

Implicit Arguments

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1 Overview

Reference to non-overt arguments has been made in the description of a wide range of syntactic phenomena. Some of them (PRO, *pro*, A/A'-traces) are relatively well-understood and there exists a certain consensus regarding their analysis. There is another class of non-overt arguments, often referred to as implicit arguments, for which no such consensus prevails. Implicit arguments do not seem to form a unified class. To appreciate this let us examine some cases which have been argued to involve implicit arguments.

- (1) Implicit agents of passives (vs. middles and unaccusatives)
 - a. This ship was sunk [PRO to collect the insurance]. (Passive)
 - b. # This ship sank [PRO to collect the insurance]. (Unaccusative)
 - c. *This ship sinks easily [PRO to collect the insurance]. (Middle)
- (2) Benefactive arguments of adjectives (from Roeper (1987))
 - a. It is necessary/*inevitable [PRO to go].
 - b. It is wise/*probable [PRO to go].
- (3) The bearer of the obligation of a deontic modal
 - a. The books can be sold [without PRO reading them]. (from Chomsky (1982) via Williams (1985))
 - b. *The books might have been sold [without PRO reading them]. (from Kratzer (1991))
- (4) Implicit agents of nouns
 - a. the negotiations [PRO to achieve a peaceful settlement]
 - b. the taking of drugs [PRO to become happy]
 - c. the playing of the game [PRO to prove a point]
- (5) Implicit agents of agentive suffixes (e.g. *-able*)

Goods are exportable [PRO to improve the economy].
- (6) Null objects (cf. Rizzi (1986))
 - a. Questo conduce (la gente) alla seguente conclusione
this leads the people to-the following conclusion
'This leads (people) to the following conclusion.'

- b. Questo conduce (la gente) a [PRO concludere quanto segue].
 this leads the people to conclude what follows
 ‘This leads people to conclude what follows.’

The above list includes the implicit agent of a passive (§2), the benefactive argument of an adjective (§5), the bearer of the obligation argument of a deontic modal (§6), the implicit agent of a noun (§3), the implicit agent associated with agentive suffixes like *-able*, and null objects (§4).¹ What unifies this class? It is felt that all of these examples involve a missing nominal element. The evidence for this missing nominal element comes from the fact that (1-6) all involve an infinitival with a PRO subject. Something, it is argued, must be controlling these PROs. There is no NP argument in the relevant structures that could be doing so. The element held responsible for control is the implicit argument.

In principle, null subjects (PRO, *pro*) could have been called implicit arguments, given that they are non-overt and indisputably arguments. Furthermore there have been analyses in the literature according to which PRO/*pro* are not syntactically expressed (for PRO see Partee and Bach (1980), Chierchia (1984), Klein and Sag (1985) a.o, and for *pro* see Alexiadou and Anagnostopoulou (1998) a.o.). However, by convention, PRO/*pro* are not grouped together with the cases of implicit arguments in (1-6). This is why in this survey we do not discuss PRO/*pro*.

From its inception, the literature on implicit arguments has defined them as syntactically active elements that nevertheless do not occupy a syntactically projected position. Consider for example, the following definitions for implicit arguments that have been proposed in the literature.

- (7) Implicit arguments are not the mysterious shadowy presences they are sometimes made out to be. They are really nothing more than the argument slots in the argument structure,..... A ‘weak’ θ -criterion is all that is needed to give implicit arguments, since these are nothing more than unlinked argument roles. (pg. 314 from Williams (1985))
- (8) An implicit argument is a conceptual argument that is neither expressed syntactically nor bound to an argument that is expressed syntactically. (pg. 409 from Jackendoff (1987))

However, not all researchers have followed this understanding of implicit arguments. Some have proposed that what they call implicit arguments are realized as *pro* (cf. Epstein (1984), Rizzi (1986), Borer (1998)) and PRO (cf. Roeper (1987)).

¹Larson (1988) uses the term ‘implicit argument’ more generally to cover in addition to the cases discussed in the main text, optional but non-iterable phrases such as phrases of source, path, goal and phrases of instrumentality.

- i. a. John ran (*Source* from the house) (*Goal* to the store) (*Path* along the river).
 b. John cut the salami (*Instrument* with a knife).

But even if it is assumed that all of the non-overt arguments in (1-6) are syntactically realized syntactically as *pro*/PRO, given that (1-6) are not the canonical environments for *pro*/PRO, it is justified to include them in a discussion of implicit arguments. By general assumption then, the term implicit arguments is reserved for those covert elements about whose syntactic representation we still have doubts.

In (1-6), we have a list of environments which have been claimed to involve implicit arguments. That these different environments have been argued to involve implicit arguments should not, by itself, be taken to indicate that they should receive a uniform analysis. It has been questioned whether some of the members of the list in (1-6) are truly implicit. For example, Baker et al. (1989) argue the passive suffix *-ed* is the agent of the passive i.e. it is not implicit. Even if an argument is implicit, the question of how it is to be represented stays open. The implicit argument may be represented at a level of thematic structure, or as a null PRO/*pro* subject or object. For example, Roeper (1987) argues that the subjects of nouns are realized by PRO. Similarly Epstein (1984), Rizzi (1986), and Borer (1998) argue that the implicit argument of evaluative predicates, null objects in Italian, and implicit external argument of the passive, respectively, are realized by *pro*. In what follows, the cases in (1-6) and the analyses proposed for them will be discussed one by one. Throughout we will focus on the diagnostics that have been proposed for detecting the presence of an implicit argument. We will examine what exactly these diagnostics test.

2 Implicit Arguments in Passives and Middles

2.1 Implicit Arguments in Passives

A classic case where an implicit argument has been argued to be present is that of an ‘agentless’ passive. Passives have been contrasted with unaccusatives, which in contrast to passives have been argued to not involve an implicit agent.

- (9) (from Roeper (1987))
- a. The ship was sunk.
 - b. The ship sank.

Intuitively, it seems clear that the passive in (9a) has implied agency as part of its meaning while the unaccusative in (9b) does not. In case the ship sprang a leak on its own and sank, (9b) would be true but not (9a). For (9a) to be true, there must have been someone who was responsible for sinking the ship.

If by implicit argument we mean a non-overt element that is nevertheless part of the interpretation of a predicate, then the facts about the interpretation of (9a) are enough to show that passives involve an implicit agent and unaccusatives do not. However, the literature on implicit arguments aims to go beyond just showing that a particular non-overt argument is part of the semantic representation. It attempts to show that implicit arguments take part in syntactic processes and that therefore implicit arguments are syntactically real. Once

it is granted that implicit arguments are syntactically real, additional questions arise that pertain to the representation of these arguments.

