

Structural Properties of Implicit Arguments

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1 The Diversity of Implicit Arguments

1.1 Definitional Issues

What is an implicit argument?

- (1) 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))
- (2) 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))
- (3) An argument is implicit only if it is in a structural position to license a thematic PP but no thematic PP occurs. (pg. 274 from Roeper (1987))
- (4) ...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. (pg. 375 from Engelberg (2002))

Are null subjects implicit arguments?

- (5) An operational definition: Implicit Arguments are elements that we need for syntactico-semantic reasons but which do not occupy a canonical syntactically realized position.

1.2 A Non-exhaustive List

1.2.1 'Thematic' Implicit Arguments

- (6) 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)
- (7) 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]
- (8) 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.'
 - c. John said (to us) [PRO to leave]. (cf. Landau (2000)).
- (9) Implicit arguments of adjectives (from Roeper (1987))
 - a. It is necessary/*inevitable [PRO to go].
 - b. It is wise/*probable [PRO to go].
- (10) 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))
- (11) Implicit agents of agentive suffixes (e.g. *-able*)
Goods are exportable [PRO to improve the economy].
- (12) Implicit Possessors

Sie trat ihm gegen das Schienbein.
she kicked him in the shin

'She kicked him in the shin.' (vs. *she kicked him in the headphones.)

1.2.2 'Athematic' Implicit Arguments

- (13) Degree Arguments (see Lasersohn (1997))
 - a. Paula is tall.
 - b. Paula is 6 feet/that tall.
 - c. Paula is taller.
- (14) Path/Location/Instrument Arguments (see Larson (1988))
 - a. John ran (*Source* from the house) (*Goal* to the store) (*Path* along the river).
 - b. John cut the salami (*Instrument* with a knife).
- (15) Implicit Contextual Variables (cf. Mitchell (1986), Partee (1989))
 - a. John visited a local bar.
 - b. Every sports fan in the country was at a local bar watching the play-offs.
 - c. Every participant had to confront and defeat an enemy.
- (16) Implicit Domain Restrictions/Situation Variables (cf. Kratzer (2004) for a reduction of the former to the latter)
 - a. Everyone looks quite serious.
 - b. Every girl finished every task.

- an argument from expressive power for explicit situation variables

1.3 A semantic classification

- (17) a. Passives: The ship was sunk.
 - ≈ The ship was sunk by someone.
 - existential semantics
- b. Arguments of Nouns 1: the use of drugs [PRO to fall asleep]
 - ≈ The use of drugs by someone [PRO to fall asleep].
 - existential semantics
- c. Arguments of Nouns 2: John is a friend.
 - ≈ John is x_C 's friend/*someone's friend.
 - context-dependent semantics

- d. Null Object 1:
 Questo conduce (la gente) a [PRO concludere quanto segue].
 this leads the people to conclude what follows
 ‘This leads people to conclude what follows.’
 \rightarrow *arbitrary* semantics
- e. Null Object 2:
 John said [PRO to leave].
 \approx John said to x_C /*someone [PRO to leave].
 \rightarrow context-dependent semantics
- f. Implicit arguments of adjectives:
- i. It is fun [PRO to play poker].
 \approx It is fun (for one) [PRO to play poker].
 generic \rightarrow *arbitrary* semantics
- ii. It was fun [PRO to play poker with Iva at the clubhouse last evening].
 \approx It was fun for x_C /*someone [PRO to play poker with Iva at the
 clubhouse last evening].
 \rightarrow context-dependent semantics
- g. Degree Arguments of adjectives:
 Paula is tall.
 \approx Paula is tall to d_{pos} /*some degree.
 \rightarrow context-dependent semantics

2 Structural Representation

(based on joint work with David Embick)

2.1 The semantic basis of Implicit Arguments

- $open_{intr}$ and *be opened* are both intransitive.
- But *be opened* has an implicit agent while $open_{intr}$ does not.

