprojected θ -role’ in (57b) does not pick a grammatically coherent entity. The ontology of implicit controllers needs to be rethought. The direction this effort should

¹⁶ The interpretive properties of Rizzi’s pro_{arb} follow straightforwardly if it is a variable subject to unselective binding, as shown in Authier 1989. Authier 1992 takes it to be “a pronominal variable”. These subtleties are not crucial in the present context. All that matters is that generic null direct objects are structurally represented.

¹⁷ Williams (1985) maintains that θ -roles must be syntactically visible (say, to control) since they are anyway visible for projection. The error here is in supposing that projection is equivalent to any other “syntactic” process. In fact, projection is not a syntactic process at all, but a lexicon-syntax interface procedure. Unprojected θ -roles fail to cross this “bridge” to syntax, hence cannot be accessed by syntactic processes.

take is also clear: Given (45), we must seek to characterize implicit controllers in syntactic terms. The obvious question, then, is how to distinguish them from implicit binders; for the distinction between (57b) and (57c), even if theoretically unsound, tracks a real empirical split.¹⁸

5 Weak and strong implicitness: An analysis

5.1 A syntactic definition of implicit controllers

The problem we now face is very concrete. We know that implicit controllers are ‘more’ than just unlinked θ -roles; they are syntactic entities. At the same time, they must be ‘less’ syntactic than implicit binders, which, by Rizzi’s tests, are null pronouns (pro). If not a null pronoun, what is the syntactic content of an implicit controller?

Before attempting an answer, let us look at a set of facts that on first sight appears to compound the problem but, as will be shortly argued, in fact helps see where its solution lies. So far, in discussing implicit binders, we only considered condition A of the binding theory. Rizzi’s argument that binders must be syntactically represented as pro is only justified for anaphor binders. It turns out that conditions B and C are less stringent. In fact, implicit arguments trigger condition B/C effects (qua binders) even in contexts that provide no evidence for a pro element.

- (58) a. Mary talked about him.
 [implicit goal \neq *him*]
 b. John paid the money with her.
 [implicit goal \neq *her*]

¹⁸ One type of understood argument that is not discussed here is the subject of nominalizations. Whether this argument is truly implicit or projected as PRO has been a subject of some debate. The PRO hypothesis, I believe, is strongly supported (at least for deverbal nominalizations) by three arguments.

First, as noted already in Ross 1969, the null subject of N triggers condition C effects. Given the non-local nature of these effects, and the LLR, a lexical analysis appears inadequate.

i. The PRO_{i/*j} knowledge that Fred_j will be unpopular doesn’t bother him.

Second, the null subject of N may saturate a secondary predicate (Safir 1987). Given condition (12) above, this is evidence for a syntactic PRO position.

ii. [PRO discussion of these issues stoned] rarely produces satisfactory results.

Third, a preposed object preempts binding by the null subject, indicating that the latter normally occupies the syntactic position serving as the landing site for the object (see Longobardi 2001:575-6 for the relevant paradigm in Italian).

The element PRO is of a kind with what we refer to below as a strong implicit argument (for a recent defense of the existence of PRO in nominalizations, see Sichel 2007).

- c. The promise that John would win. (Williams 1985:306)
[implicit goal of *promise* ≠ *John*]
- d. It was insulting that no one helped John.
[implicit experiencer ≠ *John*]

The type of arguments left implicit in (58) does not license secondary predicates, even when overt. Thus, we are deprived of a useful test for or against a pro analysis. Nonetheless, the fact that these implicit arguments freely allow specific, nongeneric interpretation, classifies them with Rizzi's implicit controllers in (57b), as opposed to the pro binders of (57c).

Brody and Manzini (1987) maintained that implicit arguments are not projected in the syntax, but behave ‘like pronouns’ with respect to binding.¹⁹ This characterization is theoretically suspect, for the reasons given above. A pronoun is a set of syntactic features, {D,[αperson],[βnumber],[γgender]}. It is not clear how such features could be represented in a lexical entry of a predicate, whose unassigned θ-role is meant to carry them. Furthermore, at least for condition C, the offending relations are clearly not lexical, as they span indefinitely many argument structure domains. A non-syntactic entity, such as these implicit arguments, could not participate in such relations.

Therefore, we must take implicit binders (for conditions B/C), similarly to implicit controllers, to be syntactically represented, and yet, distinct from an implicit binder of an anaphor (presumably, pro). In fact, all the evidence suggests that there are just two types of implicit syntactic arguments, and they divide the data as follows.

