Remarks on PRO_{arb}

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1. Introduction

While in the past thirty years we have learned a lot about the syntax and semantics of controlled PRO, little progress has been made in our understanding of the syntax and semantics of PRO_{arb}. Syntactically, it is still unclear whether PRO_{arb} is “free”, that is, uncontrolled, as the seminal studies on Control (Williams 1980 and Chomsky 1981) suggested, or whether it is controlled, as a series of subsequent studies claimed. Semantically, we do not know exactly what its semantic contribution is: is it “generic” (Williams 1980 and others), or generic and first-personal (Moltmann 2006)? And if it is generic, why does it show up as specific in certain contexts? Last but not least, we do not even know whether PRO_{arb} really exists: Chierchia (1988) argues against the existence of PRO_{arb} on semantic grounds, Hornstein (1999) identifies it with small pro mainly on syntactic grounds.

This paper is an attempt to give a sense of these issues. We will be mainly concerned with the questions related to Control and the semantics of PRO_{arb}, assuming that there exists a syntactic formative corresponding to PRO_{arb}. In reviewing the main ideas on PRO_{arb} we will first face a purely empirical question: In which syntactic environments does PRO_{arb} occur? Even in this respect PRO_{arb} raises problems, since what sometimes has been labeled “PRO_{arb}” is in fact – as we take – an instance of implicitly controlled PRO, whose meaning recalls the “arbitrary” interpretation. Adjunct Control is a case in point. Although the similarities between Adjunct Control and “Arbitrary Control” (as following Landau 2000, we will call the “cases where no argument in the sentence, either overt or implicit, is understood as the controller”) may not be accidental, we will
leave these cases out of the scope of this article and focus on the prototypical occurrences of PROarb, namely subject clauses.

This paper is organized as follows. After considering the distributional properties of PROarb, we will discuss some ideas concerning the syntax and the semantics of PROarb. As for the syntax of PROarb we will show that even the cases where a general consensus holds about PROarb as thematically controlled, are not so doubtless. We will then analyze the semantic properties that have been singled out in the literature on PROarb and show that even in this respect some facts may have been misinterpreted. We will then discuss some issues concerning a class of predicates that rules out infinitive arguments (and PROarb) – namely, epistemic modals. Finally we will present some remarks on the de se reading that PROarb apparently displays.

2. Empirical framework

PROarb has been claimed to occur in a wide range of environments:

A. Infinitival clausal argument of different categories of adjective: “psychological” (examples (1)a), “evaluative” (examples (1)b and c), deontic modal adjectives (examples (1)d and e):

(1)  a. It is fun [PROarb to play baseball] (Epstein 1984)
     b. It is important [PROarb to get an A in math] (Chomsky 1981)
     c. [PROarb to walk alone at night] is dangerous (Bhatt and Izvorski 1998)
     d. It is necessary [PROarb to go] (Roeper 1987)
     e. [PROarb to take the exam] is obligatory (Moltmann 2006)

B. Infinitival clausal argument of “causative” verbs:

(2)  a. [PROarb/1 to behave oneself/himself in public] would help Bill1 (Manzini 1983)
     b. [PROarb/1 to behave oneself/himself in public] would help Bill1’s development (Manzini 1983)

C. Infinitival indirect questions (‘wh-complements’):

(3)  a. It is unclear [how PROarb to behave oneself] (Chomsky 1981)
b. John asked [how $\text{Pro}_{\text{arb}}$ to behave oneself]  
(Manzini (1983))

D. Copulative structures:

(4)  [PROarb making a large profit] requires [PROarb exploiting the tenants]  
(Epstein 1984)

E. Adjunct clauses (rationale, temporal, absolutive or without-clauses):

(5)  a. Boats are sunk [PROarb to collect the insurance]  
(Bhatt and Pancheva 1998)
   b. [Before PROarb entering the basement], the stairs were washed  
(Manzini 1986)
   c. The game was played [PROarb wearing no shoes]  
(Roeper 1987)
   d. The president was elected [without PROarb considering his competence]  
(Roeper 1987)