The absence/presence of an implicit agent seems to correspond with the semantics of $open_{intr}$ and *be opened*.

- (18) a. $\llbracket open \rrbracket = \lambda x \lambda e [\mathbf{open}(e)(x)]$
 b. $\llbracket be\ opened \rrbracket = \lambda x \lambda e \exists y [Ag(e) = y \wedge \mathbf{open}(e)(x)]$

- (19) Two Scenarios:
- a. Scenario 1: A gust of wind opens the door.
 - b. Scenario 2: Someone opened the door.
- (20) a. The door opened. → suitable in both Scenario 1 and 2
- b. The door was opened. → suitable in Scenario 2 but not in Scenario 1

2.2 Encyclopedic Agentivity

Hitting events cannot be conceptualized without an agent, while breaking events can be.

I will refer to this property of hitting events as 'Encyclopedic Agentivity'. *hit* is encyclopedically agentive, while *break* is not encyclopedically agentive.

In English, only verbs that are not Encyclopedically Agentive (i.e. they do not require an agent) participate in the transitivity alternation.

- (21) a. Some predicates that aren't Encyclopedically Agentive:
Transitive/Unaccusative: break, open, tear, blacken, boil,
- (this list is practically open class, see Keyser and Roeper (1984))
- b. Some predicates that are Encyclopedically Agentive:
Transitive/*Unaccusative: hit, cut, kill, distribute, make,...

In other languages, however, most notably in the Indo-Aryan languages (see Masica (1976)) and the Salishan languages (see Davis (2000)), encyclopedically agentive predicates also participate in the transitivity alternation.

- (22) **Question:** Do the intransitive counterparts of Encyclopedically Agentive predicates have implicit agents?

- Definitionally, the semantics of intransitive counterparts of Encyclopedically Agentive predicates makes reference to agentivity.

- But, nevertheless the conclusion I arrive at is that unaccusative Encyclopedically Agentive predicates do not have implicit agents.

They pattern with unaccusative non-Encyclopedically Agentive in lacking an implicit agent.

- (23) Things to keep separate: Encyclopedic vs. Syntactic Agentivity
- Syntactically Agentive, non-Encyclopedically agentive predicate:
break in ‘Erik broke the camera.’
 - Syntactically non-agentive, non-Encyclopedically agentive predicate:
break in ‘The camera broke.’
 - Syntactically Agentive, Encyclopedically agentive predicate:
hit in ‘Erik hit the bouncer.’
 - Syntactically non-Agentive, Encyclopedically agentive predicate:
no examples in English, *pit* ‘hit’ in Hindi-Urdu
- Note: non-Encyclopedically Agentive \neq Encyclopedically non-Agentive

2.3 Encyclopedically Agentive Unaccusatives in Hindi

- (24) a. Intransitive:
- per̄ kaṭ rahe hē̄
trees.M cut Prog.MPl be.Prs.Pl
‘Trees are cutting_{intr.}’ (i.e. Trees are being cut.)
- b. Transitive:
- kampani per̄ kaṭ rahii hai
company.f tree cut Prog.f be.Prs
‘The company is cutting trees.’
- c. Passive:
- kampani-dwaaraa per̄ kaṭ-e jaa rahe hē̄
company-by trees.M cut-Pfv.MPl Pass Prog.MPl be.Prs.Pl
‘Trees are being cut by the company.’

Every syntactic test for agents indicates that the intransitive of Encyclopedically Agentive *kaṭ* ‘cut’ patterns with the intransitive of non-Encyclopedically Agentive *tor* ‘break’ in lacking an implicit Agent.

(25) Licensing of *dwaaraa* 'by'-phrases

a. Intransitive:

*kampani-dwaaraa per̄ kaṭ rahe hẽ
company-by trees.M cut Prog.MPl be.Prs.Pl

'*Trees are cutting_{intr} by the company.'

b. Passive:

kampani-dwaaraa per̄ kaaṭ-e jaa rahe hẽ
company-by trees.M cut-Pfv.MPl Pass Prog.MPl be.Prs.Pl

'Trees are being cut by the company.'