The primary tests used to demonstrate the syntactic reality of the implicit agent of a passive are licensing of *by*-phrases, the ability to control, and compatibility with adverbs like *deliberately*. The argument from *by*-phrase licensing goes as follows. Passives allow for an overt *by*-phrase while unaccusative verbs do not (cf. 10). The implicit agent in the passive is taken to be responsible for this licensing.

- (10) (from Roeper (1987))
- a. The ship was sunk by Bill.
 - b. *The ship sank by Bill.

Next we turn to the argument from control. The implicit agent of a passive can control the PRO subject of a rationale clause. Unaccusatives do not have an implicit agent argument and so control is not possible.

- (11) (from Manzini (1983))
- a. *The boat sank to collect the insurance.
 - b. The boat was sunk to collect the insurance.

If we take it as given that only syntactically active elements can control PRO then it follows that the implicit agent of the passive must be syntactically real.

A related point is made by the fact that adverbs like *deliberately* can appear in a passive sentence and be associated not with the syntactic subject but with the implicit agent. In contrast, in (12b) there is no implicit argument and *deliberately* can only be associated with the lone argument of *sink*, *the boat*. Consequently (12b) is perceived as pragmatically deviant.

- (12) a. The boat was sunk deliberately.
b. # The boat sank deliberately.

If we assume that adverbs like *deliberately* can only be associated with syntactically real elements, it follows that the implicit agent of the passive is syntactically real.

The argument for the syntactic reality of implicit argument therefore rests upon our acceptance of the assumptions behind the argument from *by*-phrase licensing, the ability to control, and compatibility with adverbs like *deliberately*. We already know that passives have implicit agents as part of their semantics. It is not clear that postulating that this implicit agent is represented syntactically is necessary for explaining the possibility of *by*-phrases. It may be the case that syntactically unexpressed agentivity is all that is needed for licensing a *by*-phrase.

Next we turn to the argument from the acceptability of *deliberately*. Again it is not clear that anything more than the presence of an implicit agent in the semantic representation is needed. We are left with the argument from control. The implicit argument is able to control the PRO subject of a rationale clause.

So the question is whether the ability to control requires the controller to be syntactically realized.

Williams (1985) provides several arguments in support of the claim that controllers need not be syntactically realized. The first argument is based on the observation that the implicit agent of a noun like *attempt* controls the PRO subject of the complement clause in both (13a) and (13b).

- (13) a. Attempts [PRO to leave]
b. Yesterday's attempts [PRO to leave]

If it is assumed that the implicit agent of *attempt* in (13a) is a PRO that occupies the position occupied by *yesterday* in (13b), we expect the PRO to be absent in (13b). However, the implicit agent of *attempt* controls the PRO subject of the infinitival clause in both (13a) and (13b). Williams (1985) takes this to suggest that the implicit agent in (13b) is able to control the subject of the infinitival clause without being syntactically realized. Williams' argument depends upon the assumption that the PRO that realizes the implicit agent would appear in the position occupied by *yesterday* (presumably [Spec,DP]) and not [Spec,NP]. If the implicit agent can be generated in [Spec,NP], both (13a) and (13b) can have PRO implicit agents in [Spec,NP] and the parallelism between (13a) and (13b) with respect to control follows. In other words, the argument against realizing the implicit agent as a PRO subject vanishes.

Williams (1985) argues that control of rationale clauses does not require the controller to be syntactically realized. In fact, the examples that he provides demonstrate that even the presence of an implicit argument is not necessary.

- (14) Grass is green [to promote photosynthesis]. (from Williams (1974) via Williams (1985))

In (14), *grass* is not a sensible controller. *Green* does not have any implicit argument either. Instead what promotes photosynthesis is the circumstance of grass being green and this circumstance is under the control of some purposeful agent such as evolution or God. Williams (1985) also points out that in the right context the ungrammatical *the boat sank in order to impress the king* becomes acceptable. Consider a situation where a playwright is rationalizing the design of his play and utters:

- (15) The boat sank in order to impress the queen and move her to murder her husband by the end of act iii. (from Williams (1985))

Since Williams' examples show that the PRO subjects of rationale clauses can be controlled even in the absence of any implicit argument, the proposal that all controllers must be syntactically realized is weakened.

2.2 Implicit Agents in Middles

The contrast between passives and ergatives carries over to middles. Middles are incompatible with overt *by*-phrases.

- (16) (ex. 75, pg. 406 from Keyser and Roeper (1984))
- a. Bureaucrats were bribed by managers.
 - b. *Bureaucrats bribe easily by managers.

They either lack an implicit agent argument, or the implicit argument of a middle is unable to control the understood subject of a rationale clause or a subject-oriented adverb.

- (17) (from Baker et al. (1989))
- a. This bureaucrat was bribed [PRO to avoid the draft].
 - b. *This bureaucrat bribes easily [PRO to avoid the draft].
- (18) (from Baker et al. (1989))
- a. This bureaucrat was bribed deliberately.
 - b. *This bureaucrat bribes deliberately.

Despite these tests, the English middle construction has been assumed to involve an implicit agent. For example, Fiengo (1980), Condoravdi (1989), Fagan (1992), Zribi-Hertz (1993), and Ackema and Schoorlemmer (1995) argue that the implicit agent of the middle is present at a (lexical)-semantic level, while Stroik (1992) and Hoekstra and Roberts (1993) propose that the agent of the middle is syntactically realized. Of course any theory which proposes that an agent is present in middles needs to provide an account of why middles fail the tests for agentivity shown in (16-18), all of the implicit agent of the passive passes.

There are several reasons that have been advanced for assuming that middles involve an implicit agent. The first is the contrast in meaning that is perceived between (19a, b).

- (19) a. The clothes hang easily. (from Keyser and Roeper (1984))
- b. The clothes are hanging on the line. (from Marantz (1981))

Keyser and Roeper (1984) observe that (19a) implies that it is easy for someone to hang clothes, whereas there is absolutely no implied agent in the ergative/unaccusative (19b). This is why the addition of *easily* to (19b) is infelicitous. The second reason for postulating an implicit agent in the middle is that even though middles do not license *by*-phrases, they can contain a *for*-PP whose argument seems to be identical to the agent of the middle verb.

- (20) a. French books read easily for educated people.
- b. Latin texts do not translate easily for Bill.

The licensing of agentive *for*-PP's has been used to argue for the syntactic presence of an agent in the middle. For Stroik (1992), the *for*-phrase is an overt realization of the agent argument realized as PRO that for him is always syntactically present in the middle.

The third argument for agentivity comes from the incompatibility of middles with a phrase like *all by itself*.

- (21) a. *This kind of bread cuts easily all by itself.
 b. *This wood carves easily all by itself.
 c. *This ice crushes easily all by itself.

