The property analysis of control constituents

An argument from modal existential wh-constructions

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Recent discussion of obligatory control in the literature concentrates on the issue of which syntactic module (movement, agreement, etc.) is responsible for the establishment of the control relation. This paper looks at the issue of control from a higher order perspective. Abandoning the presupposition that control constituents denote propositions and that, therefore, control must be syntactic, I deliver an argument in favor of the property analysis of control constituents and, by transitivity, for a semantic resolution of the control relation. The argument comes from modal existential wh-constructions and in particular from a strong parallelism between obligatorily controlled PRO and wh-expressions. It is revealed that PRO and wh-words form a natural class, to the exclusion of all other types of nominal expressions. This is then turned into an argument of treating PRO and wh-words essentially as logical lambda-operators, naturally leading to the property theory of control.

1. Introduction

This paper is intended as a contribution to the discussion of the syntax and semantics of obligatory control. Drawing from the empirical domain of modal existential wh-constructions, I will put forth some novel evidence supporting the view that control constituents map to properties rather than propositions. By transitivity, the evidence supports approaches in which obligatory control is resolved on the basis of the lexical semantics of control predicates, rather than by interplay of syntactic conditions. The argument is based on a strong parallelism between PRO and wh-words and as such, it also supports a particular analysis of wh-fronting in which fronted wh-words map to logical lambda-operators (as opposed to indefinites or quantifiers). The parallelism will be formulated in terms of the *PRO-wh generalization,* which states that if a language has modal existential wh-constructions whose empty subject is an obligatorily controlled PRO (as in Russian or Spanish), then a structurally analogous modal existential wh-construction can contain an overt subject if and only if the subject is a wh-expression.

Section 2 sets the theoretical stage by laying out the landscape of theories of obligatory control. The PRO-wh generalization will be introduced in section 3, along with the basic typology of modal existential wh-constructions. In section 4, I will argue that the PRO-wh generalization can be captured in an elegant way if one adopts the conjunction of (i) the property theory of control constituents (Chierchia 1984, 1989), (ii) the logical lambda-operator theory of wh-words (Groenendijk and Stokhof 1984, Heim and Kratzer 1998), and (iii) a strict type-theoretic construal of control predicates. In that case, the PRO-wh generalization falls out as a natural consequence of the success and failure of functional application at the syntax-semantics interface. In section 5 I provide a detailed analysis of modal existential wh-constructions that exhibit obligatory control and propose an explicit treatment of the PRO-wh complementarity. Section 6 concludes the paper.

2. The landscape of theories of obligatory control

In this section, I will first lay out the set of assumptions about control that I will take for granted and then introduce those that will be subject to testing. As far as I can tell, none of the adopted assumptions is intrinsically tied to any of the tested ones, so the argument to be made is not biased from this perspective.

Control is broadly defined as a particular way of determining the reference of phonologically empty subjects, designated as PRO, which typically (but not necessarily; cf. Landau 2004 and section 3) appear in non-finite clauses. I will assume the usual (though simplified) dichotomy (going back to Williams 1980) of obligatory control (OC), illustrated by (1a), in which the reference of PRO is grammatically fixed, and non-obligatory control (NOC), (1b), in which it is fixed contextually. The bracketed part is called the *control constituent*.

(1) a. They persuaded him$_i$ [PRO$_{i/*j}$ to remain in the cabin].
    b. Mary$_i$ wonders [PRO$_{i/j}$ how to feed kids in Africa].

In OC, the primary focus of this paper, the reference of PRO is determined by one of the arguments of the *control predicate* (*persuade* in (1a)), so called *controller* (*him* in (1a)). The characteristic properties of PRO in prototypical obligatory control are (i) exhaustive (as opposed to partial) determination of the reference by the controller, (2a), (ii) sloppy (as opposed to strict) readings under ellipsis, (2b), and (iii) *de se* (as opposed to *de re*) readings, (2c).

(2) a. # They persuaded him$_i$ [PRO$_i$ to gather at the square].
    b. I$_i$ tried [PRO$_i$ to win] and so did John$_j$ (*try [PRO$_{*i/j}$ to win]*)
    c. *Mary is watching a video, not recognizing herself in it and she saying that brown eyes would fit that person [i.e. herself] better. Mary actually loves her own blue eyes.*
    # Mary$_i$ wants [PRO$_i$ to have brown eyes].

Concerning the choice of the controller among the arguments (i.e. why *him* and not *they* determines the reference of PRO in (1a)), I will assume that it is, by default, the argument that is merged with the control predicate immediately after the control constituent is merged, i.e. the one that is the "closest" to PRO (Rosenbaum 1967, Bach 1979, Bach and Partee 1980, Larson 1991, Hornstein 1999).[1] This is by no means the only possible approach to controller choice and, as suggested by Landau (2000, 2003), perhaps not even the most generally accepted one. Yet, it will be adequate for the limited set of data discussed here.

[1] The minimality-based account of controller choice will converge here with a theta-role-based account (Jackendoff 1972, Chierchia 1984), since I will also assume a strict locality condition (or in fact one-to-one head-spec mapping) on so called theta role assignment.

Having set the basic working assumptions let me now introduce some parameters along which theories of control vary and which will be subject to the test imposed by the newly observed PRO-wh generalization. The dispute most relevant to the present purposes concerns the semantic type of the control constituent. Closely related is then the issue of OC PRO, in particular its semantic type and nature. There are two basic approaches to this issue. The *propositional approach* assumes that control constituents are semantically propositions, i.e. expressions of type t (or $\langle s,t\rangle$ in an intensional system), and PRO is a variable of type e (usually regarded as an anaphor). The *property approach* assumes that control constituents are semantically properties, i.e. expressions of type $\langle e,t\rangle$ (or $\langle s,et\rangle$/$\langle e,st\rangle$; cf. Stephenson 2010), and PRO is either non-existent or reduces to a logical lambda-operator (see section 4). Let me give a simple example for clarity. On the proposition approach, the infinitive *to remain in the cabin* in (1a) denotes a truth-value, i.e. is either true or false (in some situation), depending on the value eventually assigned to the PRO variable. On the property approach, the infinitive characterizes a set of individuals which remain in the cabin (in some situation).

Importantly, this dispute touches upon a more general issue in the theory of control, namely whether the control relation is primarily syntactic or semantic. The property theory quite naturally couples with semantic approaches and the proposition theory with syntactic approaches. Let us see why. Remember that the goal of a theory of control is to explain why the empty subject in a control constituent is obligatorily coreferent with some argument of the control predicate.[2] For a theory in which control constituents denote properties it is very natural to assume that the coreference relation is a consequence of the lexical semantics of the control predicate. This is because both the denotation of the controller and the denotation of the subject of the control constituent are perfectly accessible to the predicate: the former directly—by being one of the arguments, and the latter indirectly—by being lambda-bound in the representation of its other argument (the control constituent). In effect, the control predicate introduces a predicative relation between the two. A simplified and schematic lexical entry of a control predicate *pred* under a semantic theory of control is in (3), where P corresponds to the control constituent, x to the controller, and $pred'$ to the denotation of the control predicate:[3]

(3) $\|$*pred*/property$\| = \lambda P \lambda x[pred'(x) \wedge P(x)]$

Now, in the proposition approach, there is no chance for the control predicate to resolve the controller-PRO coreference simply by predication.[4] The reason is that the variable introduced by PRO, being "buried" inside of the proposition, is inaccessible for compositional manipulation from the control predicate. A lexical entry for a control predicate under the proposition approach therefore looks like in (4), where p corresponds to the control constituent, x to the controller, and y to PRO. The notation $p[y]$ should be read as a proposition containing a free variable y (i.e. y is not an argument of p, as opposed to (3), where x is an argument of P).