¹⁹ The behavior of implicit arguments qua bindees is non-uniform. Existential and generic construals resist coreference for obvious semantic reasons.

- i. They expected damaging testimony to be given. (Chomsky 1986:119)
[implicit giver ≠ *they*]
- ii. John believes that it is easy to write an article. (Brody & Manzini 1987:125)
[implicit experiencer ≠ *John*]

Brody & Manzini further claim that implicit arguments are necessarily nonspecific, but this is false. Nongeneric contexts allow a specific reading, and coreference, for an implicit argument.

- iii. John was flattered. Mary talked endlessly about his achievements.
[possible: implicit goal = *John*]
- iv. We refused to obey when Mary said to drink urine.
[possible: implicit goal = *we*]

On the other hand, it seems true that implicit arguments cannot be locally bound.

- v. To shout to leave is difficult. (Brody & Manzini 1987:124)
[≠ To shout to oneself to leave is difficult]

This follows from the fact that implicit arguments lack any formal reflexive-marking capacity.

(59) *Two types of syntactic implicit arguments*

	Visible as subject of predication	Visible as binder to Condition A	Visible as binder to Conditions B/C	Visible as controller
Implicit argument Type I	–	–	+	+
Implicit argument Type II (pro)	+	+	+	+

This dichotomy subsumes the dichotomy between weak and strong implicit arguments, introduced in the context of secondary predication (see (4)).

The proposal I make is very simple. Both types of implicit arguments consist of a (possibly partial) set of ϕ -features, a ϕ -set. SIA minimally differ from WIA in possessing a [D] feature as well, and it is precisely this feature that is required for reflexive binding.

- (60) a. Strong implicit argument =_{def} [D, ϕ -set] (=pro)
b. Weak implicit argument =_{def} [ϕ -set]

- (61) a. A binder of a reflexive must be specified for [D, ϕ -set].
b. A controller or binder for conditions B/C need not be specified for [D].

(61b) requires no special explanation, reflecting a free application of grammatical processes. What needs to be explained is the requirement in (61a), restricting the range of possible reflexive binders. Section 5.2 derives this property, and section 5.3 utilizes it to derive the distinction of interest between direct and indirect implicit arguments ((57b) vs. (57c)).

5.2 *The syntax of reflexive binding*

A basic intuition guiding many studies of the binding conditions is that there is a fundamental split between the positive, ‘licensing’ condition A, and the negative conditions B/C. Whereas the former involves, at least partially, explicit reference to formal syntactic licesning, the latter do not, applying at later stages as it were, where

semantic and pragmatic considerations are involved. Rather than surveying various implementations of this intuition, I will simply follow one influential school of thought on these matters, represented in Reinhart and Reuland 1993, Reuland and Reinhart 1995, Reinhart 2000 and especially Reuland 2001. Within this framework, syntactic encoding of binding (via some reflexive marking) is cheaper than semantic encoding (via variable binding), which is in turn cheaper than establishing coreference via discourse storage. This economy metric yields the choice of anaphors over pronouns in condition A/B contexts and pronouns over names in condition C contexts, as well as familiar ‘exceptions’ to these conditions.

In Reuland 2001, the syntactic basis of reflexive binding is made very explicit. Greatly simplifying, there are two types of anaphors, simplex (SE-anaphors) and complex (SELF-anaphors), giving rise to two syntactic licensing strategies.

(62) *SE-binding*

- a. Oscar voelde zich wegglijden. *Dutch*
 Oscar felt SE slide.away
 ‘Oscar felt himself slide away.’
- b. [TP [voelde+T_[φ] [VP Oscar t_V [SC zich wegglijden]]]].
-
- c. Oscar λx (x voelde (x wegglijden)).

The SE anaphor consists of the features [D, person, case]. It enters an Agree relation with the same head, finite T, that Agrees with the binder.²⁰ The features [D, person] are interpretable on SE, but semantically redundant, being fully recoverable from the binder. Thus, they are deleted without infringing on Full Interpretation. The two Agree relations compose to form an A-CHAIN which, for all purposes, is equivalent to a movement A-chain that leaves a copy. The semantic component interprets the binder and the anaphor as variables co-bound by the same λ -operator, as in (62c).

From the present perspective, this view of SE-binding has one important entailment: The binder must be specified for [D], or else it would not be able to check off the [D] feature of SE and form the requisite A-CHAIN. This provides a partial account for the condition in (61a).

