

# Implicit Arguments

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## 1 Introduction

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

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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) Implicit arguments of nouns
  - a. the negotiations [PRO to achieve a peaceful settlement]
  - b. the use of drugs [PRO to fall asleep]
  - c. the playing of the game [PRO to prove a point]
- (3) Null objects (see Rizzi 1986)
 

Italian

  - 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.'
- (4) Implicit arguments of adjectives (from Roeper 1987)
  - a. It is necessary/\*inevitable [PRO to go].
  - b. It is wise/\*probable [PRO to go].
- (5) Implicit agents of agentive suffixes (e.g., *-able*)
 

Goods are exportable [PRO to improve the economy].

The above list includes the implicit agent of a passive (see section 3 below), the implicit agent of a noun (section 4), null objects (section 5), the implicit argument of evaluative predicates (section 6), and the implicit agent associated with agentive suffixes like *-able*.<sup>1</sup> 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)–(3) 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 (see, among others, for PRO Bach and Partee 1980; Chierchia 1984; Klein and Sag 1985; and for *pro* Alexiadou and Anagnostopoulou 1998). However, by convention, PRO/*pro* are not grouped together with the cases of implicit arguments in (1)–(3). 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.<sup>2</sup> Consider, for example, the following definitions for implicit arguments that have been proposed in the literature.

- (6) 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’ theta-criterion is all that is needed to give implicit arguments, since these are nothing more than unlinked argument roles.  
(Williams 1985, 314)
- (7) An implicit argument is a conceptual argument that is neither expressed syntactically nor bound to an argument that is expressed syntactically.  
(Jackendoff 1987, 409)
- (8) An argument is implicit only if it is in a structural position to license a thematic PP but no thematic PP occurs.  
(Roeper 1987, 274)

However, not all researchers have followed this understanding of implicit arguments. Some have proposed that what they call implicit arguments are realized as *pro* (see Epstein 1984; Rizzi 1986; Borer 1998) and PRO (see Roeper 1987). But even if it is assumed that all of the non-overt arguments in (1)–(3) are syntactically realized as *pro*/PRO, given that (1)–(3) 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)–(5), 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)–(5) are truly implicit. For example, Baker, Johnson, and Roberts (1989) argue the passive suffix *-ed* is the agent of the passive; that is, 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. In what follows, the cases in (1)–(4) 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 Interpretive properties of implicit arguments

### 2.1 More than unrealized roles

In this section, we will consider the independent motivation for claiming that a certain environment involves an implicit argument. Let us start with the notion of *unrealized role*. Following Williams (2014),<sup>3</sup> we can define an unrealized role as an entailed relation that does not correspond to any obvious part of the clause, be it overt or covert. Consider the following sentences.

- (9) a. Mo robbed Lee (vs. Mo robbed Lee of a necklace).  
b. Mo won (vs. Mo won a bet).

(Williams 2014, ch. 5, exs 8 and 9)

The first sentence entails the existence of something of which Lee was robbed. This would count as an unrealized role. Likewise the second sentence entails the existence of something that Mo won. Both sentences also entail the existence of a location and a time at which the robbing/winning took place. Our intuition is that the notion of unrealized role is too permissive. The lexical semantics of a predicate might entail quite a range of unrealized roles, and these are not referred to as implicit arguments. To count as implicit argument, something stronger than the notion of unrealized role is required. In particular, we require that the unrealized role participate in some grammatical dependency, the exact nature of which can vary. One such dependency is variable binding. With respect to variable binding, there is a clear contrast between *rob* and *win*. As noted in Williams (2014), the unrealized role of *win* can be bound but not the unrealized role of *rob*.

- (10) a. No man who placed a bet on me won.  
 (≈ No man who placed a bet on me won the bet he placed on me.)  
 b. No kid who waxed a car robbed its owner.  
 (≠ No kid who waxed a car robbed its owner of the car he waxed.)

The fact that the unrealized role of *win* can be bound supports treating it as an implicit argument. The fact that the unrealized role of *rob* cannot leaves things open. As we will see, there might be independent reasons that block an implicit argument from being bound.

The point that merely being an unrealized role is not enough is made particularly clearly with unaccusatives of encyclopedically agentive verbs like *cut* in Hindi-Urdu. Hindi-Urdu allows for unaccusative intransitives both of verbs like ‘cut’ (*kaat*, transitive; *kaṭ*, intransitive), which are encyclopedically agentive, and verbs like ‘open’ (*khol*, transitive; *khul*, intransitive), which are not.

- (11) a. Unaccusative  
 peṛ      kaṭ      rahe      hẽ  
 trees-M    cut    PROG.M.PL    be-PRS.PL  
 ‘Trees are cutting<sub>INTR</sub>.’ (i.e., ‘Trees are being cut.’)  
 b. Transitive  
 kampani    peṛ    kaṭ    rahii    hai  
 company-F   tree   cut    PROG.F   be-PRS.SG  
 ‘The company is cutting trees.’  
 c. Passive of transitive  
 kampani-dwaaraa    peṛ      kaṭ-e      jaa    rahe      hẽ  
 company-by        trees-M    cut-PFV.M.PL    PASS    PROG.M.PL    be-PRS.PL  
 ‘Trees are being cut by the company.’

The unaccusative *kaṭ* in (11a) lacks structural agentivity (no agentive *by*-phrases; no control into adjuncts; no agent-oriented adverbs) but it is still encyclopedically agentive. When Hindi-Urdu speakers use the unaccusative *kaṭ*, they still generate an entailment that there is an agent. The unrealized agent role of *kaṭ* is plausibly not an implicit argument but it is certainly an unrealized role. In lacking structural agentivity, the unaccusative contrasts with the passive, where the unrealized agent

participates in a number of grammatical dependencies. We can also contrast the encyclopedically agentive *kaṭ* ‘cut<sub>UNACC</sub>’ with *khul* ‘open<sub>UNACC</sub>’, which in addition to lacking structural agentivity also lacks encyclopedic agentivity. A door can open on its own. Therefore (12a) does not have agent as an unrealized role. We take the difference between *kaṭ* ‘cut<sub>UNACC</sub>’ and *khul* ‘open<sub>UNACC</sub>’ to follow from their encyclopedic semantics.

- (12) a. Intransitive  
 darwaazaa khul rahaa thaa  
 door-M open PROG.M be-PST.M  
 ‘The door was opening.’
- b. Transitive  
 Amit darwaazaa khol rahaa thaa  
 Amit-M door open PROG.M be-PST.M  
 ‘Amit was opening the door.’
- c. Passive  
 darwaazaa khol-aa jaa rahaa thaa  
 door-M open-PFV PASS PROG.M be-PST.M  
 ‘The door was being opened.’