(26) Compatibility with Agentive adverbs like *jaan buujh-kar* 'deliberately'

a. Intransitive:

per̄ (*jaan buujh-kar) kaṭ rahe hẽ
trees.M deliberately cut Prog.MPl be.Prs.Pl

'*Trees are cutting_{intr} deliberately.'

b. Passive:

kampani-dwaaraa per̄ jaan buujh-kar kaaṭ-e jaa rahe
company-by trees.M deliberately cut-Pfv.MPl Pass Prog.MPl
hẽ
be.Prs.Pl

'Trees are deliberately being cut by the company.'

(27) a. Passive:

hāste hāste per̄ kaaṭ-e jaa rahe hẽ
laughing laughing trees cut-Pfv.Pl PASS Prog.Pl be.Prs.Pl

'The trees are being cut by someone who is laughing.'

b. Intransitive:

*hāste hāste per̄ kaṭ rahe hẽ
laughing laughing trees cut Prog.Pl be.Prs.Pl

(28) a. Passive:

khaanaa khaa-kar per̄ kaaṭ-aa jaa rahaa hai
food eat-having tree cut-Pfv PASS Prog be.Prs

'The tree is being by cut by someone, that someone having eaten food.'

b. Intransitive:

*khaanaa khaa-kar per̄ kaṭ rahaa hai
food eat-having tree cut Prog be.Prs

2.4 Local Conclusion

Encyclopedic Semantics is not a good guide to the presence of an implicit argument. We need additional tests - I have considered syntactic tests here, but psycholinguistic data of the sort explored in an extensive body of work by Jean-Pierre Koenig and Gail Mauner is highly relevant here.

3 Structural Properties

3.1 Binding Theoretic Arguments

Implicit arguments participate in binding theory:

- (29) a. Condition A:
- i. Respect for oneself is important. (from Williams (1985))
 - ii. He_i respects himself_{*i*}.
- b. Condition B:
- i. Admiration of him
(*admirer* \neq *admiree*) (from Williams (1985))
 - ii. * He_i respects him_{*i*}.
- c. Condition C:
- i. The realization that John was unpopular
(*realizer* \neq *John*) (from Ross (1969) via Williams (1987)).
 - ii. * He_i realized that John_{*i*} was unpopular.

They seem to have pretty much the same behavior as overtly projected arguments.

Binding theory is stated in structural terms.

→ Implicit Arguments must have some structural representation.

Where is the implicit argument?

In a position from which it c-commands the material to the right of the noun.

If a predicate has more than one implicit argument, they are all subject to binding theory.

- (30) a. Implicit Arguments:
- i. *The promise that John would win was made to him yesterday.
 - ii. *The promise that John would win was made by him yesterday.
- b. Overt Pronouns:
- i. *They promised him_i yesterday that John_i would win.
 - ii. *He_i promised them yesterday that John_i would win.

The above facts follow straightforwardly if we assume that implicit arguments appear in the same structural configuration as overt arguments.

Williams (1985)'s alternative:

- (31) 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))
- (32) Landau (2007)'s distinction between 'strong' and 'weak' implicit arguments:
- a. Strong: *pro*, PRO (including subjects of nominalizations):
visible as subject of predication, binder for Principle A, binder for Principle B/C, and as controller.
 - b. Weak: implicit agents of passives, certain implicit objects in English"
not visible as subject of predication or as binder for Principle A
visible as binder for Principle B/C and as controller.
 - i. Mary talked about him.
(implicit goal \neq *him*)
 - ii. Mary talked *(to John) about himself.
(implicit goal cannot bind *himself*)
 - iii. John heard about her.
(implicit source \neq *her*)
 - iv. The promise that John would win.
(implicit goal of *promise* \neq *John*)
 - v. It was insulting that no one helped John.
(implicit experiencer \neq *John*)

3.2 Arguments from Variable Binding

3.2.1 Implicit Arguments that can be bound

Certain implicit arguments can be bound:

(33) (from Partee (1989))

- a. An enemy is approaching.
- b. Every participant had to confront and defeat an enemy.