[2] Note that I use the term *coreference* in a non-technical sense, encompassing (accidental) coreference and binding.

[3] For the first full-fledged analysis of control predicates along these lines, see Chierchia (1984). See also section 5 of the present paper.

[4] Wurmbrand (2002) is of a different opinion. She assumes a proposition analysis of (a subclass of) OC and at the same time a semantic resolution of the controller-PRO coreference. Unfortunately, she does not clarify what the "inherent semantic properties of the selecting (OC) verbs", allegedly responsible for this coreference, should be.

(4) $||pred/\text{proposition}|| = \lambda p \lambda x[pred'(x) \wedge p[y]]$

It follows that some other module than (lexical) semantics must be responsible for the obligatory coreference between the controller and PRO in the proposition approaches. There is wide agreement that this module is syntax (though see Farkas 1988). What submodule of syntax this should be is subject to continuing controversy. The existing accounts are based on (i) a designated control module of the grammar, where PRO has special properties ([+pronominal, +anaphor]) and its reference is determined by special rules (e.g. Chomsky 1980, 1981), (ii) binding, where PRO is considered a subtype of a reflexive anaphor (e.g. Koster 1984, 1987), (iii) movement, where PRO is treated as a trace after A-movement (e.g. Hornstein 1999, 2001) and (iv) agreement, where PRO has to agree with a functional head associated with the control predicate, such that the functional head in turn agrees with the controller (e.g. Landau 2000, 2004). These submodules, in particular binding, movement, and agreement, naturally lend themselves to locality conditions and hence contain a seed of accounting for the relatively restricted occurrence of the phenomenon of obligatory control. (Notice that no reference to syntactic locality is needed in the semantic approach, where the relevant restriction is captured by the general principles of semantic compositionality.)

The last parameter to be considered is syntactic and carves out two subclasses within the class of property theories. These correspond to two ways of arriving at the property semantics of the control constituent. In the first case, PRO is an operator that undergoes operator movement, much like relative clause operators, for instance (e.g. Aoun and Clark 1985, Clark 1990). This movement then maps onto lambda-binding of the trace and the control constituent—presumably a CP—maps onto a property. In the second case, which is entertained more often, PRO does not exist at all (e.g. Bresnan 1978, Chierchia 1984, Culicover and Wilkins 1986, Jones 1991, Bošković 1996, Babby 1998). The control constituent is a subject-less VP, mapping to a property in the semantics.[5] These two types of property approaches to control are schematically illustrated below:

(5) a. PRED $[_{CP}$ OP_i … $[_{vP}$ t_i $[_{VP}$ …]]]
 b. PRED $[_{VP}$ …]

In summary, I considered three parameters that have shaped the landscape of theories of obligatory control. They are (i) the semantic type of the control constituent (proposition vs. property), (ii) the module in which control is established (syntax vs. semantics), and (iii) the very existence of PRO (yes or no). We will see that the PRO-wh generalization most clearly relates to the first parameter and provides an argument in favor of the property theory of control constituents. To the extent that the property analysis entails something about the second parameter, the PRO-wh generalization also supports the semantic resolution of control. With respect to the third parameter, the generalization provides an inconclusive support for the existence of PRO and hence—in combination with the preceding two—its operator-hood.

[5] A similar division can in principle be applied to the proposition approaches, though it is not really attested. In virtually all proposition approaches, the control constituent is a CP (or a TP). The movement of PRO is then not motivated by its operator-hood (though see Clark 1990 for a notable exception), but rather by some formal requirements, relating to government, case-checking, or agreement.

3. Types of MECs and the PRO-wh generalization

Modal existential wh-constructions are primarily infinitival and secondarily subjunctive.[6] Their subject is mostly empty. Consider an example from Spanish:

(6) Tengo con quién *e* hablar.
have:1sg with who speak:inf
'There is somebody I can speak with.'

What is the nature of the MEC subject (marked as *e* in (6))? A cross-linguistic investigation reveals that there is no universal constraint on MEC subjects; the whole range of subject types are compatible with MECs—a trace after raising, obligatorily or non-obligatorily controlled PRO, *pro,* as well as overt nominative-marked subjects. Most languages can make use of more than one of these strategies, depending on various factors, such as the mood of the embedded verb or the type of the embedding predicate. Let us illustrate these types one by one.

3.1. Types of MECs with respect to their subject

Raising MECs

That an MEC empty subject can be a trace after subject raising was first observed by Ceplová (2007) for Czech. The clearest argument for this comes from the possibility to use impersonal predicates in MECs, as in (7a). Both the examples below are therefore unified under an analysis where the subject—an empty expletive in (7a) and *Honzík* in (7b)—is base generated in the embedded clause, raises into the matrix clause, and agrees with the matrix verb.

(7) a. *expl*$_1$ Nemělo tady kdy t_1 pršet.
neg:had:3sg.neut here when rain:inf
'There was no time when it could rain here.'
b. Honzík$_1$ si neměl kde t_1 hrát.
H.:3sg.masc refl neg:had:3sg.masc where play:inf
'Honzík had nowhere to play.'

Obviously, the overt raising of the empty expletive (and even its very existence) is difficult to prove. However, nothing hinges on it—arguably, overt raising is not obligatory in Czech anyway, as it can be replaced by long-distance agreement. The important point is that the matrix verb—*nemělo* 'neg:had' in (7a)—is not thematically related with what appears to be its subject.

Besides Czech, raising MECs also exist in Polish, Slovak, and Slovenian.

Control MECs

Most languages that make use of infinitival MECs cannot use impersonal predicates in the MEC. This suggests that the selecting predicate cannot be a raising predicate, like in Czech.

[6] For a detailed description of the cross-linguistic distribution of the infinitive and subjunctive mood in MECs, see Šimík (2011:Ch2).

Consider the Spanish example in (8). Neither the personal predicate *tuvo* 'had' (meant to express agreement with the empty expletive, as in (7a) above), nor the impersonal *hubo* 'had' (displaying default agreement) are capable of embedding a weather predicate.

(8) * No tuvo/hubo cuando llover.
neg had:3sg/imprs when rain:inf
'There was no time when it could rain.'

Yet, the reference of the embedded subject in Spanish MECs selected by the verb *tener* 'have' is strictly determined by the matrix subject, suggesting that it is an obligatorily controlled PRO.

(9) Tienes$_i$ con qué PRO$_{i/*j}$ escribir?
have:2sg with what write:inf
'Do you have anything that you/*I/*one can write with?'

The following examples further confirm that the empty subject qualifies as an OC PRO: it is exhaustively controlled (no partial control is possible), (10a), and ellipsis yields sloppy readings only, (10b).[7]

(10) a. * Pablo$_i$ aún no tiene donde PRO$_{i+}$ reunirse.
Pablo still neg has where gather:inf
'Pablo$_i$ still doesn't have a place where they$_{i+}$ could gather.'
b. Juan$_i$ no tiene a quién PRO$_i$ pedir consejo, y sus amigos$_j$ tampoco
J. neg has a who ask:inf advice and his friends neither
(*have who PRO$_{*i/j}$ ask for advice*).
'Juan has nobody to ask for advice and neither do his friends (have anybody that Juan/they could ask for advice).