The passive in (12c) does have agent as an unrealized role, and here the unrealized role is an implicit argument proper: like the implicit agents of other passives, it participates in a number of grammatical processes. Any theory of implicit arguments should be able to represent the distinction between the unrealized agent role of unaccusative *kaṭ* ‘cut’ and the implicit agent of passive *kaat* ‘cut’. The standard conception of passives as having a structurally represented implicit agent and unaccusatives as lacking one gives us a good handle on this distinction. Under this conception, the particular properties of unaccusative *kaṭ* ‘cut’ – encyclopedic agentivity but no structurally represented agentivity – can be easily handled. It is less clear that this distinction could be captured naturally if we were to treat both kinds of agentivity as unrealized roles.

This metric of participation in a grammatical process will be our way of deciding whether an unrealized role counts as an implicit argument or not. For the rest of this discussion, we will assume that we know that we have an implicit argument; our goal will be to enumerate certain diagnostics that will help us to classify a particular implicit argument along certain interpretive dimensions.

## 2.2 Existential or definite

Lasersohn (1997) and Williams (2014) note that we find implicit arguments, like overt arguments, with a range of quantificational forces. The putative implicit arguments of verbs like *rob* and *steal* and the implicit agent of a passive seem to have existential force, judging from paraphrases with an overt argument.

- (13) a. Mo robbed Lee (of stuff).  
 b. Mo stole a bag of money (from someone).  
 c. John was killed (by someone).

Putative implicit arguments can also be definite, as in the cases in (14).

- (14) a. Mo noticed.  
 b. Ron won.  
 c. John is stronger.  
 d. John arrived.

And some implicit arguments seem to be interpreted generically.

- (15) It is fun (for one) [to dance].

The first distinction between existential implicit arguments and definite implicit arguments is that the latter place inferential demands on the discourse. (13a) can be used without knowing what Lee was robbed of or who Mo stole from. However, out-of-the-blue usages of definite implicit arguments are perceived as odd.

- (16) a. Check it out, Ron has a new car! <sup>#</sup>He won.  
 b. Check it out, Ron has a new car! He won a contest.

To use *won* with an implicit argument satisfactorily, the speaker has to know/ accommodate what was won. A related contrast is that definite implicit arguments are odd if the context makes clear that no one is aware of their value. No such requirement holds of indefinite implicit arguments.

- (17) a. Mo robbed Lee, but no one has any clue what he took.  
 b. <sup>#</sup>Mo noticed. Though no one has any idea what he noticed.

Negated sentences with existential implicit arguments are much stronger than negated sentences with definite implicit arguments.

- (18) a. Indefinite  
 i. Mo didn't rob her (of anything).  
 ii. Lee didn't bake (anything) this morning.  
 b. i. Ron was on the subway with Mo but Mo didn't notice.  
 (≠ Mo noticed nothing.)  
 ii. Ron placed a bet on number 17. He didn't win.  
 (≠ he didn't win anything.)

Existential implicit arguments take narrowest scope with respect to any negation; in this they differ from comparable structures with overt existential arguments, which have more scopal flexibility but come with additional restrictions pertaining to the novelty of the element they introduce.

Finally, the possibility of dependent readings distinguishes between definite and indefinite implicit arguments. The latter never allow for dependent readings while the former do, with certain exceptions.<sup>4</sup> The dependent readings of definite implicit arguments can function like donkey pronouns and like paycheck pronouns.

- (19) a. Every man who shaves off his beard expects his wife to notice.  
 (Partee 1989, 262, ex. 10c)  
 (donkey pronoun,  $\approx$  to notice [that he has shaved off his beard])
- b. Every secretary made a mistake in his final draft. The good secretary corrected his mistake. The bad secretary didn't even notice.  
 (Dowty 1981, 90)  
 (paycheck pronoun,  $\approx$  notice [that s/he had made a mistake in his/her final draft])

In other cases, the definite implicit argument can be bound directly.

- (20) a. Every contest turned out to have been rigged by the person who won.  
 ( $\approx$  won it)
- b. No task is impossible for a person who is ready ( $\approx$  for it)

Returning to putative existential implicit arguments, we see that they do not allow for dependent readings.

- (21) a. No kid who waxes a car robs its owner.  
 ( $\neq$  No kid who waxes a car robs its owner of it.)
- b. No baker who had a cupcake for lunch baked this morning.  
 ( $\neq$  No baker who had a cupcake for lunch baked it this morning.)

### 3 Implicit arguments in passives and middles

#### 3.1 Implicit arguments in passives

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

- (22) a. The ship was sunk.  
 b. The ship sank.

(Roeper 1987, 267, exs 1a–1b)

Intuitively, it seems clear that the passive in (22a) has implied agency as part of its meaning while the unaccusative in (22b) does not. In the case that the ship sprang a leak on its own and sank, (22b) would be true but not (22a). For (22a) to be true, there must have been someone who was responsible for sinking the ship.<sup>5</sup>

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 (22a) 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 (see (23)). The implicit agent in the passive is taken to be responsible for this licensing.

- (23) a. The ship was sunk by Bill.  
b. \*The ship sank by Bill.

(Roeper 1987, 268, exs 2a–2b)

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.

- (24) a. \*The boat sank to collect the insurance.  
b. The boat was sunk to collect the insurance.

(Roeper 1987, 268, exs 3a–3b)

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.<sup>6</sup>

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 (25b) there is no implicit argument and *deliberately* can only be associated with the lone argument of *sink*, namely *the boat*. Consequently (25b) is perceived as pragmatically deviant.

- (25) 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 agentivity as part of their semantics. It is not clear that postulating that this agentivity is represented syntactically is necessary to explain the possibility of *by*-phrases. It may be the case that syntactically unexpressed agentivity is all that is needed to license 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 agentivity in the semantics 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 (26a) and (26b).

- (26) a. attempts [PRO to leave]  
 b. yesterday's attempts [PRO to leave]

If it is assumed that the implicit agent of *attempt* in (26a) is a PRO that occupies the position occupied by *yesterday* in (26b), we expect the PRO to be absent in (26b). However, the implicit agent of *attempt* controls the PRO subject of the infinitival clause in both (26a) and (26b). Williams (1985) takes this to suggest that the implicit agent in (26b) 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*. However, this is by no means a necessary assumption, given the acceptability of (27).<sup>7</sup>

- (27) yesterday's teachers' strike (Tom Roeper, p.c.)

If the implicit agent can be generated in a position lower than *yesterday*, both (26a) and (26b) can have implicit agents and the parallelism between (26a) and (26b) 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.