(34) $\llbracket \text{enemy} \rrbracket = \lambda x \lambda y [\text{enemy}(x)(y)]$

- a. Erlend is an enemy of Howard/Erlend is Howard's enemy.
 $\text{enemy}(\text{howard})(\text{erlend})$
- b. Erlend is [an enemy x_C].
 $\text{enemy}(x_C)(\text{erlend})$

(35) Every participant defeated an enemy.

[Every participant] $\lambda x [x \text{ defeated an enemy of } x]$

(36) (from Partee (1989))

- a. Most Europeans speak a foreign language.
- b. Most foreigners speak a foreign language.

Implicit Arguments are also subject to Weak Crossover restrictions: the quantifier that binds them must precede them.

(37) (from Partee (1989))

- a. From five feet away, I tried to toss a peanut to the pigeon.
- b. #?From five feet away, I tried to toss a peanut to every pigeon.

(38) (from Partee (1989))

- a. #?The leader of the local union wrote a letter to every untenured professor in the state.
- b. Every untenured professor in the state received a letter from the leader.

Implicit arguments pattern closely with overt pronouns:

- (39) Implicit Arguments (from Partee (1989))
- a. Only the nearest photographer got a good picture of Reagan.
 - b. #?Only the nearest photographer got a good picture of every senator.
 - c. Every senator directed a smile at the nearest photographer.
- (40) Overt Pronouns (from Partee (1989))
- a. Only his top aide got a good picture of Reagan.
 - b. #?Only his top aide got a good picture of every senator.
 - c. Every senator directed a smile at his top aide.

If lexical representations do not contain free variables, the existence of bound readings is an argument for the structural representation of the above implicit arguments.

3.2.2 Implicit Arguments that cannot be bound

- Implicit Agents of Passives:

As noted by Baker et al. (1989), 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.

One explanation for the above pattern could be that the implicit argument of a passive is pronominal, not anaphoric. The absence of a bound reading would then reduce to a Condition A violation.

The facts are, however, more general. It seems that the implicit agent of a passive cannot be bound at all.

- (43) a. Every journalist wants [Kylie to be interviewed].
b. Every journalist wants [Kylie to be interviewed by him].
c. Every journalist wants [Kylie to be interviewed by someone].
(43a) \neq (43b), (43a) \approx (43c)

The absence of the bound reading is further brought in (44).

- (44) a. Every journalist wants [Kylie to be interviewed], #not anyone else.
 b. Every journalist wants [Kylie to be interviewed by him], not anyone else.
 c. Every journalist wants [himself to interview Kylie], not anyone else.
 (# indicates that the contrast cannot be with the journalist.)

The absence of bound readings is not, however, grounds for doubting the existence of an implicit argument in these cases. The facts follow if we assume that these implicit arguments are existentially bound along the lines suggested in Koenig and Mauener (1999).

Some wrinkles:

- We need to allow for ‘existential disclosure’ for the cases when there is a *by*-phrase.

- (45) a. Erik was insulted.
 $\exists x, e[Ag(e) = x \wedge \mathbf{insult}(\mathbf{Erik}, e)]$
 b. Erik was insulted by Nina.
 $\exists x, e[Ag(e) = x \wedge x = \mathbf{Nina} \wedge \mathbf{insult}(\mathbf{Erik}, e)]$

- The implicit argument isn’t always existentially bound. Sometimes it can also be bound by a generic operator.

- (46) Attention must be paid to oneself.

oneself indicates that the implicit argument in (46) is not existentially bound. The existential quantification is therefore not part of the lexical entry - rather it probably comes in through a process like a last resort Existential Closure.