Control MECs constitute the major MEC-strategy in nearly all the languages that make use of the infinitive mood (e.g. Portuguese, Italian, and Russian). An interesting case are subjunctive MECs in languages that also have infinitival MECs, in particular Czech and Hungarian. In these languages, the embedded subject of a subjunctive MEC must be coreferent with the matrix subject, despite the fact that the embedded context is finite and there should therefore be no formal obstacle for hosting referentially independent subjects such as *pro*.

(11) a. Péter$_i$ van kit {$e_{i/*j}$ / * Anna} küldjön a postára. *Hungarian*
P. be:imprs who:acc A. send:sbj.3sg the post.office.to
'Peter has somebody who he/Anna can send to the post office.'
b. Karel$_i$ neměl koho by {$e_{i/*j}$ / * Petr} pozval na večeři. *Czech*
K. neg:had:3sg who:acc sbj.3 P. invite for dinner
'Karel had nobody who he/Petr could invite for dinner.'

I will assume that (11) represent examples of genuine obligatory control into finite complements and hence use the standard notation PRO for the empty category above. This stance is further supported by the Czech examples in (12), which analogous to (10) above.

[7] Testing the availability of *de se* vs. *de re* readings is not easy due to the fact that the matrix subject is not an attitude holder.

(12) a. * Karel$_i$ nemá kde by PRO$_{i+}$ se shromáždil(*i).

* Karel$_i$	nemá	kde	by PRO$_{i+}$	se	shromáždil(*i).
K.	neg:has	where	sbj.3	rflx	gather:pst.ptcp.sg(pl)

‘Karel has no place where he (and others) could gather.’

b.

Karel$_i$	nemá	koho	by	se	zeptal	na	radu	a	Petr$_j$
K.	neg:has	who:acc	sbj.3	rflx	ask:pst.ptcp	for	advice	and	P.

bohužel	taky	ne (*have who PRO*$_{*i/j}$ *ask for advice*).
unfortunately	also	not

‘Karel has nobody who he could ask for advice and unfortunately, Petr doesn’t either (have anybody who Karel/Petr could ask for advice).’

OC into finite structures is not unattested, though typically limited to languages which lack the infinitive mood (e.g. Bulgarian and Greek; see Landau 2004 and the numerous references cited therein). Admittedly, the presently observed cross-linguistic pattern is somewhat unexpected, since languages that normally exhibit OC into finite structures do not do so in MECs (see the next section), while languages without this trait (Czech and Hungarian) do so in MECs. This paradox will have to stay unresolved here. However, notice that it provides a tentative argument in favor of treating control (in MECs) as a semantic phenomenon, in accordance with the presently made argument, rather than a phenomenon restricted by syntax. In some sense, these cases of control into finite constituents are akin to Chierchia’s (1989) cases of “control” of overt pronouns by attitude-holders. This means that they could be reanalyzed as containing a *pro,* which is obligatorily bound by a lambda-operator (effectively an OC PRO, cf. section 4) in the left periphery of the MEC. (See also footnote 11.)

Non-control MECs

The last type of MECs is one where the MEC-subject is referentially independent of any matrix argument. There are three basic cases to distinguish. Firstly, non-control MECs are the only strategy in languages which only have subjunctive MECs (due to the complete lack of the infinitive in that language), such as Greek:

(13)

Den	exo	ti	na	foresi	i	Vassiliki	sti	jiorti	tis.
neg	have:1sg	what	sbj	wear:3sg	the	Vassiliki	at.the	name.day	her:gen

‘I don’t have anything that Vassiliki could wear on her name-day.’

Other members of the non-control class are those MECs which are selected by predicates other than ‘be’ or ‘have’, irrespective of the grammatical mood of the embedded predicate (infinitive in (14a,b) and subjunctive in (14c)). Notice that the embedded PRO can be coreferent with one of the matrix arguments, as in (14a), but need not be, as in (14b,c).

(14) a. Dei-lhe$_i$ o que PRO$_i$ fazer.
gave:1sg-to.him:cl the what do:inf
'I give him something (work) that he can do.'
b. Ja$_i$ našel čem {PRO$_{i/j}$ / tebe$_k$} pisat'.
I found what:instr you:dat write:inf
'I found something that I/you/one can write with.'
c. Karel pořád ještě hledá kde by se (jeho kolegové) sešli.
K. still look.for where sbj.3 rflx (his colleagues) meet:pst.ptcp.pl
'Karel is still looking for a place where they/his colleagues could meet.'

Finally, there are MECs that are selected by impersonal predicates, typically the existential 'be', with no overt controller, as in the Hungarian example (15). Yet, these examples still allow for an analysis where the obligatory control is implicit (to the extent that our definition of OC is flexible enough to include these cases, as e.g. in Wurmbrand 2002). Indeed, the analysis put forth in section 5 will rely on the assumption that predicates like the Hungarian *van* 'be:imprs' involve implicit arguments.[8]

(15) Van kivel beszélni.
be:imprs who:instr talk:inf
'There is nobody who one could speak with.'

This finishes a brief excursus into the variation in (empty) subject realization and interpretation in both cross- and intralinguistic types of MECs. We saw that every type of (empty) subject can appear in at least some type of MEC. Starting with the next subsection, which introduces the PRO-wh generalization, I will zoom in onto the behavior obligatory control MECs.

3.2. The PRO-wh generalization

The core empirical contribution of this paper is embodied in the following generalization:

(16) **The PRO-wh generalization**
Obligatorily control MECs are in complementary distribution with MECs containing wh-subjects.

In other words, it is possible to disrupt the obligatory control relation between the matrix and the embedded subject but only if the embedded subject takes a wh-form.

The PRO-wh generalization cuts across a number of typologically quite different languages as well as the two verbal moods that MECs can make use of—just as long as it targets OC MECs. Perhaps the most straightforward illustrations of (16) come from Czech and Hungarian subjunctive MECs, where neat minimal pairs of OC MECs vs. MECs with wh-subjects can be formed. This is because both OC PRO and nominative wh-subjects can be licensed by the subjunctive mood in MECs. The examples from Czech in (17) show that

[8] In some languages, e.g. Hungarian and Russian, the relevant argument can be expressed overtly; it typically surfaces with dative marking.

despite the acceptability of a subject disjoint from the matrix subject, (17b), this disjointness obtains always and only if the subject is a wh-word, cf. (17c).[9]

(17) a. **Karel**$_i$ neměl koho by **PRO**$_i$ pozval na večeři.
K. neg:had who:acc sbj.3 invite for dinner
'Karel had nobody who he/Petr could invite for dinner.'
b. **Karel**$_i$ neměl **kdo**$_j$ by ho pozval na večeři.
K. neg:had who:nom sbj.3 him invite:pst.ptcp for dinner
'Karel had nobody who could invite him for dinner.'
c. * **Karel**$_i$ neměl koho by **Petr**$_j$ pozval na večeři.
K. neg:had who:acc sbj.3 Petr invite:pst.ptcp for dinner
'Karel had nobody who Petr could invite for dinner.'