- (28) Grass is green [to promote photosynthesis].  
 (Williams 1974 via Williams 1985, 310, ex. 38)

In (28), *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. 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:

- (29) The boat sank in order to impress the queen and move her to murder her husband by the end of act iii.  
 (Williams 1985, 311, ex. 39)

Williams (1985) takes these examples as a strong argument against the claim that rationale clauses require a syntactic controller and hence against the claim that the implicit agent of the passive is syntactically realized. However, we believe this to be premature. As Williams (2014) notes, the generalization is that the subject of the rationale clause can be controlled by the syntactic subject, the implicit agent of the passive, or the entire clause. This characterization accords a special status to the implicit agent of the passive: not just any unrealized role can control, nor can overt expressions that do not satisfy this characterization.

- (30) a. John<sub>i</sub> received Mary<sub>j</sub> [PRO<sub>i/\*j</sub> to make a good impression].  
 (Roeper 1987, 229)  
 b. A hired crook stole the ship [PRO to collect the insurance].  
 (Williams 2014, 296, ex. 87)  
 (→ the victim of the theft cannot control PRO.)

The fact that the implicit agent of a passive can control indicates that it has a special status compared to other implicit arguments. One way of marking this special status is by syntactically representing the implicit agent. Williams (2014) brings forward an important set of facts that complicate this picture. These facts concern “remote control,” which is exemplified below.

- (31) a. I have only purchased one Manilow album in my life: 1984’s *2:00 AM Paradise Café*. The reason was to hear the song “When October Goes.”  
 b. The ewe was killed. And the reason was to win the favors of Apollo.  
 (“... the reason was that way the killers might win the favors of Apollo.”)  
 c. \*Parasites cover these sharks<sub>k</sub>. And the reason is, to have their<sub>k</sub> gills kept clean.  
 d. A hired crook stole the ship. The reason was to collect the insurance.  
 (→ the victim of the theft cannot control PRO.)

The reason clauses in (31) get their controller from the preceding clause. Curiously, this kind of control is still sensitive to the status of the controller: subjects/implicit agents qualify; objects and other implicit arguments do not. Williams (2014) assumes that the structural status of arguments does not persist through discourse. Therefore he argues that we cannot make any claims about the syntactic representation of the controller on the basis of these control facts. Note that assuming that the controller is in fact an implicit argument of reason does not remove the problem; this implicit argument must itself be controlled from the preceding clause and the problem arises anew. These sets of facts are clearly a challenge to the argument for syntactic representation of the implicit agent. A possible way forward is to relate this phenomenon to the question of the anaphoric properties of null and overt pronouns, in particular their sensitivity to the structural prominence of their antecedent (see Alonso-Ovalle et al. 2002; Carminati 2002; Belletti, Bennati, and Sorace 2007; Filiaci, Sorace, and Carreiras 2013).

### 3.2 Implicit agents in middles

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

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

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.

- (33) a. This bureaucrat was bribed [PRO to avoid the draft].  
 b. \*This bureaucrat bribes easily [PRO to avoid the draft].  
 (Baker, Johnson, and Roberts 1989)
- (34) a. This bureaucrat was bribed deliberately.  
 b. \*This bureaucrat bribes deliberately.  
 (Baker, Johnson, and Roberts 1989)

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 (32)–(34), all of which 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 (35a) and (35b).

- (35) a. The clothes hang easily.  
 b. The clothes are hanging on the line.  
 (Keyser and Roeper 1984, 383, ex. 7)

Keyser and Roeper (1984) observe that (35a) implies that it is easy for someone to hang clothes, whereas there is absolutely no implied agent in the unaccusative (35b).<sup>8</sup>

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.

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

The licensing of agentive *for*-PPs 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 that for him is always syntactically present in the middle as PRO.

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

- (37) 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 (37a)–(37c) has been used by Keyser and Roeper (1984) and Fagan (1992) as an argument in favor of the middle's agentivity.

However, Rapoport (1999) challenges the conclusion that the middle necessarily involves agentivity, noting that the above tests for agentivity do not hold for all middles. As Ackema and Schoorlemmer (1995) noted, not all middles allow for *for*-phrases.

- (38) a. These books don't sell (\*for the average shopkeeper).<sup>9</sup>  
 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*.

- (39) 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 (see (32)–(34)) receives a very natural explanation under Rapoport's (1999) proposal: there simply isn't an implicit agent in the English middle. The English middle is not inherently agentive.

The licensing of *for*-phrases in (36) and the unacceptability of *all by itself* with certain middles in (37) 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 (37), 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 (see (38), (39)).

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 ones that do can be accounted for without postulating an implicit argument.

Rapoport's conclusions, however, can be challenged on the following grounds. The predicates which demonstrate the absence of agentivity (see (39)) also have unaccusative counterparts. This makes it possible to analyze these cases not as middles but as generic unaccusatives.<sup>10</sup>

#### 4 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.

- (40) a. Condition A  
 Respect for oneself is important. (Williams 1987, 151, ex. 1b)
- b. Condition B  
 admiration of him (*admirer* ≠ *admiree*) (Williams 1987, 152, ex. 2a)

- c. Condition C  
 the realization that John was unpopular (*realizer*  $\neq$  *John*)  
 (Ross 1969 via Williams 1987, 152, ex. 2b)

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 (40) follow directly. In addition to participating in binding, implicit arguments are also able to control and be controlled/bound themselves (see (4a) and (4b) respectively).<sup>11</sup>

- (41) a. the attempt [PRO to leave]  
 (*attempter* controls the PRO)  
 b. John made an attempt [PRO to leave].  
 (*John* is the attempter)

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

- (42) a. yesterday's attempt [PRO to leave]  
 (*attempter* = *leaver*)  
 b. yesterday's decision [that John was the best candidate]  
 (*decider*  $\neq$  *John*)

Williams assumes that a PRO agent would occupy the position occupied by *yesterday's*. Thus a PRO should be blocked in (42a) and (42b). 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.

- (43) For *attempt*, and similar nouns, the Agent controls (or is associated with) the subject of the embedded clause.  
 (Williams 1985, 302, ex. 14)
- (44) 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.  
 (Williams 1985, 303, ex. 17)

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.

- (45) 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 (45) to correctly show that just syntactically representing the Agent is inadequate. This is so because in (45a) 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 indirect 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 (42) 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.

#### 4.1 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.

- (46) a. They<sub>i</sub> told [<sub>NP</sub> stories about each other<sub>i</sub>].  
 b. \*They<sub>i</sub> told [<sub>NP</sub> my stories about each other<sub>i</sub>].  
 c. \*They<sub>i</sub> told [<sub>NP</sub> stories about them<sub>i</sub>].  
 d. They<sub>i</sub> told [<sub>NP</sub> my stories about them<sub>i</sub>].
- (Chomsky 1986, 166)

- (47) a. They<sub>i</sub> heard [<sub>NP</sub> stories about each other<sub>i</sub>].  
 b. \*They<sub>i</sub> heard [<sub>NP</sub> my stories about each other<sub>i</sub>].  
 c. They<sub>i</sub> heard [<sub>NP</sub> stories about them<sub>i</sub>].  
 d. They<sub>i</sub> heard [<sub>NP</sub> my stories about them<sub>i</sub>].
- (Chomsky 1986, 166)

Chomsky (1986) argues that the object of *tell* and *hear* in (46a), (46c), (47a), and (47c) has an implicit subject on a parallel with the overt subject in (46b), (46d), (47b), and (47d). Since there is an overt subject in the object of *tell* and *hear* in (46b), (46d), (47b), and (47d), the object constitutes the binding domain of the anaphor/pronoun. (46b) and (47b) are ruled out because the anaphors are not bound in their binding domain and (46d) and (47b) are acceptable because the pronouns are free in their binding domain.