Consider next the derivation of SELF-binding. If the specifier of the complex anaphor is a SE element (as in Dutch *zichzelf*), this case reduces, syntactically, to simple SE-binding, with the A-CHAIN now formed between SE, the specifier of the

²⁰ Reuland’s exposition is based on feature movement (FF-attraction), the precursor of Agree. This is modified here with no loss of content.

complex anaphor, and the binder. The semantics takes SELF to be some function of the bound element, such that *Oscar haat zichzelf* ‘Oscar hates himself’ is interpreted as *Oscar λx (x hates $f(x)$)*. This ‘shift’ from x to $f(x)$ that stands proxy for x underlies familiar split-self scenarios with SELF-binding. As far as the need for a [D] feature on the binder is concerned, this case is analogous to SE-binding.

If the specifier of the complex anaphor is a pronoun (as in English *himself*), no Agree relation is established. Instead, the SELF morpheme (often realized as a body part in the world’s languages) adjoins covertly to the main predicate. This morpheme denotes an identity predicate, which composes with the main predicate, effectively forcing a reflexive interpretation on the ‘pronominal’ residue.

- (63) a. Oscar hates himself.
 b. LF: Oscar self_i-hates him-t_i
 c. Oscar λx (x hates him & him = x)

Reuland does not elaborate on the conditions governing this process. One trivial condition is that the binder be a possible object for the SELF predicate to be predicated of. Notice, though, that SELF functions as a secondary predicate in (63b,c). If we take this analysis seriously, it implies that the subject of this predicate must respect the general condition on secondary predication, namely (12), repeated below.

- (64) A secondary predicate must be predicated of a DP.

But (64) simply says that a ‘subject’ of a predicate must be specified for [D]. It follows that the binder of a SELF-anaphor must be specified for [D], similarly to the binder of a SE-anaphor.

To sum up this section: Reflexive binding (Condition A) is encoded in the syntax, while interpretive constraints (Conditions B/C) are not. We have examined one particular implementation of this idea (Reuland 2001). It turns out that the relevant syntactic encoding implicates a [D] feature on the binder – whatever mechanism is involved (A-CHAIN formation or SELF-adjunction). This completes the explanation for the contrast stated in (61): Anaphoric binders must be SIAs but controllers may be WIAs in the sense of (60).

5.3 Direct vs. indirect objects

We still need to explain Rizzi’s observation that implicit indirect objects may control but not bind, unless they are generic, while implicit direct objects, which are

obligatorily generic, show no binding/control contrast (see (57b-c)). Let us factor out the interpretive aspect (generic vs. specific reading), which turns out to be language-specific. We return to this aspect in the next section. What is left is the following asymmetry in the realization of internal arguments (recall that we take SIA to be the traditional pro).

- (65) a. Direct objects may be SIA but not WIA.
 b. Indirect/oblique objects may be either SIA or WIA.

Rizzi (1986) proposed that direct θ -marking (in a head-complement relation) entails syntactic projection, but indirect θ -marking (via P, as with indirect objects) does not. Addressing the same asymmetry, Brody & Manzini (1987) proposed that the Projection Principle applies to structural cases and not to θ -roles. Thus, only arguments associated with structural case (subject and direct object) must be syntactically realized.

The latter intuition can be reconstructed in present terms as follows. Assume that the feature bundles in (60) can be realized as interpretable features on a functional head. In other words, while an overt argument is projected as a sister to its licensing head, which bears uninterpretable features, an implicit argument is simply realized as an a bundle of interpretable features on that head. Presumably, the choice between the two types of features is free, up to violations of Full Interpretation (below, uF denotes an uninterpretable feature F).

- (66) a. *Overt argument*
- ```

 graph TD
 FP --> F["F[uφ, case]"]
 FP --> DP["DP[D, φ, case]"]

```
- b. *Implicit direct object*:  $v_{[D, \phi, \text{acc}]}$
- c. *Implicit indirect object*:  $F_{[\phi]} / F_{[D, \phi]}$

The functional head associated with a direct object is light v. The functional head associated with an implicit argument is some F, an applicative head of sorts. The crucial difference between the two heads is the case feature. While light v checks structural accusative case on the direct object, F does not check the case of the indirect/oblique object; the latter receives inherent case directly from the verb. This is nothing but a modern rendition of the fundamental distinction between structural and inherent case.