An interesting situation obtains in languages with infinitival OC MECs, such as Spanish or Portuguese. The illustrations in (18) are from Spanish. These languages allow for an exceptional use of the subjunctive, but just in case this finite mood is introduced to license the nominative on wh-subjects, (18b). Again, non-wh-subjects are ungrammatical, (18c).

(18) a. No tien**es**$_i$ a quién {**PRO**$_i$ ayudar / * ayud**es**$_i$}.
neg have:2sg a who help:inf / help:sbj.2sg
'You don't have anybody who you could help.'
b. No tien**es**$_i$ **quién**$_j$ te {ayude / * ayudar}.
neg have:2sg who you:cl help:sbj.3sg / help:inf
'You don't have anybody who could help you.'
c. * No tien**es**$_i$ a quién (**Juan**$_i$) ayude.
neg have:2sg a who (J.) help:sbj.3sg
'You don't have anybody who Juan/(s)he/I could help.'

Analogous behavior is observed for other OC-MEC languages with possible variation concerning the mood that exceptionally steps in to license the wh-subjects. Thus, Hebrew, lacking the subjunctive mood, makes use of the future tense form, (19a), while Italian, though in posseession of the subjunctive mood, makes use of the present indicative, (19b).

(19) a. yeš l-a mi še-**yišmor** al ha-yeladim
exists to-her who rel-guard:fut on the-children
'She has somebody who could take care of the children.'
b. Maria ha già chi le **cura** i bambini.
Maria has already who her:cl take.care.of:3sg the children
'Maria already has somebody who could take care of her children.'

Details aside, the empirical pattern entailed by the PRO-wh generalization is clear and cross-linguistically robust and as such calls for an explanation.

[9] The pattern in (17) is strongly supported by corpus findings (Google, November 25, 2010). Three conditions were tested, corresponding to the types in (17), the factors being the value of the matrix and embedded subject: (i) a congruent condition (1sg+1sg), corresponding to (17a), (ii) an incongruent condition (1sg+wh-subject), corresponding to (17b), and (iii) an incongruent condition (1sg+2sg/3[not wh-subject]), corresponding to (17c). Condition (i) yielded 8240 hits, while out of the first 40, all were relevant examples of MECs. Condition (ii) yielded 28.400 hits, while out of the first 40, 29 were relevant examples of MECs. Condition (iii) yielded 18 hits, none of which were examples of MECs.

4. Capturing the PRO-wh generalization: the core idea

The central question posed by the PRO-wh generalization is: What makes OC PRO and wh-subjects behave on a par and differently than all other types of subjects? The answer that I put forth in this paper is simple: Both OC PRO and wh-words map to logical lambda-operators (in their derived positions)—a type of mapping generally assumed to be excluded for other types of DPs, including referential (RE) and quantificational expressions (QE), but also non-obligatory controlled PRO and other types of pronominal variables. The LF-semantics mapping proposed here is in (20). The first column contains a schematic LF syntax of some embedded (clausal) category XP, containing/being introduced by a particular DP, the second one a simplified logical formula that XP maps to, and the last one the domain of objects that the formula is a member of.

(20)	a.	$\|\|[_{XP}$ wh-DP … $]\|\|$	$= \lambda x[P(x)]$	$\in D_{\langle e,t \rangle}$
	b.	$\|\|[_{XP}$ OC PRO … $]\|\|$	$= \lambda x[P(x)]$	$\in D_{\langle e,t \rangle}$
	c.	$\|\|[_{XP}$ QE … $]\|\|$	$= \Omega x[Q(x) * P(x)]$	$\in D_t$
	d.	$\|\|[_{XP}$ … RE … $]\|\|$	$= P(c)$	$\in D_t$
	e.	$\|\|[_{XP}$ … NOC PRO/pro … $]\|\|$	$= P(x)$	$\in D_t$

The idea is that wh-words (20a) and OC PRO (20b) undergo operator movement to the edge of some XP, serving to lambda abstract over a variable (their trace). They literally map to a lambda-operator and hence have no semantic type. The variable they bind is restricted by the descriptive content of the wh-word in the first case and unrestricted in the case of OC PRO.[10] The resulting formula is of a functional type—denoting a function from individuals to truth-values/propositions. Quantificational expressions (20c), while also undergoing operator movement (quantifier raising), do not leave their syntactic sister intact, but rather take it as their argument, yielding a truth-value/proposition. They are of type $\langle et, t \rangle$, as standardly assumed. (Replace Ω by a any quantificational determiner and $*$ by the particular relation between propositions that it entails; e.g., if Ω is *every* ($\forall$), then $*$ is the entailment relation $\rightarrow$; Q is the restriction of the quantifier and P is its scope.) Referential expressions (20d) and various pronominals (20e) are entity-type expressions and thus can be interpreted in situ. The only difference between the two is that REs denote constants (c), while pronominals denote (free) variables (x). In both cases, the whole XP in which they appear is of a truth-value/propositional type.[11]

It follows from (20) that wh-clauses (before the application of further operators, e.g. the iota-operator in free relative clauses) and OC constituents are fundamentally different from other embedded clauses. The difference is formulated in the standard property vs. proposition dichotomy.

Now, suppose that control predicates always select for property-type expressions, as proposed by Chierchia (1984) (but already assumed in Montague 1973, Bach 1979, and

[10] The precise manner in which the wh-word contributes the variable restriction is immaterial here. It could either be done via a run-of-the-mill presupposition or by construing their trace as definite descriptions (see Rullmann and Beck 1998, Johnson to appear).

[11] Some complements of attitude predicates arguably constitute an exception to (20e), as they denote properties rather than propositions (see Chierchia 1989). In that case, the pronominal functions as a sort of resumptive pronoun, being lambda-bound at the edge of the complement.

others). Then, in conjunction with (20), we have a handle for understanding why OC PRO and wh-subjects are the only acceptable subjects in MECs, in particular those of the "control type" (see section 3.1). Other types of subjects simply fail to deliver the type-theoretical semantics appropriate for the MEC-selecting predicate.

Before I turn to a detailed analysis of control MECs, it should be noted that (20a), i.e. the particular syntax-semantics mapping of wh-clauses, is by no means the only possible one. This logical-lambda construal of wh-expressions was utilized by Groenendijk and Stokhof (1984) in their dissertation on questions and also by Heim and Kratzer (1998) in their formal semantics textbook. Perhaps the strongest argument supporting this position comes from the use of wh-expressions as relative operators in headed relative clauses, where virtually no other analysis is well imaginable. Yet, other proposals abound for other uses of wh-expressions, particularly wh-questions and free relative clauses. The analysis that is closest in spirit to the logical-lambda analysis is the one of Caponigro (2003), who assigns wh-words the type of identity functions. Also under his approach, wh-constituents end up denoting properties and to the extent that it is empirically equivalent, it could also be used here.[12] There are three other widely used approaches to the semantics of wh-expressions. One treats them as existential quantifiers, whether ordinary ones (Karttunen 1977, May 1977) or dynamic ones (Haida 2007). Another takes them to be simply Heimian individual variables (Berman 1991, Beck 2006) and yet another uses a set-of-individuals construal (Hamblin 1973, Kratzer and Shimoyama 2002). In none of these approaches can a type-theoretical difference between wh-clauses/control constituents on the one hand and all other constituents on the other be naturally postulated: all denote propositions (or sets of propositions in Hamblin semantics). Therefore, to the extent that the present argument is valid, it also provides an argument for a property-construal of wh-clauses and, by transitivity, for a syncategorematic logical-lambda treatment of wh-words (in their derived positions).