(46a) and (47a) 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 (46c) and (47c).

The verbs *tell* and *hear* differ in how they combine semantically with their object *story*. Consider the contrast in interpretation between (48a) and (48b).

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

In (48a), 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 (48b). The process by which the implicit arguments of a noun receive their interpretation will be discussed in section 4.2. 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 (49).

- (49) a. John<sub>i</sub> told [IMP<sub>i/\*j</sub> stories about Mary].  
 b. John<sub>i</sub> heard [IMP<sub>i/j</sub> stories about Mary].

The contrast between (46c) and (47c), repeated below in (50), now follows.

- (50) a. They<sub>i</sub> told [IMP<sub>\*i/\*j</sub> stories about them<sub>i</sub>].  
 (IMP<sub>i</sub> is ruled out by Condition B; IMP<sub>j</sub> is ruled out by *tell*.)  
 b. They<sub>i</sub> heard [IMP<sub>j/\*i</sub> stories about them<sub>i</sub>].  
 (IMP<sub>i</sub> is ruled out by Condition B; IMP<sub>j</sub> is allowed by *hear*.)

The presence of the implicit argument as the subject in (50a) and (50b) makes the object NP become the binding domain for *them*. Since in (50a), the implicit argument is obligatorily coreferent with the matrix subject, we have a violation of Condition B in (50a). Since *hear* in (50b) does not require obligatory coreference, (50b) 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 (50b): it blocks the interpretation of (50b) where the hearers are the narrators.<sup>12</sup>

Let us now re-examine the analysis of anaphors inside the NP complements of anaphors in (46a) and (47a), repeated here as (51a) and (51b).

- (51) a. They<sub>i</sub> told [IMP<sub>i/\*j</sub> stories about each other<sub>i</sub>].  
 b. They<sub>i</sub> heard [IMP<sub>i/\*j</sub> stories about each other<sub>i</sub>].

The analysis makes the right predictions concerning the grammaticality of (51a) and (51b). However, it seems to make the wrong prediction concerning the interpretation of (51b). As Williams (1985) notes, the representation in (51b) 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.

- (52) a. \*They<sub>i</sub> told [IMP<sub>i</sub> stories about them<sub>i</sub>]. (Condition B)  
 b. \*The IMP<sub>i</sub> realization [that John<sub>i</sub> was sick] upset him<sub>i</sub>. (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 (52a), discussed in section 4.2) and in nominalizations (as in (52b)). In other circumstances, as is the case with *hear*, we could assume either optionality or even complete absence of the implicit agent of the noun.

#### 4.2 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.

- (53) a. Gillian persuaded Stuart<sub>i</sub> [PRO<sub>i</sub> to leave].  
 (*persuade* is an object control verb.)  
 b. Gillian<sub>i</sub> promised Stuart [PRO<sub>i</sub> to leave].  
 (*promise* is a subject control verb.)

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.

- (54) 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 (54a)–(54c), the matrix subject controls/binds the implicit agent of *attempt/picture/operation* respectively, in (54d), the matrix subject controls/binds the implicit



theme of *operation*. The difference clearly lies in the meaning of *undergo* vs. *make/take/perform*. 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 (55).

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

The existence of a choice concerning what is controlled (see (54)) and the possibility of double control (see (55)) 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 (54c) and (54d).

- (56) 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 their 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 agent with the patient of its complement event. Clearly every theory needs to specify such associations.<sup>13</sup>

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.

### 4.3 Differences between implicit arguments of nouns and passives

#### 4.3.1 Controlling implicit arguments of passives

Unlike the implicit arguments of nouns which can be bound/controlled by c-commanding NPs, the implicit agent of a passive seems to be resistant to being bound by a c-commanding NP. Baker, Johnson, and Roberts (1989) note that the implicit argument of a passive cannot be interpreted as coreferential with the syntactic subject of the passive. Thus (57) is not equivalent to (58) under any interpretation.

- (57) a. They were killed.  
 b. They were admired.
- (58) a. They committed suicide.  
 b. They admired themselves.

This point is further demonstrated by (59), where the *by*-phrase is bound by the syntactic subject of the passive. Since the *by*-phrase is coindexed 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 (59).

- (59) \*They<sub>i</sub> were killed by themselves<sub>i</sub>.

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

- (60) They<sub>i</sub> ... -ed<sub>i</sub> ... t<sub>i</sub>  
 where *they* c-commands *-ed* and *-ed* c-commands the t<sub>i</sub>.

Baker, Johnson, and Roberts (1989) argues that the configuration in (60) 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 (61), where we find a disjoint reference effect even though there is no crossover.

- (61) John wants Mary to be seen.

(Williams 1987, 155, ex. 9)

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) 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) intuition that passive implicit arguments differ from other implicit arguments is developed and made explicit in independent work by Lasersohn (1997).

Williams (2014) notes that while pairs like the following are not synonymous, there are in fact situations that verify them both.

- (62) a. Mo was soundly criticized.  
 b. Mo was soundly criticized by himself.

He suggests that the sense that (62a) is anti-reflexive is a pragmatic enrichment that arises due to not choosing the stronger reflexive statement. Williams (2014) also marks cases like (62b), where the subject binds a reflexive *by*-phrase, as grammatical, contra the claim from Baker, Johnson, and Roberts (1989) exemplified by (59).

### 4.3.2 Differences in control by implicit arguments of nouns and passives

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

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

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

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

There is disagreement in the literature concerning whether (64) 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 (65).

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

The unacceptability of (65a) and the acceptability of (65b) is correlated by Roeper (1987) with the availability of a potential controller in (65b) in the form of the implicit agent of the passive. No such implicit agent is available in (65a) and hence the former is unacceptable.

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

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

Roeper argues that in (66a) 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 (66b) as blocking the implicit agent from appearing in the position where it appears in (66a). Therefore the implicit agent is not able to control the PRO subject of the infinitival adjunct.

Roeper's account for the ungrammaticality of (66b) leaves unexplained why (67) is grammatical.

- (67) yesterday's attempt [PRO to leave]

Williams (1985) suggests that whatever blocks the implicit argument from being syntactically projected in (66b) should also block it from being syntactically projected in (67). Yet control by the implicit argument is possible in (67).