In the environments (A) and (B), other constituents within the infinitival clause may enforce the arbitrary interpretation of PRO:

(6)  a. It is dangerous for babies$_1$ [PROarb to smoke around them$_1$]  
(Kawasaki 1993)
   b. It helped John$_1$ [PROarb to teach him$_1$ Spanish]  
(Kawasaki 1993)

Finally, the presence of PROarb is banned in Obligatory Control infinitives PROarb:

(7)  a. *John wanted [PROarb to be quiet]  
(Landau 2000)
   b. *John remembered [PROarb not to smoke around the babies]  
(Landau (2000))

Whether all or just some environments involve PROarb is a debated question. While the environments in (A), (B), (D) and (E) have been claimed to involve PROarb, wh-infinitives are probably instances of Partial Control (Landau 2000). It is nonetheless debatable whether the environment in (A), (B), (D) and (E) all involve Arbitrary Control as defined by Landau (2000). We will address the question in the following section.
3. The Syntax of PRO_{arb}

Although in a series of seminal works on Control (Williams 1980, Chomsky 1981, Manzini 1983) PRO_{arb} was claimed to be “free”, that is, uncontrolled, later works privileged the opposite solution. Examples (1) and (5) have been taken as evidence that Arbitrary Control is in fact Control by an implicit argument (Epstein 1985, Bhatt and Izvorski 1998), which may be assigned different theta-role: the experiencer role (examples (1)a, b), the benefactive (examples (1)c-e), or the agent (examples (5)). This idea also predicted that monadic predicates cannot take an infinitival clause as their argument, since a controller for PRO would be missing and PRO would be uncontrolled. Since epistemic modals are monadic, the ungrammaticality of the following examples was interpreted as evidence in favor of the thematically controlled theory of PRO_{arb}:

(8) a. *To play baseball is certain.
   b. *It is probable [PRO to go]

In other environments, however, it is unclear whether PRO_{arb} is controlled or not. A general agreement is missing whether an implicit argument occurs in examples (3) and (4). Bhatt and Izvorski (1998) classify the examples in (3) as an instance of implicit Control, Landau 2000 as Partial Control. Bhatt and Izvorski (1998) consider example (4) as involving Implicit Control, too, but Lebeaux (1984), Cinque (1988), Landau (2000), Moltmann (2006) label such example as a case of Arbitrary Control. Finally, as far as we know, the examples in (2) and (6) have never been claimed to involve Implicit Control. Manzini (1983) and Landau (2000) interpret them as real instances of Arbitrary Control.

Finally, a general consensus is also missing on the mechanisms of Control involved in the above examples. Epstein (1985) and Bhatt and Izvorski (1998) claim that PRO_{arb} is controlled by an implicit argument, Lebeaux (1984) and Kawasaki (1993) have hypothesized that A'-positions may be involved in the Control relation. We will briefly review these viewpoints.
3.1. Control Theories of PRO<sub>arb</sub>

Building on examples like (1)a, the intuitive interpretation of which is that playing baseball is fun for whoever plays baseball, Epstein (1984) proposes that PRO<sub>arb</sub> is controlled by an implicit argument, which may be made overt by a for-clause:

(9) It is fun for Lucy to play baseball.

Epstein suggests the possibility that in general PRO must be controlled by an implicit argument. This idea, he argues, would explain the difference in status between sentences like (1)a and sentences involving epistemic modals (see (8)), which disallow for-clauses. The availability of a for-clause is the only diagnostics to show that a covert argument occurs. This diagnostics builds on the observation that if in a given structure an argument satisfying a theta-role can occur, then it must occur, since the theta-grid of a predicate is invariable. Thus, if there is no overt argument in that structure, that argument must be covert.