In summary, I argued that it is possible to draw a type-theoretical line between wh-clauses and obligatory control constituents on the one hand and all other types of embedded clauses on the other. This is the case if the former denote properties and the latter propositions. These analyses have been proposed on independent grounds, for all types of constructions involved, though rarely (if ever) in this particular conjunction. In the next section, I turn to a particular implementation of the property analysis of control MECs.

5. A detailed analysis of control MECs and of the PRO-wh generalization

The general idea laid out in the previous section is that MECs, at the level of derivation at which they are selected by the control predicate, must denote properties. This ensures that the only possible constituents that can be "fed" into the relevant predicate are constituents with an OC PRO or a wh-word in their left periphery, thus accounting for the PRO-wh generalization introduced in section 3.2.

The particular implementation of this general idea, however, is not as straightforward as one could wish. The main issues we face concern (i) what I call the two-gap problem and (ii) the identity of the very control predicate. The first issue is illustrated in the schematic example (21). Under the present analysis, run-of-the-mill control MECs have *two* operators at their edge—the wh-operator and the OC PRO. Since both have the semantics of a logical lambda operator, the resulting expression is of type $\langle e,\langle e,t\rangle\rangle$, rather than $\langle e,t\rangle$, as envisioned in section 4.

[12] See Šimík (2011:125ff.) for one empirical reason to adopt the logical-lambda approach rather than Caponigro's identity-function approach.

(21) a. I_i have [$_{MEC}$ with whom PRO_i to speak]
b. ||with whom PRO to speak|| $= \lambda x \lambda y[can.speak.with'(y,x)]$

A simple-minded modification of the proposal in favor of the $\langle e, \langle e, t \rangle\rangle$ type will not address the problem fully, however. The reason is that for multiple-wh MECs, i.e. MECs with more than one wh-word in their left periphery, the type would have to be modified again.

(22) a. I_i have [$_{MEC}$ with whom about what PRO_i to speak].
b. ||with whom about what PRO to speak||
$= \lambda x \lambda y \lambda z[can.speak.with.about'(z,y,x)]$

The issue is therefore more general and will inevitably include the problem of distinguishing wh-words from PRO.

The problem of the control predicate itself has two parts. Firstly, the question is why only stative predicates like ‘be’ and ‘have’ exhibit OC, while dynamic ones such as ‘find’, ‘buy’, etc. are NOC (see section 3.1). The second question is how exactly the control argument is introduced, esp. with in such an impoverished argument structure as the existential ‘be’ presumably has, and what the structural relation is between this argument and the OC PRO.

In what follows I propose a solution in terms of a covert applicative predicate being hosted/licensed by the overt predicate that selects the MEC, be it ‘be’/‘have’ or the dynamic predicates ‘find’, ‘buy’, etc. The applicative head functions as a control predicate, having the properties envisioned in section 4. Non-subject wh-words move only after the applicative predicate is “discharged”, finishing the derivation of a MEC, which is then selected by a predicate of existence (‘be’, ‘have’, or a covert predicate in the complex structure of dynamic predicates). After introducing this analysis in section 5.2 and demonstrating how it accounts for both problems mentioned above, I will turn to the cases where PRO is “replaced” by a wh-subject. These will be tackled in section 5.3. But for the start, let us provide a baseline analysis of MECs, forgetting about their control property for a while.

5.1. The baseline analysis of MECs

In Šimík (2011), I argued that all MECs (irrespective of the typology in section 3.1) are selected by one and the same predicate, modulo some variation which is irrelevant for the present purposes. In this paper, I will follow the proposal in its essentials and refer the reader to the thesis to resolve potential unclarities.[13] The predicate that selects MECs, call it BE, characterizes a relation between some individual and a (minimal) situation/event in which this individual “exists” in a broad sense (is present, available, visible, etc.). BE can either be spelled out as ‘be’ or ‘have’, depending on the language and possibly a number of other factors, or it can be spelled out together with more complex predicates (I assume lexicalization of non-terminal nodes, see e.g. Ramchand 2008, Caha 2009, Starke 2011), such as ‘find’ or ‘buy’, essentially playing the role of these predicates’ result state. The simplified lexical entry for BE, i.e. its syntax, semantics, and phonology is given in (23) (in a form of a ⟨syn; sem; phon⟩ triple). This predicate can be phonologically realized as the existential ‘be’. In the case of (24), the lexical entry for the process of finding, there is no phonological

[13] In virtue of simplicity, I conflate worlds and events into a single type of situations in this paper, construing events as minimal situations (see Kratzer 2008).

realization available (marked by the emptyset in the third element of the triple). The morpheme 'find', by assumption, corresponds to the complex predicate FIND+BE, whose lexical entry is provided in (25). It expresses the process of finding (in which some individual x is active) resulting in the state of existence of some y (see also Beck and Johnson 2004).[14]

(23) BE = ⟨[$_{\text{VP}}$ x$_{\text{DP}}$ [$_{\text{V'}}$ State …]]; $\exists e, x[exist'(e) \wedge \theta(e) = x]$; *be/have*⟩

(24) FIND = ⟨[$_{\text{VP}}$ x$_{\text{DP}}$ [$_{\text{V'}}$ Process …]]; $\exists e, x[find'(e) \wedge \theta(e) = x]$; ∅⟩

(25) FIND+BE = ⟨[$_{\text{VP}}$ x$_{\text{DP}}$ [$_{\text{V'}}$ Process [$_{\text{VP}}$ y$_{\text{DP}}$ [$_{\text{V'}}$ State …]]]]; $\exists e, e', e'', x, y[find'(e') \wedge \theta(e') = x \wedge exist'(e'') \wedge \theta(e'') = y \wedge e = e' \oplus e'']$; *find*⟩

Notice that there are argument placeholders (x$_{\text{DP}}$ and y$_{\text{DP}}$) in the syntactic entry and corresponding existentially quantified variables in the semantic entry. This is a simplification reflecting the fact that the actual syntactic/semantic values of these placeholders are irrelevant for the conventional association between the three modules encoded in the lexical entry; in the actual syntax and semantics, these placeholders are replaced by actual DPs with whichever semantics they happen to have. The three dots within the (most embedded) VP hint at the possibility to "extend" the predicate by inserting more structure into its complement. This possibility is what underlies the creation of complex predicates such as FIND+BE and, as we will see shortly, also the possibility to "incorporate" MECs into the event structure of BE.

If the MEC is present, it is inserted into the complement of BE and the whole structure characterizes a complex situation of a state of existence of some object making it possible to "do" something with that object. With the notable exception of Spanish "headed" MECs (see Šimík 2011:260ff. for discussion), the external argument of BE remains implicit in MECs and is existentially quantified over. Consider the pseudo-example in (26a) and its structural description in (26b).