Within analyses of the passive that involve v_{AG} (see Embick (2004)), we might not need a separate projection of an implicit argument.

- (47) $\llbracket v_{AG} \rrbracket = \lambda x \lambda e[Ag(e) = x]$ (cf. Kratzer (1996))
 a. Active: v_{AG} gets a specifier.
 b. Passive: v_{AG} does not get a specifier, Existential Closure applies.

The implicit argument in a comparative also seems to be impervious to binding.

- (48) a. Every student believes that Erik is taller.
 b. Every student_i believes that Erik is taller than him_i.
 c. Every student believes that Erik is taller than someone. ($\forall > \exists$)
 d. Every student believes that Erik is taller than x_C .
 (48a) \neq (48b), (48a) \neq (48c), (48a) = (48d).

It seems then that this implicit argument is somewhat like an indexical element (I, you, now, here) and hence, like them, cannot be bound (see Condoravdi and Gawron (1996) for discussion).

The case of implicit arguments of nouns is tricky.

At first it seems that variable binding of the implicit argument is possible.

- (49) John made an attempt [PRO to leave].
 (*John* is the attempter.)

But note that unlike variable binding, there is no optionality here. No one else could have been the *attempter*. This is more akin to *control*.

There also seem to be locality considerations - binding/control of the implicit argument only seem to be possible when the noun in question is a co-argument of the binder/controller as in (49).

- (50) a. Annie believes that the attempt [PRO to leave] was unsuccessful.
 b. Annie believes that her attempt [PRO to leave] was unsuccessful.
 c. Annie believes that the unique contextually salient attempt by someone to leave was unsuccessful.
 (50a) \neq (50b), (50a) \approx (50c)

- the implicit arguments of nouns can be combined with the embedding predicate.
- if this does not happen, the arguments are existentially quantified and cannot be bound from above.

- (51) a. Håvard believes that Erik performed an operation.
Erik is the agent of the operation, patient existentially quantified, cannot be bound by *Håvard*.
 b. Håvard believes that Erik underwent an operation.
Erik is the patient of the operation, agent existentially quantified, cannot be bound by *Håvard*.

Implicit Arguments of predicates like *be fun/wise* etc.

Cannot be bound if the *be fun* gets a generic interpretation:

- (52) a. Liina thinks that it is fun to play hockey.
(\approx Liina thinks that Gen_x [it is fun for x [for x to play hockey]].)
(\neq Liina thinks that [it is fun for her [for her to play hockey]].)
- b. Liina thought that it was fun to play hockey in the park last evening.
(\approx Liina thought that [it was fun for her [for her to play hockey]].)

But in the absence of a generic interpretation, a bound reading seems available. Existential quantification over the implicit argument must not be available or else we would get an interpretation where what Liina believes is that there is someone for whom it is fun to play hockey.

Null Objects:

These are very limited in English. Binding does not seem to be possible.

- (53) null object cannot control PRO:
no binding, but existential quantification doesn't work either:
- a. This leads (one) to the following conclusion.
 - b. This leads *(one) [PRO to conclude that].
 - c. Every scientist thinks that this fact led IMP to that conclusion.
 - d. Every scientist_{*i*} thinks that this fact led him_{*i*} to that conclusion.
 - e. Every scientist_{*i*} thinks that this fact led someone_{*i*} to that conclusion.
- Is there really an IMP here? (See discussion in Rizzi (1986), English vs. Italian)

- (54) null object can control PRO:
no binding, but existential quantification doesn't work either:
- a. Every fan thinks that Erlend said IMP_{*i*} [PRO_{*i*} to come to the after-party].
 - b. Every fan_{*i*} thinks that Erlend said to him_{*i*} [to come to the after-party].
 - c. Every fan thinks that Erlend said to someone_{*i*} [PRO_{*i*} to come to the after-party].

The IMP here seems to be directly context-dependent, not amenable to binding.