Lebeaux (1984) claims that PRO<sub>arb</sub> is controlled as well. Differently from Epstein, however, he claims that Control on PRO<sub>arb</sub> is not thematic. Rather, an adjunct within the binding domain of PRO<sub>arb</sub> controls it. Thus, while Epstein claims that PRO<sub>arb</sub> is controlled from an A-position, Lebeaux claims that it is controlled by an A'-position. This allows him to explain data that do not include any implicit controller, like the examples involving an indirect question (see example (10)a below), the so-called “linked reading” structures (copulative structures, see example (4)), and the examples where PRO<sub>arb</sub> does not seem to co-vary with an implicit argument, as in the following example:

(10) a. John knows [how PRO<sub>arb</sub> to solve the problem].
    b. [What PRO<sub>arb</sub> to do] is unclear.

In the sentence in (10)a the main predicate does not have any implicit argument Controlling PRO, since the argument structure of know has two positions and PRO may not be interpreted as controlled by John. In (10)b PRO does not necessarily co-vary with the implicit argument of unclear.

Bhatt and Izvorski (1998) improve Epstein’s theory of PRO<sub>arb</sub> in that they claim that Arbitrary PRO is always controlled by an implicit argument à la Williams (1985) in the immediately higher clause. They extend their proposal to generic passives and propose a solution for the data that apparently could not be reduced to Epstein’s thematically con-
trolled PRO\textsubscript{arb} theory – namely, the *wh*-complement infinitives, and to the so-called ‘linked readings’.

In their view, all these environments do include an implicit argument controlling PRO. As for the passives and the ‘linked reading’ structures, they apply the *for*-clause diagnostic test as a piece of evidence in favor of their claim:

\begin{enumerate}
\item Ships are sunk [PRO\textsubscript{arb} to collect insurance]
\item Ships are sunk by their owners, [PRO\textsubscript{i} to collect insurance]
\end{enumerate}

\begin{enumerate}
\item [PRO\textsubscript{i} to know him] is [PRO\textsubscript{i} to love him]
\item For Pat, [PRO\textsubscript{i} to know him] is [PRO\textsubscript{i} to love him]
\end{enumerate}

As for PRO\textsubscript{arb} occurring in *wh*-complement infinitives, they observe that *wh*-complements are implicitly modals. Particularly, the modality involved is deontic. A sentence like (10)a can be paraphrased as follows: “John knows how one should/could solve the problem”. Similar consideration may explain the intuitions about the sentence in (10)b. Thus, they claim that the argument of the implicit deontic modal controls PRO.

\subsection*{3.2. Analytical remarks}

Despite Bhatt and Izvorski’s theory is able to explain a larger set of data than previous theories, some problems remain unsolved:

\textbf{a.} Under the hypothesis that an implicit argument appears in every environment where PRO\textsubscript{arb} occurs, it must be postulated that an implicit argument occurs in the sentences in (2) and (6). However, every theta-role appears to be assigned in these sentences.

\textbf{b.} In examples involving the ‘linked readings’, the question arises, what theta-role do predicates like *be, mean, entail, require* assign to the argument that can be made overt through a *for*-clause? The question is not faced directly in Bhatt and Izvorski (1998). They only point out that such a role is not an evidential role (in the sense of Schweikert 2005), since it cannot be paraphrased as *in x’s opinion*.\footnote{Bhatt and Izvorski (1998), n. 17.} Moreover, such a theory should explain why an implicit controller occurs in the examples in (2), in (4), and in (6), but it...
does not in (8). However, if there is no implicit argument in (8), why should there be one in the other examples?

(c) There is no general agreement on the presence and on the role of implicit arguments in some of the examples where an implicit argument is postulated. We focus on the case of deontic modals. Bhatt (1999) and Wurmbrand (1999) argue that the bearer of the obligation or of the permission (which in (1)d,e is assumed to be implicit in thematically controlled PRO\(_{arb}\) theories) is not syntactically represented in some contexts. Consider the following example:

(13) There must be fifty chairs in this room by 5 p.m. (said to a caterer)  
(Bhatt and Izvorski 2006)

As for Control in adjunct clauses the presence of a implicit controller is also doubtful. Let us consider first rationale clauses. Examples that have been claimed as involving an implicit agent may have been misinterpreted, since in many cases PRO\(_{arb}\) does not seem to need a controller, or a potential controller cannot Control PRO\(_{arb}\):