The ungrammaticality of (21a-c) has been used by Keyser and Roeper (1984) and Fagan (1992) as an argument in favor of the middle's agentivity.

However, Rapoport (1999) points out that there is a serious problem with the above tests for agentivity: they do not hold for all middles. As Ackema and Schoorlemmer (1995) noted, not all middles allow for *for*-phrases.

- (22) a. These books don't sell (*for the average shopkeeper).
 b. (On shoe chest:) Stows on floor or shelf (*for tidy people).

Rapoport (1999) further points out that many middles are in fact compatible with *all by itself*.

- (23) a. This kind of glass breaks easily all by itself.
 b. Milk chocolate melts smoothly all by itself.
 c. These heavy windows open easily all by themselves.
 d. These comic books sell (easily) all by themselves.

Rapoport (1999) therefore concludes that middles do not have an implicit agent. The fact that the implicit agent of the middle is syntactically inactive (cf. 16-18) receives a very natural explanation under Rapoport (1999)'s proposal – there simply isn't an implicit agent in the English middle. The English middle is not inherently agentive.

As for the licensing of *for*-phrases in (20) and the unacceptability of *all by itself* with certain middles in (21) is related by Rapoport (1999) to the Instrumental/Manner (I/M) component in the meanings of certain verbs. Inherent in the meaning of *cut*, *carve*, and *crush*, the verbs in (21), is the means or manner involved in the action described by the verb (the I/M component). Rapoport argues that the I/M component brings along with it an implication of a proto-agent and this implication is responsible for the agentivity effects discussed above. Not all verbs have an I/M component as part of their meaning and with such verbs there is no agentivity effect (cf. 22, 23). To sum up, we do not need to postulate an implicit agent in middles across the board. Some middles don't have any agentivity effects and the agentivity effects in the one that do can be accounted for without postulating an implicit argument.²

²There is a rich literature on middle and passive constructions involving *si* in the Romance languages. The discussion in Cinque (1988) seems to suggest that *si* constructions in Italian, which can be both middles and passives, allow control when the *si* construction can be passive but not when it can only be a middle. See Cinque (1988), Vinet (1988) and Dobrovie-Sorin (1994) for details.

3 Implicit Arguments of Nouns

One argument for the syntactic visibility of implicit arguments of nouns comes from the fact that they participate in binding theory.

- (24) a. Condition A:
Respect for oneself is important. (from Williams (1985))
- b. Condition B:
Admiration of him (*admirer* ≠ *admiree*) (from Williams (1985))
- c. Condition C:
The realization that John was unpopular (*realizer* ≠ *John*) (from Ross (1969b) via Williams (1987)).

A natural way to account for the syntactic visibility of implicit arguments involves projecting them syntactically as PRO subjects. If we do that, the binding effects in (24) follow directly. In addition to participating in binding, implicit arguments are also able to control and be controlled/bound themselves (cf. 25a, b respectively).

- (25) a. The attempt [PRO to leave]
(*attempter* control the PRO)
- b. John made an attempt [PRO to leave].
(*John* is the attempter.)

Williams (1985) and Williams (1987) note that the binding and control judgements stay unchanged even if the noun in question has an overt NP in its specifier position.

- (26) a. Yesterday's attempt [PRO to leave]
(*attempter* = *leaver*)
- b. Yesterday's decision [that John was the best candidate]
(*decider* ≠ *John*)

Williams assumes that a PRO agent would occupy the position occupied by *yesterday's*. Thus a PRO should be blocked in (26a, b). Since the binding and control judgements stay unchanged, Williams argues that binding and control do not require a syntactically projected NP. He proposes that non-syntactically projected implicit arguments are also visible to binding and control. Non-syntactically projected implicit arguments are made visible to syntax by statements like the following.

- (27) For *attempt*, and similar nouns, the Agent controls (or is associated with) the subject of the embedded clause. (ex. 14 on pg. 302 of Williams (1985))
- (28) An implicit argument c-commands X if the verb (or noun) of which it is an implicit argument c-commands X.
If an implicit argument is coindexed with X and c-commands X, then it binds X. (ex. 17 on pg. 303 of Williams (1985))

The result of these statements is that the binding and control effects discussed above follow naturally.

With his system, Williams (1985) is able to derive the fact that Condition C effects surface with respect to all the implicit arguments of triadic predicates.

- (29) a. *The promise that John would win was made to him yesterday.
b. *The promise that John would win was made by him yesterday.

Since Williams (1985) is arguing against a PRO subject of NP, he takes the facts in (29) to correctly show that just syntactically representing the Agent is inadequate. This is so because in (29a) the Condition C effect is triggered by the goal implicit argument and not by the agent implicit argument. Then Williams goes on to conclude that the implicit agent should not be syntactically represented at all. This latter move is not forced by the facts. The facts are equally compatible with the syntactic projection of the implicit arguments of *promise* as null pronouns. Both the subject and direct object of *promise* would c-command into the complement of *promise* and yield the observed Condition C effects.

Moreover, Williams' conclusion that implicit arguments are not syntactically projected is based on the assumption that an agent projected as PRO would necessarily be occupying the location occupied by *yesterday's*, which is presumably [Spec,DP]. If we assume, as is plausible, that the agent projected as PRO could occupy the [Spec,NP] position (assuming that PRO needs no case), then the facts in (26) do not come as a surprise and Williams' argument against the syntactic projection of implicit arguments is defused. To be sure, the facts are compatible with Williams' proposal. They are also, however, compatible with the syntactic projection of implicit arguments as null pronouns.

3.1 Optionality of the Implicit Arguments of Nouns

The treatment of anaphors within NPs in Chomsky (1986) assumes that NPs have implicit agents that are projected as subjects which are visible for the binding theory.

- (30) (from Chomsky (1986), pg. 166)
a. They_i told [_{NP} stories about each other_i].
b. *They_i told [_{NP} my stories about each other_i].
c. *They_i told [_{NP} stories about them_i].
d. They_i told [_{NP} my stories about them_i].
- (31) (from Chomsky (1986), pg. 166)
a. They_i heard [_{NP} stories about each other_i].
b. *They_i heard [_{NP} my stories about each other_i].
c. They_i heard [_{NP} stories about them_i].
d. They_i heard [_{NP} my stories about them_i].

Chomsky (1986) argues that the object of *tell* and *hear* in (30, 31a, c) has an implicit subject on a parallel with the overt subject in (30, 31b, d). Since there is an overt subject in the object of *tell* and *hear* in (30, 31b, d), the object constitutes the binding domain of the anaphor/pronoun. (30, 31b) are ruled out because the anaphors are not bound in their binding domain and (30, 31a) are acceptable because the pronouns are free in their binding domain.