The last step in the argument is this: Case is a property of DPs. Note that this assumption is morphologically well-motivated, as case inflection is primarily visible on D elements across languages (articles, pronouns, clitics). Thus, the presence of [case] implicates the presence of [D]. For this reason, a SIA (66b) must carry a [D] feature whereas a WIA (66c) may, but need not.<sup>21</sup>

#### 5.4 *The interpretation of WIA and SIA*

In this section I show how the basic interpretive properties of the two types of implicit arguments are accommodated by the present proposal. I will only address basic properties, as the full integration of implicit arguments and null objects into grammatical theory is a project beyond this article.

Recall the basic proposal: WIA=[ $\phi$ -set], SIA=[D, $\phi$ -set]. Consider first the contribution of a  $\phi$ -set.  $\phi$ -features are simply interpretive constraints on the denotation of an argument. An argument that consists of nothing but a  $\phi$ -set is minimally interpreted as a variable whose value is constrained by the values of its  $\phi$ -set. For example:

(67) [[{3rd,sg,F}]] = a female *x* which is neither the speaker nor the addressee

The value of *x* is completely context dependent. It could be deictic, anaphoric to some discourse antecedent, or it could be bound by some default sentence level operator—existential or generic. As we have seen, WIA indeed can display any of these interpretations.

Turning to SIAs, or simply null objects, the literature reveals that they fall into two major types:  $\bar{A}$ -bound variables or pronouns.<sup>22</sup> In languages like Chinese, European Portuguese and Spanish, null objects display typical properties of  $\bar{A}$ -traces: They cannot occur inside islands and are subject to Strong Crossover. Sometimes, the null operator that binds the null object is incompatible with other overt operators (A Doubly-filled Comp effect). The interpretation of the null object, mediated by the null operator, is rather free: It can pick any salient antecedent from the linguistic or the deictic context (see Huang 1984, Raposo 1986, Campos 1986).

Null pronominal objects break into two types. In languages like Italian, object *pro* must be [+human, +generic] (see Rizzi 1986). In languages like Chamorro,

<sup>21</sup> Notice that (66b) makes *pro* superfluous, its features being “absorbed” by *v* (see Alexiadou and Anagnostopoulou 1998 for a similar proposal for subject *pro*). The alternative is to split *v* and *pro* into two separate nodes, parallel to (66a). As far as I can tell, there are no empirical differences between the two options, although the link between [case] and [D] is easier to state under the former.

<sup>22</sup> I disregard here languages that license an object *pro* via agreement or cliticization.

Imbabura Quechua, Korean, Thai and Brazilian Portuguese, the interpretation of object pro is not so restricted, being context dependent (see Chung 1984, Cole 1987, Farrell 1990). In French, apparently, the two types of object pro coexist, each surfacing in different contexts (Cummins and Roberge 2005).<sup>23</sup>

Although it is often assumed that  $\bar{A}$ -bound and pronominal null objects are fundamentally different, this need not be the case. An object pro that remains in-situ will be interpreted as a pronoun, provided the language has grammaticalized the necessary identification strategies (inherent features or contextual linking). An object pro that is  $\bar{A}$ -moved will turn into a null operator that binds a variable.

Indeed, some languages appear to harbor both types of null objects. KiNande manifests both  $\bar{A}$ -bound null objects (Authier 1988) and the Italian type pro<sub>arb</sub> (Authier 1992), though in different environments. Cole (1987) argues that Korean and Thai possess not only referential pro objects but also the Chinese type  $\bar{A}$ -bound null objects, although his evidence for the latter is rather indirect. Null objects in Hebrew have been classified as variables (Doron 1999, Goldberg 2002), yet matters are not so clear. In nongeneric contexts with a salient antecedent, the null object does display island sensitivity, as expected on the variable analysis. Note that the null object (of *photograph*) is embedded in a complement clause in (68a) and in a relative clause in (68b).

(68) On the sea shore, pointing upwards to a magnificent seagull, I turn to my friend and say:

- a.    ani mekave še-cilamta.  
       I   hope    that-you.photographed  
       'I hope you managed (=were quick enough) to photograph'.
- b.    \* tamid   tizkor                    et    ha-yom še-cilamta.  
       always you.will.remember ACC the-time that-you.photographed  
       'You will always remember the day you photographed'.

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<sup>23</sup> Even English has “semi-productive” null object in restricted domains. One is the “recipe context”; as ??? observe, the null object can bind an anaphor, indicating its presence in the syntax.

- i.     Take a crepe. Cover one half with the jam. Fold *ec<sub>i</sub>* onto itself<sub>i</sub> and sprinkle *ec<sub>i</sub>* with sugar.