3.3 Arguments from Control

The ability of an implicit argument to control the subject of an infinitival clause is taken to be a major argument in favor of the syntactic projection of implicit arguments.

For example, the implicit agent of a passive is able to control the subject of a rationale clause.

- (55) 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)

Such control is not possible with unaccusatives and middles. This has been used to argue that unaccusatives and middles do not have an implicit agent.

3.3.1 The Photosynthesis Counterexample

The argument from control rests on the following assumption:

- (56) The controller of a (non-arbitrary) PRO must be syntactically represented.

Williams (1985) argues that control of rationale clauses does not require the controller to be represented in the matrix clause.

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

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:

- (58) 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))

Do the photosynthesis examples indicate that the PRO control data does not bear upon the linguistic representation of implicit arguments?

I think that would be an instance of generalizing to the worst case.

The cases where there is no implicit agent require more context than the ones where there is an implicit agent.

Speculation: instances of control into rationale clauses which involve no linguistically represented implicit agent might involve a process of accommodation along the lines suggested in Koenig and Mauner (1999). If this is on the right track, we would expect such cases to be harder to process than cases with implicit agents (see Mauner and Koenig (2000)).

A desirable generalization:

- (59) An implicit agent of the right semantic type in a local c-commanding configuration should be able to control a PRO subject of an infinitival clause.

Alas the facts are more complicated.

3.3.2 Control into Complement Clauses

With certain exceptions, implicit arguments seem to be able to control into the complement clause of their predicate

With passives, this is a bit hard to see due to Visser's Generalization.

- (60) Visser's Generalization: subject control predicates do not passivize.
- 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]).

It is possible that these cases are bad due to the inability of the implicit agent to control the PRO in the infinitival clause. Alternatively there could be some other factor that blocks passivization here.

But there is an exception to Visser's Generalization, *decide*, where we can see that the implicit argument can control into the complement clause.¹

- (61)
- a. In December 1942 it was decided [PRO to build a POW camp in Concordia, KS].
 - b. During the last meeting it was decided [PRO to conditionally approve the new security requirements].
 - c. It was decided [PRO to transport the serum by train from Anchorage to Nenana].

¹The *it was decided to* locution tends to be used to describe decisions made by groups. It feels decidedly odd when used to describe a decision made by an individual.

Nouns that take infinitival complements robustly allow for their implicit agent to control into the infinitival complement.

- (62) a. The attempt [PRO to leave] was unsuccessful.
b. The promise [PRO to let the refugees return] was not kept.
(Agent controls the PRO.)

Null Objects in English that correspond to PPs can control into infinitival complements, but not those that correspond to DPs. This is in contrast to Italian where implicit arguments corresponding to DPs can control.

- (63) (from Rizzi (1986))
- a. English 'DP' implicit arguments:
 - 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.'
 - c. English 'PP' implicit arguments:
 - i. John said to us_i [PRO_i to meet by the fountain].
 - ii. John said IMP_i [PRO to meet by the fountain].

Implicit arguments of predicates like *be wise/fun* which take infinitival complements also control.

- (64) a. GEN_i [It is difficult (for IMP_i) [PRO_i to dance the dance]].
b. This morning, it was difficult (for us_i [PRO_i to dance the tango] since the floor was slippery and we were all hung over.

Locality effects emerge here. The controller must be in the immediately higher predicate (as long as we stay in the domain of Obligatory Control (OC); with Non Obligatory Control (NOC), non-local antecedents are possible. see Landau (2001)).

- (65) **A Summation:** Implicit arguments do not always control into their predicate's infinitival complement. But if anything can control into the infinitival complement, it is the implicit argument.

3.3.3 Control into Adjuncts

The constraints on control into adjuncts by implicit (and even overt) arguments are poorly understood. A number of additional factors enter into the picture and the conclusion in (65) does not hold i.e. something other than the implicit argument may be able to control into the adjunct.