(30, 31a) by themselves are compatible with there being an implicit subject in the *story* NP bound by the matrix subject and the anaphor bound by this implicit subject, or with there being no implicit subject and the binding domain of the anaphor being large enough to include the matrix subject, which is its binder. The relevant evidence in favor of postulating an implicit subject comes from the contrast between (30c) and (31c).

The verbs *tell* and *hear* differ in how they combine semantically with their object *story*. Consider the contrast in interpretation between (32a) and (32b).

- (32) a. John told [stories about Mary].
 b. John heard [stories about Mary].

In (32a), the subject of *tell* has to be interpreted as the ‘agent’/narrator of the story. It is claimed that there is no such requirement in (32b). The process by which the implicit arguments of a noun receive their interpretation will be discussed in the next section (§3.2). For now, we can represent the difference between *tell* and *hear* by stipulating that the ‘agent’/narrator argument of the complement of *tell* must be the same as the agent of *tell*. *hear* does not bring in such a requirement. This is shown in (33).

- (33) a. John_i told [IMP_{i/*j} stories about Mary].
 b. John_i heard [IMP_{i/j} stories about Mary].

The contrast between (30c) and (31c), repeated below in (34), now follows.

- (34) a. They_i told [IMP_{*i/*j} stories about them_i].
 (IMP_i is ruled out by Condition B; IMP_j is ruled out by *tell*.)
 b. They_i heard [IMP_{j/*i} stories about them_i].
 (IMP_i is ruled out by Condition B; IMP_j is allowed by *hear*.)

The presence of the implicit argument as the subject in (34a, b) makes the object NP become the binding domain for *them*. Since in (34a), the implicit argument is obligatorily coreferent with the matrix subject, we have a violation of Condition B in (34a). Since *hear* in (34b) does not require obligatory coreference, (34b) has a representation where the ‘agent’/narrator of the story is different from the subject of *hear*. This representation does not trigger a violation of Condition B. Condition B is still relevant for (34b) – it blocks the interpretation of (34b), where the hearers are the narrators.³

Let us now re-examine the analysis of anaphors inside the NP complements of anaphors in (30, 31a), repeated here as (35a, b).

³It is likely that the hearers as narrators reading is ruled out by the pragmatics of the verb *hear*. It is hard to construe *John heard a story about Mary* as John hearing a story about Mary, where John is the narrator of the story. Presumably whatever makes it hard to construe the hearer as the narrator

- (35) a. They_i told [IMP_{i/*j} stories about each other_i].
 b. They_i heard [IMP_{i/*j} stories about each other_i].

The analysis makes the right predictions concerning the grammaticality of (35a, b). However, it seems to make the wrong prediction concerning the interpretation of (35b). As Williams (1985) notes, the representation in (35b) suggests that *each other* can be bound by *they* only if *they* also bound the ‘agent’/narrator argument of *story*. This seems wrong since it seems possible for *they* to bind *each other* even when someone other than *they* are narrating the stories.

For this reason, Chomsky (1986) concludes that the presence of implicit arguments as subjects is optional. The optionality of implicit arguments needs to be further constrained. The presence of implicit arguments as subjects cannot be optional everywhere. If we assume full optionality, we lose our explanations for cases like the following.

- (36) a. *They_i told [IMP_i stories about them_i]. (Condition B)
 b. *The IMP_i realization [that John_i was sick] upset him_i. (Condition C)

A possible line of attack is to assume that implicit arguments are obligatorily present in nominal complements when the semantics of the embedding verb requires them (as in 36a, discussed in §3.2) and in nominalizations (as in 36b). In other circumstances, as is the case with *hear*, we could either assume optionality or even complete absence of the implicit agent of the noun.

3.2 Control of Implicit Arguments of Nouns

We have seen evidence that implicit arguments participate in binding and control. This evidence shows that the implicit agent of a passive and of certain noun phrases can control PRO subjects. We also saw that the implicit arguments of nouns were subject to the binding theory. Next we see that not only can implicit arguments of nouns bind/control, they can also be bound/controlled. We also see that the implicit agent of a passive differs from the implicit arguments of nouns in that it cannot be bound/controlled.

Williams (1985) discusses a set of facts which show that the binding/control of implicit arguments differs considerably from the control of PRO subjects of infinitival clauses. We know that depending upon the verb, we can have either subject or object control.

- (37) a. Gillian persuaded Stuart_i [PRO_i to leave].
 (*persuade* is an object control verb.)
 b. Gillian_i promised Stuart [PRO_i to leave].
 (*promise* is a subject control verb.)

here can be used to block this reading in (34b). Then we can dispense with the implicit argument in (34b) or equivalently assume it to be fully optional. This point is relevant for the discussion of optionality at the end of this section.

The choice depending upon the verb is of which argument of the verb will control the PRO subject of the infinitival clause. There is no choice regarding what is controlled, which is always the PRO subject. Control of implicit arguments of nouns displays a markedly different pattern.

- (38) a. John made an attempt to leave.
(*John* is agent of *attempt*.)
b. John took a picture of Mary.
(*John* is maker of *picture*.)
c. John performed an operation on Harry.
(*John* is agent of *operation*.)
d. Mary underwent an operation.
(*Mary* is theme, and not agent of *operation*.)

While in (38a-c), the matrix subject controls/binds the implicit agent of *attempt/picture/operation* respectively, in (38d), the matrix subject controls/binds the implicit theme of *operation*. The difference clearly lies in the meaning of *undergo* vs. *make/take/perform*.⁴

As discussed above, this kind of choice concerning what is controlled is not found in cases where it is the subject of an infinitival clause that is being controlled.

Control of implicit arguments of nouns also allows for so-called double control as in (39).

- (39) Mary gave John a kick.
Mary is the agent, and *John* the patient of *kick*.

The existence of a choice concerning what is controlled (cf. 38) and the possibility of double control (cf. 39) has been argued by Williams (1985) to show that implicit arguments should not be realized as PRO subjects. We think that these facts are actually agnostic about the issue of syntactic projection.

To see this let us examine how Williams derives the contrast between (38c) and (38d).

- (40) a. John performed an operation on Harry.
Agent of *perform* must be the same as the agent of its theme.
b. Mary underwent an operation.
Agent of *undergo* must be the same as the patient of its theme.

Williams proposes that verbs can specify associations between its arguments and their argument structures. Thus *perform* takes two arguments, an agent and an event, and requires that its agent be the agent of the event which is its complement. *Undergo* also takes an agent and an event, but it identifies its

⁴Note that all these examples are plausibly analyzed as involving 'light' verbs e.g. *take*, *perform*, *undergo*, *give*. Arguably the noun phrase complement of a light verb contributes to the argument structure in a way that is different from what its contribution would be if it were an ordinary argument DP.

agent with the patient of its complement event. Clearly every theory needs to specify such associations.