(26) a. There is who to visit. ('There is somebody who one can visit.')
b. [$_{\text{VP}}$ ∅$_i$ [$_{\text{V'}}$ BE [$_{\text{XP}}$ who$_i$ PRO to visit]]]

The syntax-semantics mapping of (26) is spelled out in detail in (27). The MEC, as shown in (27b), denotes a property concept (type $\langle s, et\rangle$), a set of situation-individual pairs. Notice that the wh-movement in MECs corresponds simply to lambda-binding, in accordance with the assumptions introduced in section 4. (The intensional construal of the property semantics, used here to capture the modal nature of MECs, does not affect the general point.) BE takes this MEC as its internal argument, while its external argument (the individual whose existence is predicated) is "backgrounded" (removed from the syntax) and existentially quantified over.[15] This existentially quantified variable is also "fed" into the open individual argument position of the MEC, created by wh-movement. Notice that BE also introduces the modal existential quantifier, ranging over a set of situations circumstantially accessible from e'. The primary circumstance restricting the quantifier is the most salient one, namely the existence of

[14] The semantic format and the syntax-semantics mapping is inspired by Ramchand's (2008) constructivist approach to event semantics. Here, I introduce an insignificant simplification by replacing Ramchand's asymmetric causal "leads-to" relation between subevents (→) by a simple Link (1983)-style operator, assuming that the asymmetry between subevents can be read off directly from the syntax.

[15] Alternatively, the position is filled with a phonologically empty property-type nominal, preserving the existential quantification over the individual variable it introduces. See Šimík (2011) for discussion.

x. The truth-conditions are derived by feeding (27b) into (27a), the result of which is shown in (27c). The sentence is true iff some individual x is in the state of existence (in the broad sense), characterizing the situation e', and there is some circumstantially accessible situation e'', in which somebody visits x.

(27) a. ||BE|| $= \lambda Q_{\langle s,et\rangle}\lambda e_s \exists e'_s, x_e[exist'(e') \wedge \theta(e') = x \wedge$
$\exists e'' \in A(e')[Q(e'')(x) \wedge e = e' \oplus e'']]$
b. ||who PRO to visit|| $= \lambda e_s \lambda x_e[visit'(e) \wedge Ag(e) = y \wedge Th(e) = x]$
c. ||(26)|| = ||BE||(||who PRO to visit||)
$= \exists e, e', x, y[exist'(e') \wedge \theta(e') = x \wedge$
$\exists e'' \in A(e')[visit'(e'') \wedge Ag(e'') = y \wedge Th(e'') = x \wedge e = e' \oplus e'']]$

There are two provisos to take into account, both included for expository reasons at this point. Firstly, the situation variable introduced by BE is existentially closed, whereas normally it would either be bound by a higher predicate (such as FIND) or by an aspect or tense head. Secondly, the embedded subject is treated essentially as a NOC PRO and represented as an existentially closed variable. A proper analysis of this PRO is what I turn to now.

5.2. Introducing the control predicate

Having laid out the basic syntactic and semantic analysis of MECs, let us now move on to the analysis of control. The core proposal made here is that the control predicate is not BE itself, but rather a separate atomic predicate—call it FOR. This predicate is a kind of low applicative head, expressing the state of profiting/benefiting from some event (namely the event that appears in its complement). The implementation of this idea is fully incorporated into the presently assumed system of assembling complex predicates from atomic event predicates. In particular, the idea is that the MEC-embedding predicate BE always comes coupled with the abstract predicate FOR (similarly as the process FIND always comes with the result state BE). Compare the lexical entry in (23) above with the amended one in (28).

(28) BE+FOR = ⟨[$_{\text{VP}}$ x$_{\text{DP}}$ [$_{\text{V'}}$ State$_1$ [$_{\text{VP}}$ y$_{\text{DP}}$ [$_{\text{V'}}$ State$_2$ …]]]]; $\exists e, e', e'', x, y[exist'(e') \wedge \theta(e') = x \wedge profit'(e'') \wedge \theta(e'') = y \wedge e = e' \oplus e'']$; *be/have*⟩

In order to illustrate how (28) works, let us revisit our simple example (26), this time modified in such a way that the selecting predicate can host an overt controller such as *Mary* in (29a). In (29b) we can see the proposed structural description of (29a). Notice that *Mary* is base-generated in the argument position of the applicative predicate FOR and subsequently gets formally licensed in the matrix TP area.

(29) a. Mary has who to visit. ('Mary has somebody who she can visit.')
b. [$_{\text{TP}}$ Mary$_1$ [$_{\text{VP1}}$ $\emptyset_j$ [$_{\text{V'}}$ BE [$_{\text{VP2}}$ who$_{2/j}$ [$_{\text{VP2}}$ t$_{1/i}$ [$_{\text{V'}}$ FOR [$_{\text{XP}}$ PRO$_i$ to visit t$_2$]]]]]]]

The derivation of the truth-conditions of (29) is given in (30). Concentrate first on the semantics of the applicative predicate FOR in (30a). Notice that its semantic profile is essentially one of a control predicate in property theories of control (see section 2), modulo event semantics, in that it takes two arguments, a property (Q) and an individual (x) and attributes the property to that individual. In this particular example, FOR takes the control constituent XP as its internal argument, while such constituents, as proposed in section 4, have the same semantics as wh-clauses (cf. (27b) above and (30d) below), namely one of a property concept, where PRO corresponds to a lambda-operator binding the subject variable (the introduction of the lambda-binding could, but need not be achieved by operator/PRO-movement; cf. the discussion in section 2). The external argument is Mary. The semantics of the complete VP is in (30c) and characterizes a situation in which Mary profits from visiting somebody. The resulting constituent is targeted by wh-movement, which corresponds to lambda-binding of the trace.[16] The rest of the derivation proceeds just like in (27)—BE (defined in (27a)) takes the wh-clause as its argument and the result (after existentially closing the event variable) is true iff some individual x is in the state of existence (in the broad sense), characterizing the situation e', and there is some circumstantially accessible situation e'', in which Mary profits from visiting x.

(30) a. ||FOR|| $= \lambda Q_{\langle s,et\rangle}\lambda x_e\lambda e_s\exists e'_s, e''_s[profit'(e') \wedge Exp(e') = x \wedge Th(e') = e'' \wedge Q(e'')(x) \wedge e = e' \oplus e'']$

b. ||PRO to visit|| $= \lambda e_s\lambda y_e[visit'(e) \wedge Ag(e) = y \wedge Th(e) = x]$

c. ||Mary FOR PRO to visit|| = [||FOR||(||PRO to visit||)](||Mary||)
$= \lambda e_s\exists e'_s, e''_s[profit'(e') \wedge Exp(e') = mary \wedge Th(e') = e'' \wedge visit'(e'') \wedge Ag(e'') = mary \wedge Th(e'') = x \wedge e = e' \oplus e'']$

d. ||who Mary FOR PRO to visit||
$= \lambda e_s\lambda x_e\exists e'_s, e''_s[profit'(e') \wedge Exp(e') = mary \wedge Th(e') = e'' \wedge visit'(e'') \wedge Ag(e'') = mary \wedge Th(e'') = x \wedge e = e' \oplus e'']$

e. ||(29)|| = ||BE||(||who Mary FOR PRO to visit||)
$= \exists e, e', x[exist'(e') \wedge \theta(e') = x \wedge \exists e'' \in A(e'), \exists e''', e''''[profit'(e''') \wedge Exp(e''') = mary \wedge Th(e''') = e'''' \wedge visit'(e'''') \wedge Ag(e'''') = mary \wedge Th(e'''') = x \wedge e = e' \oplus e'' \wedge e'' = e''' \oplus e'''']]$

This analysis is supported by a number of arguments. I would like to mention three of them, drawing from Russian facts. Let us come back to the structural description of control MECs under the present analysis, the general schema of which is repeated below.