For this reason among others, Williams (1985) argues against a uniform analysis of the examples in (68).

- (68) 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 (68a) is controlled by the implicit argument of *attempt*. The PRO in the adjunct clause in (68b) 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 (69), which show that the implicit agent of a passive is not always able to control the PRO subjects of infinitival adjuncts.

- (69) a. \*The boat was sunk [PRO to become a hero].  
 (Lasnik p.c. via Williams 1985, 309, ex. 34a)  
 (but also consider the much better *The king's ship was sunk just to acquire notoriety*, attributed to Alexis Wellwood by Williams 2014, 299, fn. 27, ex. 1)  
 b. \*Mary was arrested [PRO to indict Bill].  
 (Williams 1974 via Williams 1985, 309, ex. 34b)  
 c. \*The game was played [PRO mad at Bill].  
 (Williams 1985, 309, ex. 33)

If the two kinds of control seen in (68) are handled by the same mechanism, then Williams argues that there is no explanation for the ungrammaticality of (69). Therefore Williams provides an alternate account according to which the controller of the PRO in (70) is not the implicit agent of the passive.

- (70) 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].

It is worth noting that the constraints on control into adjuncts by implicit (and even overt) arguments are poorly understood. A number of additional factors enter into the picture that influence whether an implicit argument is able to control into the adjunct. A non-exhaustive list of relevant factors includes the role of modality (e.g., *\*The books were sold [without PRO reading them]* from Chomsky 1982, 46 vs. *The book can be sold [without reading them]* from Williams 1985, 312, ex. 42b vs. *\*The books might have been sold [without PRO reading them]* from Kratzer 1991, 650, ex. 28c), the location of the theme (e.g., *\*the boat's destruction to collect the insurance* vs. *the destruction of the boat to collect the insurance*; see Roeper 1987); the nature of the rationale clause (e.g., *the ship was sunk to collect the insurance* vs. *??the ship was sunk to become a hero* vs. *\*the vote was taken to be elected president*; see Roeper 1987); the +/–human nature of the implicit argument and the overt subject (*The stairs were washed before entering the apartment*, where the “washer” must be +human, and not –human like rain, and controls the adjunct clause, vs. *Mary was washed before entering the*

*apartment*, where both the +human washer and Mary are potential controllers; see Manzini 1986; Kawasaki 1993; and Landau 2001); and the need for a discourse topic, which can remove the requirement for a grammatically represented controller altogether.

- (71) a. After collecting some money, a bank account was opened by the/\*a  
businessman.  
b. After pitching the tents, darkness fell quickly.  
(Kawasaki 1993 via Landau 2001, 139, ex. v)

Williams' (1974; 1985) photosynthesis cases (*Grass is green to promote photosynthesis*) can be seen as a limiting case of the factors discussed above. Because of these factors, a purely syntactic analysis of control by implicit arguments into infinitival adjuncts remains elusive and a system like Williams' (2014) Responsibility Theory has considerable appeal.

## 5 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 those in (72) are to be analyzed (with (3a) repeated as (72b)).

- (72) 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.'  
(Rizzi 1986, 501, ex. 1a–1b)

Given the projection principle, one might conclude that in both (72a) and (72b), the null object is syntactically projected and occupied by some null pronominal element. However, Rizzi (1986) provides several arguments against giving the English (72a) and the Italian (72b) 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; that is, 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 objects 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 (72a) that certain verbs in English do not require overt realization of the object. (73a) 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; Bresnan 1982).<sup>14</sup> ((3) is repeated as (73b).)

- (73) a. 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.'
- (Rizzi 1986, 503, exs 8a–8d)

In Italian, as (73bii) shows, an object controller can be omitted. Null objects in Italian can bind reflexive pronouns as shown by (74).

- (74) a. La buona musica riconcilia \_\_\_\_ con se stessi.  
 the good music reconciles with oneself  
 'Good music reconciles one with oneself.'  
 b. Un bravo psicanalista può restituire \_\_\_\_ a se stessi.  
 a good psychoanalyst can give.back to oneself  
 'A good psychoanalyst can give one back to oneself.'
- (Rizzi 1986, 504, exs 11a–11b)

The third diagnostic for the syntactic activeness of null objects in Italian is that they can be modified by adjunct small clauses (see (75)).

- (75) a. Di solito, Gianni fotografa \_\_\_\_ seduti  
 in general Gianni photographs seated.PL  
 '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.PL in white  
 'In general, that famous painter portrays one (when one is) dressed in white.'
- (Rizzi 1986, 505, exs 14b–14c)

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* (see (76)) does not.

- (76) 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 (section 3) and nouns (section 4).

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

- (77) a. thet uerste ... *somneth to worthsipie* god  
(1340, *Ayenbite of Inwit*)
- b. When he *commaunded to receiue* the man ... into the church again, in what church *commaunded* he to *receiue* him?  
(1532–1533, Thomas More, *Works*)
- c. I then *advised to fly*.  
(1725, Alexander Pope, *Odyssey*)  
 (Visser 1969 via Rizzi 1986, 532, ex. 63)

## 6 Implicit arguments of evaluative predicates

Evaluative predicates have been argued to have syntactically projected implicit arguments. Epstein (1984) notes that the interpretation of (78) is (79a) and not (79b). This reveals that the  $PRO_{arb}$  in (78) is not an instance of PRO without a controller. Instead, it is controlled by a non-overt experiencer argument of *fun* (see also Safir 1991).

- (78) It is fun [ $PRO_{arb}$  to play basketball].
- (79) a.  $\forall x$  It is fun for  $x$  [for  $x$  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.)

(80) shows that the implicit argument of *fun* can also be overtly realized. (80a) confirms that the experiencer of *fun* is a distinct position from the subject of the infinitival clause; in (80b) the overt experiencer argument is the controller of PRO.

- (80) a. It is fun **for Lucy** [for Joe to play basketball].  
 (Epstein 1984, ex. 9)
- b. It is fun **for Lucy** [to play basketball].  
 (Epstein 1984, ex. 11)

Epstein (1984) suggests that the implicit argument of the evaluative adjective *fun* is syntactically projected as a null pronoun *pro*, similar in interpretation to the *pro<sub>arb</sub>* discussed for Spanish in Suñer (1983) (though in sentences like (78), Epstein (1984) assigns *pro* the interpretation of a universal quantifier, rather than a pronoun with arbitrary reference). Bhatt and Izvorski (1997) develop Epstein's insight and further point out that the arbitrary interpretation of *PRO<sub>arb</sub>* and of its implicit argument controller does not need to be stipulated: in sentences like (78) it comes from the presence of genericity. In (81a), as in (78), the implicit argument is bound by a generic operator and this is why the PRO in (81a) has an *arb* interpretation. In contrast, (81b) receives an episodic interpretation since there is no generic operator to bind the implicit argument. Instead, 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 more details.