(i) a. The shopwindow has a big sale sign in it [(in order) PRO\(_{arb}\) to attract customers]  
   (Farkas 1988)  
b. *The ship was sunk [PRO\(_{arb}\) to become a hero]  
   (Lasnik 1988)

As for temporal clauses, absolutive clauses, and clauses introduced by without, the idea that the implicit agent obligatorily Controls PRO\(_{arb}\) has often been argued (Borer 1989, Clark 1990, Hornstein 1999). However, the implicit agent seems to have some restriction belonging exclusively to these structures, as the [+human] feature observed by Manzini (1986). Kawasaki (1993) claims that the [+human] restriction reflects the fact that adjunct Control is not agent Control but rather ‘topic Control’, i.e. the reference of PRO is determined by the current discourse topic, which is established pragmatically. Kawasaki proves this claim observing that definite NPs, but not indefinite NPs, can Control PRO\(_{arb}\) in an adjunct:

(ii) After collecting some money, a bank account was opened by the/*a businessman.

Definite NPs refer to an entity already present in the discourse, while indefinite NPs introduce new entities. Thus, only definite NPs can work as discourse topic. Moreover, subjects work as topic easier than objects. Thus, PRO\(_{arb}\) can be controlled by subjects better than by objects:

(iii) a. John harassed many women. ??After talking to the manager, complaints were filed.  
b. Many women were harassed by John. After talking to the manager, complaints were filed.

Finally, if the discourse topic is salient enough, it can Control PRO\(_{arb}\) without even being represented grammatically:

(iv) After pitching the tents, darkness fell quickly.
Here the “obligee” is not represented syntactically – at least, not as an argument of the matrix predicate. Thus, at least in some cases, the obligee or the permisssee of a deontic modal do not have an obvious syntactic realization. Wurmbrand (1999) even suggests that the relation of obligation and permission involved in deontic modality is not encoded through theta-roles, but rather through pragmatic roles. Note that such roles can control PROarb in a rationale clause:

(14) There must be some time [PROarb to organise supply and demand].

PROarb is here licensed despite no implicit argument, is present. The question then arises, what licenses PROarb. Whatever licenses it, must occur in the sentences where PROarb appears, but it must be absent in sentences where PROarb is ruled out – as in (8) – unless the ungrammaticality of (8) is due to completely different reason than the presumed illegitimacy of Control on PROarb.

All in all, the claim that PROarb is thematically controlled by an implicit argument does not appear to be supported by strong evidence. While examples involving an implicit experiencers, like (1)a and b, appear to be compatible with the theory of Control by an implicit argument quite naturally (although the only evidence argued in favor of this view is the optionality of a for-clause), the other examples are hardly explicable through such theory. In examples involving “evaluative” and modal predicates (sentences (1)b, c, d, e), an implicit argument may not be there, and if there is one, the co-variance of the implicit argument and PRO is not obligatory (see example (6)a). The question is then,

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3. It didn’t escape our notice that structural considerations may explain why only implicit experiencers are the only implicit arguments that PROarb obligatorily co-varies with. An argument satisfying the experiencer theta-role is merged above an arguments satisfying the causer theta-role (Belletti and Rizzi 1988, Pesetsky 1995, Schweikert 2005). Infinitives are assigned the latter role. Thus, experiencers c-command PRO:

(i) [Exp… [PROarb… ]]

Causer arguments, in their turn, c-command the theme, the benefactive, and the patient – thus, infinitives c-command implicit benefactives/patient, but PROarb does not:

(ii) [[PROarb… ] Th/Ben/Pat…]

Whether these structural properties determine the co-variance of PROarb and the argument of the main verb is a challenging question.
when thematic Control does not hold, how does PROarb get its interpretation? Is it uncontrolled or is it A'-controlled?