(31) $[_{TP} \ldots [_{VP1}\ \emptyset_j\ [_{V'}$ BE $[_{VP2}$ wh$_{2/j}$ $[_{VP2}$ subj$_i$ $[_{V'}$ FOR $[_{XP}$ PRO$_i \ldots t_2]]]]]]]$

I have assumed that the matrix subject, i.e. the controller of the embedded PRO, is generated in a low position and is licensed by A-movement to the TP domain. In Russian, the TP domain of the MEC-embedding predicate *est'* 'be' does not possess the right features to license the subject, in other words, the matrix predicate is impersonal. Yet, Russian MEC subjects can be formally licensed in their base position—by dative marking—and the movement that they undergo is a non-feature driven satisfaction of the EPP requirement (see Bailyn 2004 and the references therein):

(32) { Emu / * on} est' s kem ostavit' detej.
he:dat / he:nom be:imprs with whom leave:inf children
'He has somebody with whom he can leave the children.'

[16] I adopt a considerably freer theory of wh-movement than usually assumed. In particular, there is no CP or any other projection to host the target of the wh-movement, there are no wh-features to check, wh-movement is only regulated by locality and by interface/interpretability conditions. See Šimík (2011:Ch5), but also Pancheva (2011) and Pancheva and Tomaszewicz (2011), for an empirical justification of such a theory.

The EPP requirement on T in Russian, however, can also be satisfied by other constituents than the logical subject and in such cases, the subject is predicted to stay in situ. Interestingly, we expect the subject to follow the wh-word in these cases, as the wh-word adjoins to the VP that hosts it. The following examples come from Livitz (2010). Notice that the subject *mne* 'me:dat' in (33a) cannot just be an additional subject in the infinitival, since adding another dative-marked subject results in ungrammaticality, as witnessed by (33b).[17]

(33) a. Zdes' est' čto **mne** nadet'.
here be:imprs what me wear:inf
'I have something here that I can wear.'
b. * **Mne** est' čto **tebe** nadet'.
me:dat be:imprs what you:dat wear
'I have something that you can wear.'

Another supporting argument comes from the fact that the dative controller must be animate (or even human), as shown in (34).

(34) { Kole / # Vetru} zdes' nečego razrušat'.
Kolja:dat wind:dat here neg:what destroy:inf
'Kolja / the wind has nothing more to destroy here.'

Notice that while this is expected under the present analysis where the dative originates as the argument of FOR and bears benefactive semantics, it remains unexplained under the assumption that the dative is simply an embedded subject, which undergoes (optional) raising to the matrix (along the lines of raising MECs, see 3.1, and as argued e.g. by Babby 2000).

Finally, the presently assumed structural description of control MECs could also be held responsible for the impossibility to front (e.g. topicalize) the MEC, along with its wh-word, which is demonstrated in (35a). This is because if the wh-clause fronts, the FOR-part of the complex BE+FOR predicate must move along and the adjacency of BE and FOR, required for the lexicalization of the predicate is disrupted. Crucially, fronting of the infinitival MEC is not ruled out per se, as long as the wh-word is stranded (presumably along with the FOR predicate). Notice also that fronting of wh-interrogatives, (35c), analogous to (35a), is perfectly grammatical (given the right context).

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[17] As also observed by Livitz (2010), the dative subject can be accompanied by a prepositional genitive subject—the canonical expression of possessor in Russian:

(i) U menja est' čto tebe nadet'.
at me:gen be:imprs what you:dat wear:inf
'I have something that you can wear.'

This is not problematic for the present analysis, since the dative controller does not have possessor but rather benefactive semantics/syntax and as such does not block the presence of independent possessors, which can presumably be introduced by enriching the event and argument structure of the existence predicate.

(35) a. * [$_{MEC}$ Čemu poučit'sja]$_1$ est' t_1.
what learn:inf be:imprs
'There is something that you can learn.'
b. [$_{XP}$ Poučit'sja]$_1$ est' čemu t_1.
learn:inf be:imprs what
'There is something that you can learn.'
c. [$_Q$ Čemu poučit'sja]$_1$ ja neznaju t_1
what learn:inf I neg:know:1sg
'I don't know what to learn.'

Before I turn to the analysis of MECs with wh-subjects, I would like to show how the problems pointed out in the introduction to this section can be addressed under the present analysis.

The first problem, dubbed the "two-gap problem" was that the embedded predicate must somehow be able to tell apart the two operators at the edge of the MEC: the wh-word and the PRO. The solution offered by the present analysis lies in the decomposition of the matrix predicate into the existence predicate BE and the applicative FOR. The structurally lower FOR selects for the control constituent (whose edge only contains the PRO-operator) and at a subsequent point of the derivation, i.e. after the control relation has been established, BE selects for the wh-clause, introducing the predicate relation between the wh-clause and the (phonologically empty) object whose existence is predicated.[18]

The empirical part of the second issue is summarized by the pattern in (36). The question was why only stative predicates ('be'/'have') but not dynamic ones ('find', 'buy', etc.) behave as OC predicates.

(36) a. **Tebe**$_i$ est' čem **PRO**$_{i/*j}$ pisat'?
you:dat be:imprs what:instr write:inf
'Do you have anything that you/*I/*one can write with?'
b. **Ty**$_i$ našel čem **PRO**$_{i/j}$ pisat'?
you:nom found what:instr write:inf
'Did you find anything that you/I/one can write with?

I believe that the present analysis offers a relatively elegant solution which need not resort to *ad hoc* stipulations. Consider the following two structural descriptions, corresponding to the sentences above (notice that now 'find' corresponds to the complex predicate FIND+BE+FOR):

(37) a. [$_{VP1}$ Ø$_j$ [$_{V'}$ BE [$_{VP2}$ čem$_{2/j}$ [$_{VP2}$ tebe$_i$ [$_{V'}$ FOR [$_{XP}$ PRO$_i$ pisat' t_2]]]]]]
b. [$_{VP1}$ ty$_k$ [$_{V'}$ FIND [$_{VP2}$ Ø$_j$ [$_{V'}$ BE [$_{VP3}$ čem$_{2/j}$ [$_{VP2}$ arg$_{k/i}$ [$_{V'}$ FOR [$_{XP}$ PRO$_{k/i}$ pisat' t_2]]]]]]]]

What would have to happen in order for *ty* 'you' in the matrix of (36b) to obligatorily control the embedded PRO? Basically, the argument of FOR, marked as *arg* in (37b), would have to raise to the argument of FIND. In other words, *arg* would have to be a trace after raising of *ty* 'you'. This, however, would be a movement out of a theta-position into another theta-position. While it has been proposed that such movement should be allowed (see Hornstein 2001), there seems to be no place/need for such an operation in the present system of control,

[18] The case of multiple-wh MECs requires a special treatment. See Šimík (2011:232ff.) for discussion.

where obligatory control is established in semantics rather than in syntax (e.g. by A-movement). I conclude that the implicit arugment *arg* in (37b) is a non-obligatorily controlled PRO (semantically an existentially closed variable). Notice that this analysis can directly be applied to cases with no overt controller, such as (38). In these cases, the controller is simply implicit—represented as a NOC PRO.[19]

(38) Est' kuda [$_{VP}$ PRO$_{arb/i}$ [$_{V'}$ FOR [$_{XP}$ PRO$_i$ idti]]].
be:imprs where.to go:inf
'There is a place where one can go.'