Another context is football broadcasting (P. Postal, p.c., recalling observations by J. Ross). Note that the null object is uniformly understood as *the ball*.

- ii.    Frank carried/threw/passed to the halfback.

In generic contexts without an available antecedent, however, the Italian type  $pro_{arb}$  emerges. The obligatory [+human] reading of this null object can be seen in the Hebrew examples below. While the verbs in (69a) and (69b) in principle permit a [-human] overt object (*paintings* and *opportunities*, respectively), a null object must be uniformly understood as nonspecific *people*. Note that the island environment rules out the variable analysis.

- (69) a. ha-uvda še-be-teksas tolim \_\_\_\_ be-xadarim bli xalonot matrifa oti.  
the-fact that-in-Texas hang.3pl in-rooms without windows makes-crazy me  
‘The fact that in Texas, they hang people/\*paintings in rooms without windows, drives me crazy’.
- b. ha-uvda še-Kobi tamid mexapes eyx lenacel \_\_\_\_ matrifa oti.  
the fact that-Kobi always seeks how to-exploit drives-crazy me  
‘The fact that Kobi is always looking for a way how to exploit people/\*opportunities drives me crazy’.

As in Italian, once these null objects are put in an episodic context, they are ruled out.

- (70) a. \*etmol be-teksas talu be-xeder bli xalonot.  
yesterday in-Texas hanged.3pl in-rooms without windows  
‘Yesterday in Texas, they hanged people in a room without windows’.
- b. \*Kobi lo hicliax lenacel.  
Kobi not managed to-exploit  
‘Kobi didn’t manage to exploit’.

Thus, it seems that a full typology of “understood objects” must draw, at a minimum, the following distinctions: Weak vs. strong implicit arguments ([ $\phi$ -set] vs. [D,  $\phi$ -set]); within the latter class,  $\bar{A}$ -bound variables vs. pronouns; and within the latter class, [+human,+generic] interpretation vs. free variable interpretation. Languages often opt for one of these options, but sometimes several options may coexist in the same language.

## 6 Conclusion

Implicit arguments lie at the interface of the lexicon and syntax and as such, attracted much attention from both angles. As their grammatical and interpretive properties

gradually came into light during the past two decades, an outstanding puzzle emerged. On the one hand, implicit arguments seem to be visible to the syntax, insofar as they participate in control and are counted by conditions B and C of the binding theory. On the other hand, they seem to not be fully visible to the syntax, insofar as they cannot bind anaphors and saturate predicates. Between the purely inferential status of co-construed arguments and the purely syntactic status of *pro*, the intermediate status of implicit arguments resisted any deep theoretical insight. The present paper is an attempt to solve the puzzle.

Our central argument has demonstrated that given widely accepted restrictions on the scope of lexical relations, implicit arguments can be shown to be syntactic entities. The argument exploited a novel observation, namely, that implicit arguments can exercise partial control. Since partial control cannot be reduced to predication, which is a necessary ingredient in any lexical account of OC, it must be a syntactic relation; but then implicit arguments, which are among its possible relata, must be syntactic too.

This conclusion raised the challenge of explaining the differential visibility of implicit arguments and *pro* (WIA and SIA) to syntactic processes. I proposed a minimal difference: WIAs are bare  $\phi$ -sets, specified on functional heads; SIAs contain both a  $\phi$ -set and a D feature. The latter is crucial in making an argument a licit saturator of a predicate and a licit binder of an anaphor (assuming that anaphoric binding involves either checking of a D feature or secondary predication by SELF).

This study has natural implications for the theories of predication, binding and control. One obvious implication is that OC can be reduced neither to predication nor to binding, despite the many ingenious efforts to that effect. The common occurrence of implicit arguments as controllers, across a wide range of languages, sharply contrasts with their systematic absence from predicative and anaphoric relations. Any account that ignores this asymmetry will not go to the heart of OC; any account that dismisses implicit arguments will be fatally incomplete.

Some persistent questions remain open. Why is it that some implicit arguments are syntactically represented (like WIA) but others are not (like the co-construed arguments of section 4)? Are WIAs a homogenous category or are there important differences in their syntactic constitution (e.g., implicit agent of passive vs. implicit goal argument)? Why do languages vary in the way they do in the kinds of null objects they license—sometimes to a striking degree (e.g., European Portuguese patterns with Chinese and not with Brazilian Portuguese)? As usual, the more we learn, the more we recognize our ignorance in such matters.



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