In the examples in (2) PROarb does not seem to be thematically controlled as well, since all theta-roles of the matrix predicate appear to be discharged. Here, again, PROarb may be “free” or A'-controlled. In examples (3)-(5), finally, there is no compelling evidence in favor of a thematic Control analysis. The only proof in favor of such proposal has been claimed to be the availability of an overt argument in place of the implicit argument which PROarb appears to co-vary with. However, PROarb may not co-vary with such overt argument. Thus, on one hand, Control by an implicit argument is not to be taken for granted – an overt argument may not control obligatorily PROarb, so why should an implicit argument? On the other hand, PROarb appears not to need a thematic controller at all. Some considerations from the domain of semantics point to the same conclusion.

4. The Semantics of PROarb

Despite the different claims on the syntactic mechanisms concerning PROarb, a substantial uniformity characterizes PROarb from a semantic viewpoint: in all environments illustrated in section 2 the interpretation of PRO is “generic” (more properly, kind-referring), if the sentence is generic, specific (more properly, object referring), if the sentence is episodic, no matter if there is an implicit controller (see Cinque 1988,4 Kawasaki 1993, Bhatt and Izvorski 1998).5 Let us illustrate this point through a couple of examples discussed in Krifka et al. (1995):

4. Cinque (1988) claims in fact that PROarb is interpreted as a ‘quasi-universal quantifier’. As far as we understand, the term ‘quasi-universal’ is equivalent to the term ‘generic’.

5. Cinque (1988) observes that in its ‘quasi-existential’ reading, the reference of PROarb can be specified by the context or it may correspond to a 1st person plural pronoun ‘we’. He also notes that ergative, psych-, movement, copulative, passive, and raising predicates can only induce a 1st person plural interpretation, although a different interpretation cannot be excluded contextually:

(i) Partire in ritardo (*mi pare fosse stato Carlo) ha significato perdere tutto.

‘To leave late (I think it was Carlo) meant to lose everything.’

Analyzing this problem, however, would lead us too far away from the aims of the present paper.
Remarks on \textit{PRO}\textsubscript{arb}

(15) a. [\textit{PRO}\textsubscript{arb} chewing tobacco] (usually) upsets John.  
    b. [\textit{PRO}\textsubscript{arb} chewing tobacco] upset John.

Sentence (15)a can be generally paraphrased as ‘if one chews tobacco, this generally upsets John’. Sentence (15)b can instead be paraphrased as ‘someone chewed tobacco and this upset John’. This double interpretation holds even in environments where \textit{PRO}\textsubscript{arb} has sometimes been claimed to be controlled (examples from Bhatt and Izvorski (1998):

(16) a. [\textit{PRO}\textsubscript{arb} to write haiku] is fun.  
    b. Yesterday, [\textit{PRO} to write haiku on the grass] was fun.

Sentence (16)a is generic, sentence (16)b is episodic.\textsuperscript{6} Thus, even if we admitted that an implicit argument controlled \textit{PRO}\textsubscript{arb}, the semantics of this argument would display no difference with respect to uncontrolled \textit{PRO}\textsubscript{arb}.\textsuperscript{7} The question is then, how is the index ‘arb’ to be interpreted?

Moreover, \textit{PRO}\textsubscript{arb} has been claimed to be first-personal (in the sense of Castañeda 1966, 1967) and, at the same time, generic. To illustrate:

(17) a. It is nice [\textit{PRO}\textsubscript{arb} to walk in the park].

\textsuperscript{6} Other semantic properties have been sometimes discussed in the literature. First, Manzini (1986) claims that \textit{PRO}\textsubscript{arb} can only refer to human beings. To illustrate, consider the following sentences:

(i) a. [\textit{PRO}\textsubscript{arb} rotolare giù da una collina] è pericoloso.  
      \textit{[PROarb} to roll down the hill] is dangerous.  
    b. [\textit{PRO}\textsubscript{arb} essere efficienti] è importante.  
      \textit{[PROarb} to be effective] is important.

The only possible interpretation of the sentences in (i) is that \textit{PRO}\textsubscript{arb} has [+human] features. We will keep these property of \textit{PRO}\textsubscript{arb} outside the scope of the present investigation.