- (81) a. It is fun [*PRO<sub>arb</sub>* to dance the tango].  
 b. This morning, it was fun [*PRO* to dance the tango] right after we got out of bed.

Bhatt and Izvorski (1997) provide an additional argument that implicit arguments of evaluative predicates participate in syntactic control. There are locality constraints on the relation between the implicit argument and the PRO it controls; specifically, the implicit argument needs to be in the immediately higher predicate. This is shown by the contrast in (82).

- (82) a. \*It is easy to be likely to dance the tango.  
 b. It is likely to be easy to dance the tango.  
 (Bhatt and Izvorski 1997, exs 18a–18b)

In (82b), the implicit argument of *easy* can be a local controller of PRO. In (82a), however, the implicit argument of *easy* is unable to act as a controller for PRO because of the intervening predicate *likely*, which does not provide a controller.

The argument from control developed above suggests that implicit arguments of evaluative predicates are syntactically active. Moreover, they behave just like pronouns: they can be bound by a generic operator and they can be anaphoric to a contextually salient antecedent.

However, Lasersohn (2005) doubts that *fun* and similar predicates, such as *tasty*, which he dubs *predicates of personal taste*, have implicit pronominal experiencer arguments. Given that sentences such as (78), or its counterpart (83), seem to vary in truth value from person to person, it would be natural to suppose that the implicit argument, if indeed it is syntactically represented, is an indexical that is fixed by context to the speaker. Then, when John and Mary both utter (83), each is in effect saying *Basketball is fun for me*, with the value of the indexical pronoun *me* varying by speaker.



(83) Basketball is fun.

However, if that were the case, Lasersohn (2005) points out, it would not make sense for two speakers to disagree with one another. If John says (83) and Mary responds with (84), she is contradicting him, expressing a legitimate difference of opinion. Yet, if the content of their statements contained a hidden first-person indexical, such a discourse would not be felicitous, as there would be no contradiction given that the two sentences express different content. Since we intuitively understand John and Mary to be disagreeing, when they utter (83) and (84) respectively, and moreover, we could not say that only one of them is correct (and thus this is a case of *faultless disagreement*<sup>15</sup>), it cannot be that the implicit argument of *fun* is interpreted as an indexical pronoun that refers to the speaker.

(84) No, basketball is not fun.

- (85) a. John: Basketball is fun for me.  
 b. Mary: #No, basketball is not fun for me.

Lasersohn (2005) considers a number of other possible interpretations for the implicit argument of *fun*. One attempt is to analyze this argument as a pronoun that refers to a contextually salient individual or group, not necessarily the speaker. As we noted above, this is the interpretation we would expect from the implicit argument *pro* in episodic contexts. So when John says to Mary (83) while they are playing a game of basketball, the implicit argument is naturally taken to refer to the two of them, or possibly to the larger group playing with them. Fixing the reference of the implicit argument like this, then indeed the two of them can disagree, since uttering (83) and (84) is in effect the discourse in (86).

- (86) a. John: Basketball is fun for us.  
 b. Mary: No, basketball is not fun for us.

Yet this option too turns out to be problematic, since the order of the utterances could be reversed, with Mary saying *This is not fun* and John contradicting her *Yes it is*. This is a coherent discourse, yet it shouldn't be, if Mary was really saying *This is not fun for us*. In such a case John couldn't possibly contradict her as this would be to deny her subjective experience. He would be no more entitled to do this than if she were to say *This is not fun for me*.

Existentially quantifying the implicit argument results in a meaning that is too weak. Lasersohn (2005) rejects generic quantification over the implicit argument as well, though the example that he considers involves an episodic context, and as Bhatt and Izvorski (1997) have shown, generic interpretation of the implicit argument arises only in generic contexts. We return to this issue below.

Because of the above issues, Lasersohn (2005) concludes that the implicit experiencer of predicates of personal taste is not syntactically represented. Instead, he proposes to add to the evaluation index an individual (judge) parameter. A sentence such as *This is fun* lacks a pronominal experiencer and so it expresses the same content, whether said by John or Mary. But its truth value can vary relative to John and

Mary as a judge. The two can disagree, since they assert or deny the same content, and they can disagree without fault, because truth value is determined relative to each of them. See Lasersohn (2005) for further details on how the judge can vary depending on the perspective of the speaker: typically the judge is the speaker, because of a default *autocentric* view, but it may be another individual, if an *exocentric* view is adopted, as in (87), used in a situation where John is telling Mary how their son Bill enjoyed the trip to the amusement park.

- (87) a. Mary: How did Bill like the rides?  
 b. John: Well, the merry-go-round was fun, but the water slide was a little too scary.

(Lasersohn 2005, ex. 39)

More recently, Stephenson (2007) and Pearson (2013) have proposed an analysis of predicates of personal taste that represents the implicit experiencer argument as a pronoun. For Stephenson (2007) the null pronoun is either a judge-dependent  $PRO_j$  (she too, like Lasersohn (2005), adopts a judge evaluation parameter) or a *pro* that is anaphoric to a salient discourse individual. The former option results in autocentric readings with the experiencer argument interpreted as the speaker or attitude holder; the latter option yields exocentric readings. Pearson (2013) challenges the claim that two different pronouns are needed to derive the two types of interpretations, and suggests that the null experiencer argument pronoun is interpreted as a first-person-oriented generic similar to *one* (see Moltmann 2006; 2010a).

A locality effect of the presence of the experiencer argument pronoun can be seen in examples like (88a), which illustrates what Stephenson (2007) calls the *immediateness requirement*:  $PRO_j$  must denote the attitude holder of the immediately higher predicate. In (88a) it is John, not Mary, who finds the cake tasty. Yet Pearson (2013) questions why a *pro* argument is not available in this case, and in fact points out that in contexts that are clearly marked as exocentric, as in (88b), the immediateness requirement is violated. It appears that  $PRO_j$  must be posited as default, with *pro* being available only in clearly exocentric contexts.

- (88) a. Mary thinks that John thinks that the cake is tasty.  
 b. The cat thinks that John thinks that the cat food is tasty (since he keeps buying it for her).

(Pearson 2013, ex. 17)

Other examples point to a similar conclusion: the implicit argument needs to be  $PRO_j$  by default. Even if there is no assertion that the speaker tasted the cake (cf. (89b) to (89a)), the context seems to dictate an autocentric perspective. In (89c), although  $PRO_j$  is resolved as the attitude holder John in the assertion, the  $PRO_j$  that is part of the presupposed component denotes the speaker and thus precludes the continuation.