Consider for example the following factors:

The role of modality:

- (66) 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 location of the theme:

- (67) (from Roeper (1987))
a. The destruction of the boat to collect the insurance.
b. *The boat's destruction to collect the insurance.

Properties of the rationale clause:

- (68) (from Roeper (1987))
a. The ship was sunk to collect insurance.
b. ?The ship was sunk to become a hero.
c. *A vote was taken to be elected president.

The [+/-human] nature of the implicit argument and the overt subject:

- (69) (from Manzini (1986), Kawasaki (1993) via Landau (2001))
- a. The rain washed the stairs before entering the basement.
 - b. The stairs were washed before entering the basement.
 some human, not the rain, washed the basement before entering.
 - c. Mary was washed before entering the basement.
 some human washed Mary before Mary entered the basement.

The need for a discourse topic, which can remove the grammatical controller requirement altogether:

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

The controller does not need to be either the matrix subject or the matrix event:

- (71) The old room I would creep in at midnight and try to find an empty bed in the dark. Could have been a disaster. Now the bathrooms are down the hall so the lights are on to find them (from Landau (2007)).

The photosynthesis cases can be seen as a limiting case.

- Because of these confounds, the import of the data concerning control by implicit arguments into infinitival adjuncts remains unclear.

4 Landau (2007)'s argument for syntactic representation of Implicit Arguments

Landau (2007) notes the following contrast between PRO and implicit arguments.

- (72)
- a. It is impossible [PRO to visit me together].
 - b. It is impossible [for me to be visited (*together)].
 - c. They expected [PRO to leave the room angry].
 - d. The room was left (*angry).

He takes this to show that secondary predicates can only be predicated of DPs; whatever the syntactic projection of the implicit argument is, it is not that of a DP and hence the above contrast follows.

He argues that implicit arguments are syntactically projected (as features on functional heads).² His argument goes as follows.

- (73) a. Non-local relationships (i.e. relationships between non co-arguments) must be syntactic.
b. Partial Control is not local in the above sense.
c. Implicit Arguments participate in Partial Control.
→ Implicit Arguments must be syntactically represented.

Step 1: Simple obligatory control can be treated as predication (see Dowty 1985:299, Chierchia 1989:144) - a control verb could predicate its infinitival complement of its subject. Hence it is 'local' and could in principle be non-syntactic.

Step 2: Partial control is not amenable to a predication analysis.

- (74) Partial Control:
a. We knew that Mr. Smith_i arranged [PRO_{i+} to meet after class].
b. Mr. Smith realized that his wife_i hated [PRO_{i+} to kiss in front of the kids].

- (75) Exhaustive Control:
a. *We knew that Smith remembered to meet after class.
b. *Mr. Smith realized that his wife started to kiss in front of the kids.

Partial Control underlies certain cases that are sometimes identified as involving optional control:

- (76) a. John_i wondered [who PRO to introduce his_i fiancée/*him_i to].
b. John_i asked [how PRO to talk to Mary/*him_i about oneself].

Note that the collective predicates cannot be predicated directly of the controllers:

- (77) a. *Mr. Smith met after class.
b. *His wife kissed in front of the kids.

²I am referring here to his 'weak' implicit arguments. The 'strong' implicit arguments are projected syntactically like full DPs.

We *could* write a lexical entry that predicates the infinitival clause of a plural entity that consists of the subject and some other contextually specified individuals but Landau considers such an entry to dilute the attractiveness of the predication theory as the infinitival clause is no longer predicated of a co-argument. He also notes that just writing down such a lexical entry would not reveal any correlations between the possibility of PC and other properties of predicates that permit PC; the distribution of PC would be idiosyncratic.

Step 3: Implicit Arguments participate in Partial Control:

- (78) a. Mary found it exciting to meet on top of the Empire State Building.
b. The chair found it frustrating to gather without a concrete agenda.
c. Rachel found it embarrassing to kiss in public.
- (79) I told Mary that my brother in law has been recently cold to me.
She said to meet and talk things over.

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