Now let us also assume that all the implicit arguments of *operation* are syntactically projected as null pronouns. For *operation* to successfully appear with *perform* and *undergo*, its agent and theme arguments will have to be identified with the agent of *perform* and *undergo* respectively. We do not take Williams' arguments as having demonstrated that the implicit arguments are not syntactically projected. The question of whether these implicit arguments are syntactically projected stays unresolved. Note also that the possibility of double control as in *Mary gave John a kick* is not problematic once we recognize that the process by which the implicit arguments of *kick* are associated with the arguments of *give* is not a syntactic process along the line of PRO-control.

3.3 Differences between Implicit Arguments of Nouns and Passives

3.3.1 Controlling Implicit Arguments of Passives

Unlike the implicit arguments of nouns which can be bound/controlled by c-commanding NP's, the implicit agent of a passive seems to be resistant to being bound by a c-commanding NP. Baker et al. (1989) note that the implicit argument of a passive cannot be interpreted as coreferential with the syntactic subject of the passive. Thus (41) is not equivalent to (42) under any interpretation.

- (41) a. They were killed.
b. They were admired.
- (42) a. They committed suicide.
b. They admired themselves.

This point is further demonstrated by (43) where the *by*-phrase is bound by the syntactic subject of the passive. Since the *by*-phrase is co-indexed with the implicit argument of the passive, this forces the implicit argument of the passive to be coindexed with the syntactic subject of the passive. This in turn is responsible for the ungrammaticality of (43).

- (43) * They_i were killed by themselves_i.

For Baker et al. (1989), the implicit agent of the passive is overtly realized by *-ed*. Therefore if the syntactic subject of the passive were to be co-indexed with the agent, we would have the following configuration.

- (44) They_i ... -ed_i ... t_i
where *they* c-commands *-ed* and *-ed* c-commands the t_i.

Baker et al. (1989) argues that the configuration in (44) is to be ruled out. It seems though that the facts are more general. The implicit agent of the passive cannot be taken as referring to any c-commanding NP. This point is made by (45), where we find a disjoint reference effect even though there is no crossover.

(45) John wants Mary to be seen. (from Williams (1987))

As Williams (1987) notes, the implicit agent of the passive is disjoint from *John*, or at the very least is vague in the same way that *John wants Mary to be seen by somebody* is. Neither sentence can mean *John wants to see Mary*. Williams (1987)'s suggestion is that the implicit agent of the passive is existentially quantified over. Consequently it cannot be bound by a c-commanding NP and acts like an R-expression for the purposes of binding theory.

Williams (1987)'s intuition that passive implicit arguments differ from other implicit arguments in that passive implicit arguments is developed and made explicit in independent work by Lasnik (1997). Lasnik (1997) notes that implicit arguments come in at least two distinct types, existentially quantified (as in 46a) and deictic (as in 46b, c).

- (46) a. John was killed.
($\approx \exists x \text{ kill}(x, J)$)
b. John is stronger.
($\neq \exists x \text{ stronger-than}(J, x)$)
c. John arrived.
($\neq \exists l \text{ arrive}(J, l)$)

Lasnik (1997) notes that existential quantification seems to represent the semantics of the passive quite well. However, existential quantification seems to give very weak truth conditions for (46b). For (46b) to be true, John must be stronger than some contextually salient person. It is not enough that he be stronger than someone. Similarly, Lasnik notes that (46c) doesn't just mean that John arrived *somewhere*. It means that he arrived at the pragmatically relevant location.⁵

3.3.2 Differences in Control by Implicit Arguments of Nouns and Passives

That implicit agent of a noun is able to control the PRO subject of the infinitival complement of the noun is uncontroversial.

- (47) the attempt [PRO to leave]
(*attempter = leaver*)

We have also seen instances where implicit arguments seem to control the PRO subjects of infinitival adjuncts.

- (48) a. The destruction of the city [PRO to impress the general]
destroyer = impresser
b. The game was played nude.

⁵Lasnik (1997) shows that the semantic contribution of existentially quantified implicit arguments differs from the semantic contribution of deictic implicit argument with regard to distributivity.

There is disagreement in the literature concerning whether (48) involves control of the PRO subject by the implicit argument or whether it involves some other mechanism. Roeper (1987) argues for the former position. In support of his position, Roeper (1987) notes the contrast in (49).

- (49) a. *The boat sank to impress the king.
b. The boat was sunk to impress the king.

The unacceptability of (49a) and the acceptability of (49b) is correlated by Roeper (1987) to the availability of a potential controller in (49b) in the form of the implicit agent of the passive. No such implicit agent is available in (49a) and hence the former is unacceptable.

Roeper (1987) offer another set of examples that argue more specifically for a particular syntactic representation of the implicit argument.

- (50) a. The destruction of the boat to collect the insurance.
b. *The boat's destruction to collect the insurance.

Roeper argues that in (50a) the implicit agent of *destruction* occupies a position from which it can control the PRO subject of the infinitival adjunct. He takes the presence of *the boat's* in (50b) as blocking the implicit agent from appearing in the position where it appears in (50a). Therefore the implicit agent is not able to control the PRO subject of the infinitival adjunct.

Roeper's account for the ungrammaticality of (50b) leaves unexplained why (51) is grammatical.

- (51) Yesterday's attempt [PRO to leave]

Williams (1985) suggests that whatever blocks the implicit argument from being syntactically projected in (50b) should also block it from being syntactically projected in (51). Yet, control by the implicit argument is possible in (51).

For this reason among others, Williams (1985) argues against a uniform analysis of the examples in (52).

- (52) a. The attempt [PRO to leave] (Control into a complement)
b. The destruction of the city [PRO to impress the general] (Control into an adjunct)

Williams (1985) argues that only the PRO in (52a) is controlled by the implicit argument of *attempt*. The PRO in the adjunct clause in (52b) is controlled by other mechanisms. The theoretical motivation for doing so is that for Williams, implicit arguments are invisible beyond the first projection of their predicate. Thus while the implicit agent of *attempt* is visible to the infinitival complement, the implicit agent of *destruction* is not visible to the infinitival adjunct.

The empirical motivation comes from examples like (53), which show that the implicit agents of a passive is not always able to control the PRO subjects of infinitival adjuncts.

- (53) a. *The boat was sunk [PRO to become a hero]. (Lasnik p.c. via Williams (1985))

- b. *Mary was arrested [PRO to indict Bill]. (Williams (1974))
- c. *The game was played [PRO mad at Bill]. (Williams (1985))

If the two kinds of control seen in (52) are handled by the same mechanism, then Williams argues that it is not clear why the implicit argument there is no explanation for the ungrammaticality of (53). Therefore Williams provides an alternate account according to which the controller of the PRO in (54) is not the implicit agent of the passive.