- (89) a. The cake that Mary and I ate was tasty. #But I didn't like it.  
 (Pearson 2013, ex. 17)  
 b. The cake that I made and Mary ate was tasty. #But I wouldn't have liked it.  
 (Pearson 2013, ex. 25d)

- c. John knew that the cake was tasty. #But I didn't like it.

(Pearson 2013, exs 27, 28)

The account offered by Pearson (2013) aims to capture the default first-person-oriented interpretation of the implicit argument of predicates of personal taste. She suggests that the null pronominal argument is similar to *one*, a pronoun with generic reference based on first-person experience. Borrowing from the analysis by Moltmann (2006; 2010a) on *one*, Pearson (2013) suggests that the null experiencer argument is a free variable ranging over individuals with whom the speaker/attitude holder identifies. The variable is bound by a Gen(eric) operator that is part of the meaning of all individual-level predicates, following Chierchia (1995) (and Pearson 2013 shows that predicates of personal taste behave like individual-level predicates). Crucially, this Gen operator is distinct from the aspect-based generic operator employed by Bhatt and Izvorski (1997), since it is supplied by the predicate of personal taste, and it is always available, in episodic contexts as well. Pearson (2013) does not address this issue, but on her view the contrast in (81) noted by Bhatt and Izvorski (1997) could be derived through a contextual restriction on the individuals with whom the speaker or attitude holder identifies. In aspect-based generic sentences, that would be pretty much any arbitrary individual; in episodic sentences, it would be restricted to a relevant group of contextually salient individuals. Contextual restriction is also responsible for exocentric interpretations, where the speaker is excluded from the set of individuals in the restrictor of Gen. Such situations are marked – the speaker is included in the set of individuals over which Gen ranges by default – and so they require strong contextual support. For additional discussion of the role of genericity in faultless disagreement see Snyder (2013).

On the analysis of Pearson (2013), faultless disagreement arises because the speaker includes the hearer in the group of individuals with whom he or she identifies, and the hearer then disagrees with this interpretation for the implicit pronoun. Locality constraints as in (88a) follow from the particular details in which the speaker/attitude holder is represented: it is bound by an operator in the CP-domain, as in (90), slightly modified from Pearson (2013, ex. 81b).

- (90)  $OP_1$  [[the cake]<sub>i</sub> is [GEN [<sub>t<sub>i</sub></sub> tasty  $\lambda x$  I(<sub>y<sub>1</sub></sub>, x)]]  
 where  $I(y, x)$  stands for  $y$  identifies with  $x$

Details of the semantic proposals and additional arguments that we cannot review here can be found in the referenced work. Others who have suggested that implicit arguments of predicates of personal taste are syntactically represented are Schaffer (2011), Moltmann (2010b), and Snyder (2013). We note here an argument from Schaffer (2011), namely that implicit arguments can be bound (see also Snyder 2013).

Consider (91) in a context where a family has gone out for ice cream and each member found the type of ice cream that they like. The implicit argument here is bound by the universal quantifier.

- (91) Everyone got something tasty.

Another argument comes from Snyder (2013), who notes that predicates of personal taste allow strict readings, in addition to sloppy readings, in VP-ellipsis contexts. (92) can be said in a situation where Ted is the only one going to the amusement park. What Fred is hoping for is that his friend, Ted, will have fun at the ride.

(92) Ted hopes the ride will be fun and so does Fred.

To conclude, the implicit experiencer arguments of predicates such as *fun*, *tasty*, and possibly *good* (see comments in Lasersohn 2005), *interesting*, *annoying* can control PRO, can be bound, can support strict readings in VP-ellipsis, are subject to locality constraints when embedded under attitude predicates, and share important interpretive properties with overt pronouns like *one*. These facts suggest that these implicit arguments are syntactically realized.

## 7 Structural representations of implicit arguments

Some of the challenges with syntactically representing implicit arguments came from the fact that they had to be represented as either PRO or *pro* and in some cases neither was a natural fit. Recent literature on implicit arguments explores a further possibility that goes beyond representing implicit arguments as PRO/*pro*. Landau (2010) and Legate (2014) propose that different kinds of implicit arguments have distinct syntactic representations. Landau (2010) distinguishes between strong and weak implicit arguments. Strong implicit arguments are those that behave on a par with overt arguments: they can control, bind reflexives, trigger Condition B and C effects, and license secondary predicates. Weak implicit arguments can control and trigger Condition B and C effects but they cannot bind reflexives or license secondary predicates. Landau argues that null direct objects in Italian are strong implicit arguments, null indirect objects can be strong or weak, and the implicit agent of a passive is a weak implicit argument. Strong implicit arguments consist of a phi-set and a D feature: this is the representation of *pro*. The representation of weak implicit arguments is as just a phi-set. The differences between strong and weak implicit arguments are related to the presence/absence of the D feature. Landau (2010) has both kinds of implicit arguments occupying specifier positions in the syntax. Legate (2014) also represents certain implicit arguments as feature sets but she argues that they can either be merged directly with a Voice head or be merged as the specifier of the Voice head. For the canonical passive, she argues that the phi-set associated with the implicit agent is merged with the Voice; she contrasts this with the grammatical object passive in Acehnese, where she argues that the phi-set is merged as a specifier of the Voice head. The different structural representations have implications for intervention: the implicit argument merged as a specifier intervenes, the one merged with the Voice head does not.

While a number of questions remain for the weak/strong classification of implicit arguments and the concomitant treatment of them in terms of phi-sets (see Kastner and Zu 2014b for an insightful and detailed discussion of Landau 2010), we conclude by discussing a case where this direction of inquiry has led to interesting

explanations. This concerns Van Urk's (2013) analysis of Visser's Generalization and some principled exceptions to it. Visser's Generalization is exemplified by (93), where the implicit agent of *promise* cannot control the subject of the infinitive.

- (93) \*Hobbes was promised (by Calvin<sub>i</sub>) [PRO<sub>i</sub> to make him a tuna sandwich].  
(Van Urk 2013, 169)

This generalization extends to Dutch, German, and Norwegian, but only when the object of the passive is promoted to subject position. In an impersonal passive where the object stays low, the implicit agent can in fact control into the complement clause. Van Urk (2013) derives this pattern by adopting a proposal of Landau's (see Landau 2008) according to which the functional head that agrees with the controller also agrees with the PRO. Control by the implicit agent requires that the relevant functional head agree with both the controller implicit argument and the PRO. In the standard Visser's Generalization configurations, the licensing head T agrees with the object that is promoted and not with the implicit agent. This blocks control by the implicit agent. In the absence of promotion, T agrees with the phi-set corresponding to the implicit agent, which is structurally higher than the unpromoted object, and then with PRO; this yields control by the implicit argument. The success of the analysis requires that the implicit agent has to have enough of a syntactic representation to enter into a relationship with T.<sup>16</sup>

In sections 3–6, we have seen 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 more equivocal. However, we find the existence of elements that are syntactically active but not syntactically projected conceptually problematic. We are optimistic that the wider representational possibilities explored in the recent literature (PRO/*pro*/phi-set; merged as argument/with head), together with a better understanding of cross-sentential anaphoric possibilities of different kinds of null arguments, will address the remaining challenges to the syntactic representation of these arguments.