\textsuperscript{7} Epstein (1984), Lebeaux (1984), and Bhatt and Izvorski (1998) labels by ‘\textit{PRO}\textsubscript{arb}’ only the occurrences of \textit{PRO} with a generic interpretation, assuming that under the existential reading the reference of \textit{PRO} is not ‘arbitrary’, but rather pragmatically specified by the discourse context. In what follows, we will use of the term ‘arbitrary \textit{PRO}’ to refer to \textit{PRO} in contexts as those illustrated in section 2, and specify within the discussion whether its interpretation is generic or specific.
b. Yesterday it was nice [PROarb to walk in the park].
c. John said it is nice [PROarb to walk in the park].

Moltmann observes that intuitively such sentences express an evaluation on the part of the speaker. In uttering (17)a and b, there is a natural reading in which the speaker is expressing a personal judgment about the kind of events “walking in the park” ((17)a) and as a specific occurrence of such kind of event ((17)b). More generally, such sentences convey an evaluation on the part of the agent of the context (the speaker in sentences (17)a, b, the subject of an attitude predicate, as in (17)c, which does not presupposes that the speaker find it nice to walk in the park), based on her/his own (actual or imaginary) experience. At the same time, Moltmann claims that the former sentence expresses a generalization concerning any typical person.

As far as we know, the only formal attempt to account for these properties has been worked out by Moltmann (2006), who claims that like the English impersonal pronoun one, PROarb introduces a variable that is obligatorily bound by a sentential generic empty operator (hosted in [spec; CP]). In Moltmann’s view, the fact that different occurrences of one/PROarb may co-vary without either having scope over the other is a piece of evidence in favor of her analysis. The examples in (4), here repeated, may be taken as illustrating this property:

\[(18)\] [PROarb making a large profit] requires [PROarb exploiting the tenants].

Here the two PROarb’s corefer. However, the PROarb in the higher clause does not c-command the one in the lower clause. Thus, the covariance of the higher and of the lower PROarb cannot result from a binding relation of the higher on the lower PROarb. Assuming that co-reference is obtained here as a scope phenomenon, the co-variance of the two PROarb’s may only be the result of the presence of an operator c-commanding and binding both PROarb’s.

We note, however, that one and PROarb do differ in at least one respect: PROarb can have a specific reading, while one cannot. This may be accommodated within Moltmann’s proposal by claiming that in episodic sentences the existential sentential operator bind-

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8. I refer to Moltmann (2006) for the formal details of his theory.

9. This is in fact an assumption only, since binding is not the only way to get covariance (see Safir 2005).
ing the event variable of the main predicate, binds \( \text{PRO}_{arb} \) as well (although for some reason it cannot bind the impersonal pronoun \textit{one}). Such an assumption is costless, since in a davidsonian framework (Davidson 1967, Higginbotham 1983, Parsons 1990), an existential operator does bind the event argument of a predicate. Note that Moltmann’s theory has two theoretical implications. First, \( \text{PRO}_{arb} \) is \textit{always} controlled, though (second implication) it is \textit{not thematically controlled}, since a sentential operator binds it. In other terms, \( \text{PRO}_{arb} \) is claimed to be A'-controlled (as in Lebeaux’s 1984 and Kawasaki’s 1993 theories).

This may not be the last word, however. We know indeed that that kind-level predicates (as \textit{common, rare, widespread}, etc.) apply felicitously to gerunds and to infinitives (Krifka \textit{et al}. 1995):

(19) a. Getting into troubles is very common/rare/widespread among the youth today.

\hspace{1cm} (Carlson 1977)

\hspace{1cm} b. For people to love their children is common.

This diagnostics shows that gerunds and infinitives can be interpreted as referring to kinds – particularly, to kinds of events. This explains why even in contexts where the apparent controller of \( \text{PRO}_{arb} \) is explicit, the interpretation of a gerundive or of an infinitival is kind-referring. Consider for instance the following sentence (from Krifka \textit{et al}.):

(20) Chewing tobacco calms John down.

This sentence normally asserts that whenever John chews tobacco, this (usually) calms him down. The gerundive clearly refers to a kind of events, which has as realizations single events of chewing tobacco by John.