- (54) a. The game was played [PRO nude].
- b. The ship was sunk [PRO to impress the general].
- c. The boat was destroyed [PRO to collect the insurance].

He proposes that the controller of the PRO in (54a) is the subject *the game* and not the implicit agent of the passive. The predicate *nude* is predicated of *the game*. Williams suggests that this is plausible since “one may call a game nude if it is played by nude people.” If we modify the adjunct predicate suitably to make such a predication unreasonable, the sentence becomes unacceptable. This is why (53c) is ungrammatical. While nudity can be derivatively predicated of a game, the property of being mad at Bill cannot be.⁶

This leaves us with (54b, c). In (54b), the inanimate subject *the ship* cannot be the agent of the infinitival adjunct. Here Williams suggests that the entire clause controls the subject of the infinitival adjunct. He refers to this kind of control as S-control. The entire clause *the ship was sunk* controls the PRO in the infinitival adjunct – it is the fact that the ship is sunk which is to impress the general. Similarly, Williams relates the acceptability of (54c) to the (marginal) acceptability of *That will collect you some insurance*. The ungrammaticality of (53a, b) is related by Williams to the incoherence of the boat’s sinking becoming a hero and Mary’s arrest indicting Bill.

On a parallel with S-control, Williams suggests that cases of apparent control of the subject of an infinitival adjunct by the implicit agent of a noun be analyzed as involving N'-control.

- (55) [the [_{N'} destruction of the boat]_i [PRO_i to impress the general]]

The ungrammaticality of **the boat’s destruction to impress the general* is analyzed by Williams in terms of the attachment site of the infinitival adjunct. The infinitival adjunct, Williams assumes, must be attached in an NP-internal position. As a result, *the boat’s destruction* cannot serve as a controller because under the relevant structure, it does not even form a constituent.

- (56) *[[the boat’s]_{N'} [_{N'} destruction] [PRO to impress the general]]

Williams does not indicate why *destruction* by itself cannot control the PRO.

⁶We find *The movie was watched nude*, which is parallel to (54a), acceptable. However, it seems a much greater stretch to refer to a movie that is watched nude as a nude movie.

The initial examples in (49) that were taken to demonstrate the role of implicit arguments in controlling the PRO subjects of infinitival adjuncts are argued by Williams to demonstrate not the role of implicit arguments but the presence of a purposeful agent. He offers (57a), where there is no obvious implicit argument and (57b), which shows that the unacceptable (49b) becomes acceptable given the right context.

- (57) a. Grass is green [PRO to promote photosynthesis].
b. The boat sank in order to impress the queen and move her to murder her husband by the end of Act III.

As for why the ergative *sink* requires an elaborate context to participate in (apparent) control, Williams suggests that this is so because the use of the ergative *sink* strongly implies that there is no θ -theoretic agent for *sink*. Hence to make (49b) acceptable we need a context where the absence of a θ -theoretic agent is not contradictory with the existence of a purposeful agent. These requirements are satisfied in (57b), but not in (49a).

Williams (1985) is able to provide an explanation for a puzzling contrast noted in Chomsky (1982).

- (58) pg. 46 of Chomsky (1982)
a. *The books were sold without PRO reading them.
b. The books can be sold without PRO reading them.

(58a) is ungrammatical because the event of book-selling cannot serve as the controller of the PRO subject of the infinitival adjunct. Why then is (58b) grammatical? Williams suggests that *can* has an implicit argument and that the *without* clause is an argument of the modal *can*. Therefore the implicit argument of *can* is able to control the PRO subject of the *without* clause. It is able to do so because the *without* clause in (58b) is the complement of *can* and not an adjunct clause like in (58a).

4 Null Objects

In the introduction, we discussed the question of what non-overt arguments would be covered in our discussion of implicit arguments. In particular, we decided not to cover the silent subjects of non-finite clauses. This was because we assume that the subjects of non-finite clauses are actually syntactically projected (possibly due to the Extended Projection Principle) and realized as PRO. The question then arises of how null objects like in (59) are to be analyzed.

- (59) (From Rizzi (1986))
a. This leads (people) to the following conclusion.
b. Italian
Questo conduce (la gente) alla seguente conclusione.
this leads the people to-the following conclusion

‘This leads (people) to the following conclusion.’

Given the projection principle one might conclude that in both (59a) and (59b), the null object is syntactically projected and occupied by some null pronominal element. However, Rizzi (1986) provides several arguments against giving the English (59a) and the Italian (59b) a uniform analysis. The primary theoretical motivation for providing a non-uniform analysis for null objects in English and Italian comes from the fact that English does not seem to have *pro*, the kind of null pronominal that could serve as a null object. In contrast, Italian is known to be a null subject language i.e. it has *pro*, at least in the subject position of finite clauses and it is plausible that *pro* can also appear in other case marked positions.

The empirical motivation comes from the fact that null objects in Italian, in contrast to null object in English, seem to be syntactically active. They can control, bind, and be modified by adjuncts while null objects in English seem to be able to do none of the above.

We have already seen in (59a) that certain verbs in English do not require overt realization of the object. (60a) shows that if there is an infinitival clause with a PRO subject, then the object needs to be overt. In other words, the null/implicit object cannot serve as a controller. This is, of course, an instantiation of Bach’s Generalization that object controllers in English cannot be omitted (see Bach (1979), and Bresnan (1982)).⁷

⁷Closely related to Bach’s Generalization is Visser’s Generalization that verbs do not passivize when they involve subject control. (cf. i).

- i. a. *It was preferred [PRO to leave]. (vs. He_i preferred [PRO_i to leave].)
- b. *It was tried [PRO to leave]. (vs. He_i tried [PRO_i to leave].)

That the reason behind the ungrammaticality of (i.a, b) is subject control can be demonstrated by considering a verb like *promise* that takes both finite and infinitival complements.

- ii. a. John_i promised Mary [PRO_i to be on time].
John promised Mary that he would be on time.
- b. *Mary was promised by John_i [PRO_i to be on time].
Mary was promised by John that he would be on time.

When there is no problem associated with control, it is possible to passivize *promise* as the contrast in (ii.b) shows.

As Bresnan (1982) points out, Visser’s Generalization is to subjects what Bach’s Generalization is to objects. Certain counterexamples to both Visser’s Generalization (cf. iii) and Bach’s Generalization (cf. iv) have been noted in the literature.

- iii. a. Mary was never promised to be allowed to leave.
- b. It was decided to leave.
(from Bresnan (1982))

- iv. Louise signaled (Tom) to follow her.

Bresnan (1982) suggests that the exceptions in (iii, iv) involve *anaphoric* control, a form of control that is distinct from *functional* control. Bach’s Generalization and Visser’s Generalization, she argues, follow from the properties of functional control, but not of anaphoric control.