SEE ALSO: Control Phenomena; Middles

## Notes

1. The above list is not intended to be exhaustive. Larson (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 instrumentality.
  - a. John ran (*Source* from the house) (*Goal* to the store) (*Path* along the river).
  - b. John cut the salami (*Instrument* with a knife).

Also relevant are cases of possessor raising which have been analyzed as involving nominals with an implicit possessor argument (see Hole 2005), degree arguments of adjectives, implicit contextual variables (see Mitchell 1986; Partee 1989), and implicit contextual restrictions/situation variables (see Kratzer 2004).

2. Approaching this question from a more semantic angle, Engelberg (2002, 375) offers the following characterization: "a verb's predicate constant has an implicit argument iff either (i) the verb has a variant with an explicit argument (i.e. an argument that gets syntactically realized) in the same semantic realization or (ii) there is a morphologically related verb with an explicit argument in the same semantic relation." This is perhaps a good place to point out that the focus of this survey will be limited to syntactic and, to a more limited extent, semantic properties of implicit arguments. We will not delve into the rich psycholinguistic literature on this topic such as Hartl (2003) and in particular a vital body of work developed by Jean-Pierre Koenig and Gail Mauner (see Mauner and Koenig 2000 as a point of entry), which has important implications for the question of whether there are implicit arguments in passives, middles, and unaccusatives respectively.
3. This section and the one following it bear a very obvious debt to Williams (2014).
4. Williams (2012) notes that not all definite implicit arguments can be bound. For example, the definite implicit argument of *forget/notice* cannot be bound.
  - i. Nothing was forgotten by the person who had first noticed.  
(≠ Nothing was forgotten by the person who had first noticed it.)
5. Our attention here is restricted to passives whose implicit argument is an agent. Implicit arguments of passives are not restricted to being agents; for instance, experiencers (see (i)).
  - i. The noise was heard at a great distance.
6. The following example reveals that the notion of agency relevant here needs to be broad enough to include non-animate causers.
  - i. The part was automatically rotated to insert four screws. (Tom Roeper, p.c.)
7. An anonymous reviewer notes that it is plausible that *teachers' strike* in (27) is a compound, suggesting that this would explain the ungrammaticality of *\*yesterday's [[the teachers]' strike]*. The reviewer's thought is that a compound cannot have a DP as its left-hand part. We cannot completely rule out this possibility, but we believe that an alternative, case-based explanation is available. Being a DP, *the teachers* needs case, in contrast to *teachers*, which can be an NP. PRO, on the other hand, does not need case and is hence possible despite *yesterday* occupying the case position.
8. It might seem that it is the adverb *easily* in (35a) that contributes the agentive interpretation. But *easily* does not in general force an agentive interpretation; see (i).
  - i. The ship sank easily.

An anonymous reviewer alerts us to the fact, noted in Fellbaum (1986), that middles permit only a post-VP *easily*, whereas unaccusatives permit both pre-VP and post-VP *easily*. Furthermore, while the pre-VP *easily* can contribute a meaning like 'at the slightest provocation', the post-VP *easily* means something like 'without difficulty'. These distinctions are important, but our point remains that the 'without difficulty' meaning does not deliver an agentive interpretation on its own.

9. The example improves considerably with the addition of *well*: ‘These books don’t sell well for the average shopkeeper.’ Further there are also speakers for whom (38a) is grammatical.
10. There 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; 1998) for details.
11. Sichel (2009) gives a related argument for the syntactic realization of the external argument of nominalizations based on data from Hebrew.
12. It 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 here can be used to block this reading in (50b). Then we can dispense with the implicit argument in (50b) or equivalently assume it to be fully optional. This point is relevant for the discussion of optionality at the end of this section.
13. An anonymous reviewer questions the extent to which these associations are hard-wired as opposed to pragmatically strongly preferred. This reviewer suggests the following scenario:
  - i. (One surgeon to another): I had never done anything like this before and was very nervous, so I underwent the operation with trembling hands.

This example does not sound completely natural to our ears, but the point is well taken.

14. Closely related to Bach’s Generalization is Visser’s Generalization that verbs do not passivize when they involve subject control (see (i)).
  - a. \*It was preferred [PRO to leave]. (vs. He<sub>i</sub> preferred [PRO<sub>i</sub> to leave].)
  - b. \*It was tried [PRO to leave]. (vs. He<sub>i</sub> tried [PRO<sub>i</sub> to leave].)

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

- ii. a. John<sub>i</sub> promised Mary [PRO<sub>i</sub> to be on time].  
John promised Mary that he would be on time.
- b. \*Mary was promised by John<sub>i</sub> [PRO<sub>i</sub> 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 (iib) shows. See Van Urk (2013) for an analysis of Visser’s Generalization in terms of structurally represented implicit arguments.

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 (see (iii)) and Bach’s Generalization (see (iv)) have been noted in the literature.

- iii. a. Mary was never promised to be allowed to leave.
- b. It was decided to leave.

(Bresnan 1982)

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

Bresnan (1982) suggests that the exceptions in (iii) and (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.

The ungrammaticality of (iib) could be due to the failure of a passive implicit argument to control the subject of its infinitival complement, but alternatively it could be due to the failure of certain subject control predicates to passivize, for currently unknown reasons. The latter seems more likely because some subject control predicates can in fact passivize and with them the implicit argument can control (see (iia) and (iib)).

15. Faultless disagreement effects are found with other vague scalar predicates such as dimensional *tall, rich, old* (see, among others, Richard 2004; Barker 2013; Kennedy 2013). Such predicates cannot be plausibly thought to have individual-denoting implicit arguments; instead, the source of their subjectivity lies in the setting of the standard of comparison. John and Mary can disagree on whether Ann is tall even when they rely on the same comparison class, yet differ in their assessment of what the standard degree of height is, given that comparison class. Clearly, different kinds of subjectivity can lead to faultless disagreement. An environment that distinguishes between the two kinds of subjective predicates is the complement position of *find*. Only evaluative predicates like *tasty* or *interesting* can be small-clause predicates under *find*, e.g., *John finds the cake tasty*. Dimensional predicates like *tall* or *rich* are not acceptable in this position, unless modified by evaluative adverbials such as *incredibly, surprisingly, remarkably* (Sæbø 2009; Kennedy 2013).
16. Kastner and Zu's (2014a) explanation of the absence of passive infinitives in Hebrew has a related logic; they derive this paradigm gap by appealing to an intervention effect created by a [+human] specification on the implicit agent in Hebrew.

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