Thus, the generic operator binds the event variable of an infinitival (or gerund) clause, rather than \( \text{PRO}_{arb} \). This is shown even by another diagnostics of genericity (Krifka \textit{et al}. 1995). In generic sentences a frequency adverb like \textit{always, generally, habitually} does not convey a “significant” change in meaning. Consider for instance the following sentences:

(21) a. Dogs bark.

\hspace{1cm} b. Dogs generally bark.
In the latter sentence the semantic contribution of the adverb is minimal – it only underlines that there may be exceptions. When this diagnostics is applied to PRO}_{arb} a relevant change in meaning is determined:

(22) a. [Playing baseball] is fun.
    b. [Playing baseball habitually] is fun.

The two sentences have different truth-conditions. While the first one may assert that an event of playing baseball is generally fun, the second asserts that the habit of baseball-playing is fun. Thus, one may consider the first sentence as false while considering the second one true and vice versa.

We take then that PRO}_{arb} does not have a “generic” or “specific” interpretation in itself. This rather appears as a by-product of some other computation. But how is it interpreted? A possible answer to this question may be as follows. Since the kind-referring interpretation holds when a nominal is under the scope of a generic operator, gerunds and the infinitives, rather than PRO}_{arb} itself, appear to be subjected to the generic operator. Under this view, the semantics of PRO}_{arb} should be redefined. Two options are available: first, PRO}_{arb} is interpreted by existential closure; second, it is interpreted as a lambda-operator, as in predicational approaches to Control (Lewis 1979, Chierchia 1984, among the others). In both cases, the “generic”/”specific” interpretation of PRO}_{arb} may turn out as a by-product of the binding of the whole non-finite clause. We suppose there is good reason to prefer the second option. The evidence is the fact that the scope ambiguities one would expect if PRO}_{arb} were bound by an existential operator are missing.\(^{10}\) Consider the following sentences:

\(^{10}\) We note that although implicit arguments are usually considered as an existential operator, they do not give rise to scope ambiguities, as quantifiers generally do. Consider the following sentences containing an implicit agent:

(i) Every ship has been sunk.

(ii) Every ship has been sunk by an angry dismissed insurance company employee.

Sentence (ii) is ambiguous between the de dicto (\(\forall > \exists\)) and the de re interpretation (\(\exists > \forall\)): under the first interpretation for any ship there is an angry dismissed employee, under the second interpretation, one and the same angry dismissed employee sank every ship (\(\forall > \exists\)). No such ambiguity appears to hold with respect to (i), in which the universal quantifier has always wide scope. Thus, the nature of the implicit agent remains quite mysterious.
(23) a. Every student said that answering his questions was of great help to him.  
b. Every student said that it was of great help to him that a teacher answered his questions.

Intuitively, sentence (23)b has two readings:

(23) b'. ∀x∃y x said that answer (y, x’s questions, e) & e helped x  
b''. ∃y∀x x said that answer (y, x’s questions, e) & e helped x

Under the first reading, for every student there is a teacher who answered his questions.  
Under the second reading, one and the same teacher answered every student’s questions.  
Sentence (23)a does not display such scope ambiguities. The only available interpretation is the one in which the universal quantifiers takes scope over the existential operator:

(23) a'. ∀y∃x x said that answer (y, x’s questions, e) & e helped x  
a". *∃y∀x x said that answer (y, x’s questions, e) & e helped x

Observing that a second sentential operator can also appear within a non-finite argument (see Zucchi 1990, Krifka et al. 1995), we propose that, in a davidsonian framework, an appropriate logical form for sentences containing PRO_{arb} may be as follows:

(24) a. ‘Generic’ PRO_{arb}  
GENe P(e, ^GEN∃e'λx Q(e', x));  
b. ‘Specific’ PRO_{arb}  
∃e P(e, ^GEN∃e'λx Q(e', x));

To any of the above formulas an argument may be added to the main predicate. We propose that when such an argument is implicit, it is in its turn interpreted as a lambda-

11. To illustrate, consider the following sentence (adapted from Krifka et al. 1995):

(i) [Smoking so much habitually] (generally) impresses Mary.