- (60) (from Rizzi (1986))
- a. English
 - i. This leads people [PRO to conclude what follows].
 - ii. *This leads [PRO to conclude what follows].
 - b. Italian
 - i. Questo conduce (la gente) alla seguente conclusione
 this leads the people to-the following conclusion
 ‘This leads (people) to the following conclusion.’
 - ii. Questo conduce (la gente) a [PRO concludere quanto segue].
 this leads the people to conclude what follows
 ‘This leads people to conclude what follows.’

In Italian, as (60b.ii) shows an object controller can be omitted. Null objects in Italian can bind reflexive pronouns as shown by (61).

- (61) (from Rizzi (1986))
- a. La buona musica riconcilia _ con se stessi.
 the good music reconciles with oneself
 ‘Good music reconciles one with oneself.’
 - b. Un bravo psicanalista puó restituire _ a se stessi.
 a good psychoanalyst can give back oneself
 ‘A good psychoanalyst can give one back to oneself.’

The third diagnostic for the syntactic activeness of null objects in Italian is that they can be modified by adjunct small clauses (cf. 62).

- (62) (from Rizzi (1986))
- a. Di solito, Gianni fotografa _ seduti
 in general Gianni photographs seated.PI
 ‘In general, Gianni photographs one (when one is) seated.’
 - b. Di solito, quel famoso pittore ritrae _ vestiti di bianco
 in general that famous painter portrays dressed.PI in white
 ‘In general, that famous painter portrays one (when one is) dressed in white.’

There is also a difference in the productivity of the null object option in English and Italian. In English, the possibility of omitting the object seems to be highly restricted and subject to seemingly idiosyncratic restrictions. For example, the verb *incite* allows for its object to be omitted while the nearly synonymous *push* (cf. 63) does not.

- (63) a. ?An unpopular law can incite ___ against the government.
 b. *An unpopular law can push ___ against the government.

In Italian, in contrast, null objects with *arb* interpretation seem to be generally available in generic contexts across a wide range of verbs.

The above differences between English and Italian with respect to the omission of the object lead Rizzi (1986) to conclude that in Italian, an omitted object is syntactically projected and realized as a *pro*, while in English an omitted object is not syntactically projected. Instead it is realized as an implicit argument. Rizzi (1986) assumes that arguments can be lexically saturated and suggests a modification of the Projection Principle according to which only lexically unsaturated arguments need to be syntactically projected (see also Manzini (1992)). For Rizzi, Italian therefore does not constitute a violation of Bach's generalization that object controllers cannot be omitted because in Italian, they are not omitted. They are just realized as *pro*. A background assumption here is that the implicit argument corresponding to the omitted object cannot serve as a controller. In not being able to serve as a controller, the implicit argument corresponding to the omitted object differs from the implicit arguments of passives (§2) and nouns (§3).

The absence of syntactically realized null objects in English seems to be a relatively recent phenomena. Visser (1969) notes that (like in Italian) in Old English, Middle English, and Early Modern English arbitrary null objects could function as controllers.

(64) (from Visser (1969) via Rizzi (1986))

- a. thet uerste... *somneth to worthsipie* god
(1340 Ayenbite p. 104, 33)
- b. When he *commaunded to receiue* the man ... into the church again, in what church *commaunded* he *to receiue* him?
(1532-3 St. Th. More, Wks (1557) 826 E7)
- c. I then *advised to fly*.
(1725 Pope, Tr. Odyssey (World Classics) IX p. 133)

5 Implicit arguments of evaluative predicates

Evaluative predicates have been argued to have implicit arguments. The evidence for the presence of implicit arguments comes from the interpretation of the infinitival complements of evaluative predicates like *fun*.

(65) It is fun [PRO_{arb} to play basketball].

Epstein (1984) notes that the interpretation of (65) is (66a) and not (66b).

- (66) a. $\forall x$ It is fun for x [x to play basketball]
(For everyone it is the case that if they play basketball, it is fun for them.)
- b. It is fun $\forall x$ [x to play basketball]
(If everyone plays basketball, it is fun.)

The fact that (65) can only mean (66a) and not (66b) reveals that the PRO_{arb} in (65) is not an instance of uncontrolled PRO. Instead it is controlled by a non-overt benefactive/experiencer argument of *fun* (see also Safir (1991)). (67) shows that this implicit argument of *fun* can also be overtly realized.

(67) It is fun for Lucy [for Joe to play basketball]. (ex. 9 from Epstein (1984))

Epstein (1984) assumes that the implicit argument of the evaluative adjective is syntactically projected as a null pronoun *pro*. He proposes that this *pro* is very similar in interpretation to the *pro*_{arb} discussed for Spanish in Suñer (1983). Spanish, in contrast to English, is a *pro*-drop language. Bhatt and Izvorski (1997) develop Epstein's basic insight and reduce several instances of 'uncontrolled' PRO to instances of control by an implicit argument. They provide further evidence for the role played by the implicit argument in the control of the PRO subject of the infinitival clause. PRO without an overt controller is only found in the complement of an adjective if the adjective allows for an implicit argument.

(68) (from Bhatt and Izvorski (1997))

- a. [PRO to dance] is fun.
- b. *[PRO to dance] is uncertain/unlikely.

Fun allows for an implicit argument which specifies who something is fun for. *Uncertain/unlikely* lack such an argument. They do not allow us to express who something is unlikely/uncertain for. (68b) is ruled out because unlike *fun* in (68a), *uncertain/unlikely* do not have an implicit argument that could serve as a controller.

Bhatt and Izvorski (1997) further point out that the quantificational force/arbitrary nature of PRO_{arb} does not need to be stipulated. Instead the quantificational force, they propose comes from the presence of genericity. Evidence comes from the fact that 'uncontrolled' PRO does not always have a universal/arbitrary (= *arb*) interpretation. The *arb* interpretation is only available in generic environments. In episodic environments, the 'uncontrolled' PRO picks its interpretation from the local context.

- (69) a. It is difficult [PRO_{arb} to dance the dance].
b. This morning, it was difficult [PRO to dance the tango] since the floor was slippery and we were all hung over.

In both (69a, b), the PRO is controlled by the implicit argument of *difficult*. However, in (69a), the implicit argument is bound by a generic operator and this is why the PRO in (69a) has an *arb* interpretation. (69b) receives an episodic interpretation and there is no a generic operator to bind the implicit argument. Consequently the implicit argument picks up its reference from the local discourse context. This is part of the general context-sensitivity of implicit arguments. See Condoravdi and Gawron (1996) for details.

There are locality constraints on the relation between the implicit argument and the PRO it controls. The implicit argument that controls the PRO needs to be in the immediately higher predicate. This is shown by the contrast in (70).