The infinitive predicate is generic (more properly habitual), the main predicate can be either generic or specific.
operator. This would explain why Control apparently holds between an implicit argument and PROarb. Our proposal predicts that they should get co-valued. If the argument is overt, PROarb can be interpreted as bound by such an argument, perhaps through the topic-Control mechanism proposed by Kawasaki (1993).

5. Epistemic modals

Thematically controlled PROarb supporters have often claimed that the ungrammaticality of sentences like (8) has to be interpreted as evidence in favor of their theory, since, as PROarb must be controlled, the absence of a controller in these sentences dooms its occurrence.

Under the account we are discussing here, PROarb is not thematically controlled (it may even not be controlled at all). If so, the unavailability of infinitival complements in epistemic modal contexts cannot be due to the absence of a potential controller. So why are sentences like (8) ungrammatical?

First, observe that the lack of an implicit controller does not rule out PROarb in itself, since, as we have shown, there are sentences in which PROarb occurs despite an implicit argument is missing. Second, if the interpretation of PROarb indirectly depends on sentential operators, the theory here investigated predicts that structures that are devoid of such operators cannot host an infinitive or a gerund argument. Under such a hypothesis, epistemic modal sentences should be devoid of sentential operators.

As it turns out, this seems to be the case. Iatrídou (1990) observes that epistemic modal predicates (“metaphysical modality” predicates, as she dubs them) are incompatible with past or future tense auxiliaries:

(25) #It was/will be probable that John stole the tape.

She claims that epistemic modals are temporally independent, that is, they lack a time variable, which explains why they are incompatible with tense.

We may add that genericity diagnostics (Krifka et al. 1995) shows that epistemic modals are incompatible with generic operators as well:

(26) #It is usually possible that John has left.
Sentential operators are incompatible with epistemic modals exactly because epistemic modals lack a time variable. Thus, since infinitival clauses have a time variable that must be bound by a sentential operator, the ungrammaticality of (8) may be reinterpreted as a superficial effect of the lack of this operator in sentences having an epistemic modal predicate.

6. Conclusive remarks

In the present article we have reviewed the main ideas on the syntactic and semantic properties of PROarb and we hope we have shown that a great deal is still to be achieved in our understanding of PROarb. We have shown that the presence of an implicit argument, if any, does not seem to be related to Control of PROarb, and that there is no compelling evidence to claim that PROarb is thematically controlled, since there are cases where no implicit argument can plausibly be claimed to occur. The remaining possible alternatives are that in some cases it appears to be A'-control (Kawasaki’s 1993 Topic Control), or that a lambda-variable, it is uncontrolled. On the semantic side, its “generic” or “specific” interpretation appears to raise as a by-product of mechanisms responsible for the interpretation of an infinitive and of the whole sentence.

We would like to conclude this paper with a final speculation concerning the first-personal interpretation. We have said that Moltmann (2006) observes that sentences in which PROarb occurs have a natural reading in which the agent of the context is expressing a personal evaluation. In subsequent work (2008 among others), she observes that sentences containing a subject infinitive are relative-truth sentences, a kind of sentences whose truth-conditions are relative to a standard of taste, morality or knowledge of the individual who utters the sentence or to whom an evaluation towards a certain propositional content is attributed. All seems to suggest that the “evaluator”, which we take as a pragmatic role, plays a crucial role in the interpretation of sentences containing PROarb and perhaps of PROarb itself, and may be the source of the first personal interpretation. The way the evaluator enters the computation of semantics of the sentence is still to be made clear, but a direct Control by the evaluator on PROarb seems to have little plausibility in our view, since PROarb is not simply interpreted as the speaker (in the easiest case). In uttering *It is nice to walk in the park*, the speaker is not asserting that she or he is the only person who finds it nice *his* walking in the park. This is the interpretation we would expect were the evaluator Controlling PROarb, but, crucially, this does not reflect
our intuitions, since in saying this sentence, we are also stating something that in our view seems to hold for any typical person.

References


Remarks on PRO