- (70) (from Bhatt and Izvorski (1997))
- a. *It is easy to be likely to dance the tango.
 - b. It is likely to be easy to dance the tango.

In (70b), the implicit argument of *easy* can act as a local controller. In (70a), however, the implicit argument of *easy* is unable to act as a controller for the PRO because of the intervening predicate *likely* which does not provide a controller. Based on the above data, Bhatt and Izvorski (1997) conclude that PRO can receive an *arb* interpretation iff there is a generically bound implicit argument in the immediately higher predicate.

6 Arguments of Modals

Since Ross (1969a), Perlmutter (1971), Jackendoff (1972), Kratzer (1991) among many others, we have known that modals fall into two two classes with respect to whether or not they have a non-propositional argument which has sometimes been called their external argument. Epistemic modals are semantically monadic; they only take a proposition as an argument. In contrast, deontic modals may be semantically monadic taking a proposition or semantically dyadic taking a proposition and an individual. In Brennan (1993)'s terms, this is the contrast between *ought to be* deontic modality and *ought to do* deontic modality.

Bhatt and Izvorski (1997) argue that cases of PRO_{arb} in infinitival questions can also be assimilated to control of PRO by an implicit argument.

- (71) a. Bill knows [how PRO_{arb} to behave onself].
 b. Matt_i knows [what PRO_{i/arb} to do with his_i/one's life].

Infinitival questions are always modal and the covert modality that surfaces in them is never epistemic. This is shown by the fact that (72) cannot be paraphrased as 'Hafdis know how fast it is possible to drive on I-95.'

- (72) Hafdis knows [how fast PRO to drive on I-95]. (from Bhatt (1999))

Since the covert modality in infinitival questions is always deontic, the modal can have implicit arguments and these implicit arguments can control the PRO. When the implicit arguments are bound by a generic operator, we get what is usually called PRO_{arb} and when it is associated with the matrix subject, we have control.

The role of modality in contributing an implicit argument that can participate in control is also shown by the paradigm in (73).

- (73) a. *The books were sold [without PRO reading them]. (from Chomsky (1982) via Williams (1985))
 b. The books can be sold [without PRO reading them]. (from Chomsky (1982) via Williams (1985))

- c. *The books might have been sold [without PRO reading them]. (from Kratzer (1991))

The contrast between (73a) and (73b) has already been discussed in §3.3.2. Let us focus on the contrast between (73b) and (73c). The modal in (73b) is a deontic modal and so it can have an implicit argument that can serve as a controller. This possibility is unavailable in (73c), where the modal is epistemic and does not have implicit argument. Consequently (73c) is ungrammatical.

Like with other instances of implicit arguments, there seems to be no consensus regarding whether the implicit arguments need to be syntactically projected. Ross (1969a), Perlmutter (1971), Jackendoff (1972) among many others proposed that what we have been calling the implicit argument of a deontic modal is really not implicit at all. They assume a control structure like in (74).

- (74) John_i must [PRO_i leave].

The subject of the modal is taken to be the bearer of the obligation. In recent work, this assumption has been questioned in Bhatt (1997) and Wurmbrand (1999). Both authors argue that there are environments where the bearer of the obligation is not syntactically represented (cf. 75).

- (75) There must be fifty chairs in this room by 5p.m.
(said to a caterer)

In (75), it is clear that the caterer is the bearer of the obligation and yet the bearer is not part of the syntactic representation. This is enough to show that at least in some cases, the so-called external argument of a deontic modal does not have an obvious syntactic realization. Both Bhatt (1997) and Wurmbrand (1999) provide additional arguments that modals, deontic or epistemic, never have external arguments i.e. the bearer of the obligation is never represented syntactically. The bearer of the obligation (= the implicit argument) does have a role to play in the semantics and is identified pragmatically.

7 Synthesis

In §2-6, we see a range of syntactic environments which have been argued to involve implicit arguments. In each of these environments, we investigated whether the putative implicit arguments were syntactically active and whether they were syntactically realized. That implicit arguments are syntactically active was shown to be the case – implicit arguments can control, they are subject to binding theory, and some of them can be bound/controlled. The evidence concerning the question of whether implicit arguments are syntactically realized or not is, however, more equivocal. Unlike Williams (1985), Williams (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 §2-6 must involve syntactic projection of the implicit arguments.

We find the existence of elements that are syntactically active but not syntactically projected conceptually problematic. In order to allow for elements that are syntactically active without having a syntactic realization, binding theory and control theory need to be modified. Otherwise, implicit arguments would be invisible to these modules of the grammar. Assuming syntactic realization in the form of a null pronoun (PRO/*pro*) allows us to keep binding theory and control theory unchanged. This can be taken as an argument in favor of syntactic realization of implicit arguments. Indeed this proposal has been made by several of the scholars working on implicit arguments – for passives see Borer (1998), for null objects in Italian see Rizzi (1986), for evaluative adjectives see Epstein (1984), and for implicit agents of nouns see Roeper (1987).

Towards the beginning of this review, we noted that implicit arguments did not form a unified class. This point continues to hold even if we assume that implicit arguments are uniformly syntactically projected. Implicit arguments differ in their interpretation. We saw in §3.3.1, that implicit arguments of passives receive an existential interpretation, while implicit locative arguments of unaccusatives, implicit comparison classes are interpreted deictically. In §5, it was noted that implicit arguments of evaluative predicates can receive both deictic and *arb*/generic interpretation. Finally the null objects in Italian discussed in §4 can only receive *arb* interpretation.

The syntactic properties of implicit arguments also do not stay uniform across the environments discussed in §2-6. Implicit agents of nouns are able to control the subjects of infinitival adjuncts as well as the subjects of infinitival complements.

- (76) a. Control into an adjunct:
 The IMP_{*i*} destruction of the city [PRO_{*i*} to impress the general].
 b. Control into a complement:
 The IMP_{*i*} attempt [PRO_{*i*} to become a hero]

In contrast, the implicit agent of a passive seems to generally be able to control the subject of an infinitival adjunct but not that of an infinitival complement.

- (77) a. Control into an adjunct:
 The boat was destroyed IMP_{*i*} [PRO_{*i*} to collect the insurance].
 b. Control into a complement:
 *Mary was promised IMP_{*i*} [PRO_{*i*} to leave].

To make matters more complex, it is not always the case that the implicit agent of a passive is able to control the subject of an infinitival adjunct (cf. 78a). Moreover, the implicit agent of a passive is sometimes able to control the subject of an infinitival complement (cf. 78b).

- (78) a. Control into an adjunct:
 *The boat was sunk IMP_{*i*} [PRO_{*i*} to become a hero].
 b. Control into a complement:
 It was promised IMP_{*i*} [PRO_{*i*} to leave].

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