In summary, I proposed an analysis of the control predicate as being a *part* of the MEC-embedding predicate, rather than being *the* predicate itself. Though the analysis comes at the cost of postulating covert structure, it has some welcome consequences, both syntactic and semantic.

5.3 The case of wh-subjects

So far, the present analysis accounts for the contrast between (39a) and (39b) (see the examples in section 3.2). As was discussed in section 4 and developed in more detail in the previous subsections, (39b) is ruled for type-clash reasons: the control constituent is of a propositional rather than a property type. It is now time to say more about (39c) and thus complete the explanation of the PRO-wh generalization.

(39) a. John$_i$ has with what PRO$_{i/*j}$ to clean it.
b. * John$_i$ has with what for Mary$_j$ to clean it.
c. John$_i$ has who$_j$ to clean it.

The analysis and the background assumptions so far entail that in (39c) the control predicate FOR selects the wh-clause, containing the wh-subject:

(40) [$_{VP1}$ Ø$_j$ [$_{V'}$ BE [$_{VP2}$ John$_i$ [$_{V'}$ FOR [$_{XP}$ who$_{2/j}$ t$_2$ to clean it]]]]]

Notice that the XP in (40) is of the right semantic type, i.e. $\langle s, et\rangle$, which means it can be selected by FOR and the semantic computation can proceed further (unlike in a case like (39b)). Yet, there are two rather serious problems. Firstly, given the semantics of FOR, *John* should control *who* and the sentence should be true just in case John is actually about to do the cleaning. This is obviously wrong. Secondly, BE has no access to the wh-word (and hence to the variable bound by it), so even if the type-clash that now arises between BE and VP2 could be fixed, the whole sentence would mean that there is some individual and that John can do some cleaning. This is also quite wrong.

I propose that these semantic issues can be solved by a coercion of the meaning of FOR. The goal is (i) to avoid establishing the control relation between the argument of FOR and the variable bound by the wh-word and (ii) to let the meaning of the wh-word "percolate" one

[19] In fact, an analogous analysis can be applied to the class of non-control MECs. In such MECs, the overt subject of 'be'/'have' would not originate in the specifier of FOR (which would simply host a NOC PRO), but rather higher in the structure, similarly to the argument of FIND. (Such subjects would be parallel to the possessor *u menja* 'at me' in the Russian example in footnote 19.)

step higher, in order to make it accessible to BE. The coerced meaning of FOR (cf. (30a) above) is given in (41).

(41) $||\text{FOR'}|| = \lambda Q_{\langle s,et\rangle}\lambda x_e \lambda y_e \lambda e_s \exists e'_s, e''_s[profit'(e') \wedge Exp(e') = x \wedge Th(e') = e'' \wedge Q(e'')(y) \wedge e = e' \oplus e'']$

The lambda prefix λx introduces the benefactive argument (*John* in (40)), while λy corresponds to the percolating wh-word and at the same time fills the entity-type gap in the complement of FOR' (namely Q). Importantly, the semantic type of Q remains unaffected by the coercion, still allowing us to capture the PRO-wh generalization. Now, with FOR' replacing FOR, the sentence in (40) has the right truth conditions: it is true iff there is some individual and it is possible that John profits from that individual cleaning something.[20]

There are three outstanding questions to be addressed. Firstly, what triggers the coercion of FOR into FOR'? Secondly, how exactly is the wh-subject formally licensed, given that it appears in the syntactic environment of OC PRO? Thirdly, what prevents non-subject wh-words from moving to this lower position, utilizing FOR' instead of FOR, in effect allowing for non-PRO/wh subjects to occur, and ultimately destroying the PRO-wh generalization? In the rest of this subsection I provide a single tentative answer all these three questions.

It is clear that the structure immediately below FOR/FOR' is intimately associated with formal licensing of subjects. In the run-of-the-mill cases, this structure (so far designated as XP) will be some sort of a defective TP, capable of licensing PRO (e.g. by checking its Case, cf. Chomsky 1995, Martin 2001). It is obvious that something must be different when the wh-subject is involved. There are two basic cases to distinguish. The first is represented by Spanish, which replaces the infinitive by the subjunctive if (and only if) a wh-subject is present. This seems like a last resort act utilized just to case-license an overt subject. (Notice, once more, that no other overt subject can parasite on this act, as it will not yield an interpretable LF.) If the subjunctive structurally differs from the infinitive, then it is not surprising that the two are also selected by a slightly different predicate. In other words, there is a *structural cue* for FOR to coerce into FOR'. The second case is represented by Russian. Russian does not rely on a structural change in the complement of FOR, rather, it seems to locate the change in FOR itself—by "shifting" it into an exceptional case-marking (ECM) predicate. The effect of this shift is that the wh-subject in Russian is not nominative-marked (as presumably in Spanish), but rather dative-marked. An interesting consequence of this shift from an ordinary FOR to an ECM FOR' is that Russian, as opposed to Spanish, cannot license an overt external argument of FOR' (recall that BE is impersonal in Russian). The examples in (42) show the relevant contrast between Spanish and Russian.

(42) a. **Juan** no tiene **quién** le escriba.
J. neg has who him write:sbj.3sg
'Juan has nobody who could write him.'
b. (***Maše**) zdes' est' **komu** rabotat'.
M.:dat here be who:dat work:inf
'Maša has/there is somebody who can work.'

Now let us have a look at the structural descriptions of the two sentences above. In Spanish, the wh-word fronts to the edge of the complement of FOR' and it is the complement itself

[20] I am aware that it should be clarified what exactly triggers this coercion. I leave this question aside.

(presumably the TP/finiteness related structure) that formally licenses this subject. As a result, FOR' can host its own overt argument, which in turn gets formally licensed in the matrix TP. In Russian, on the other hand, no subjunctive in MECs is available. The structure remains identical and the wh-subject at its edge gets exceptionally dative-marked by FOR'. Because the predicate has already discharged its case-licensing capacity and because there is no case-licensing functional structure in the matrix, its external argument must necessarily be covert and in no need of formal licensing, i.e. presumably a NOC PRO.

(43) a. *Spanish*
[$_{TP}$ Juan$_1$ [$_{VP1}$ Ø$_j$ [$_{V'}$ BE [$_{VP2}$ t$_1$ [$_{V'}$ FOR' [$_{TP[fin]}$ **quién**$_{2/j}$ **T** t$_2$ le escriba]]]]]]
b. *Russian*
[$_{VP1}$ Ø$_i$ [$_{V'}$ BE [$_{VP2}$ PRO$_{arb}$ [$_{V'}$ **FOR'** [$_{XP}$ **komu**$_{1/i}$ t$_1$ rabotat']]]]]

Notice that this proposal about the structure of control MECs with wh-subjects establishes a very close relationship between the "shifted" structure/form of the MEC and/or the predicate it is selected by and the "shifted" semantics of this predicate, i.e. FOR'.

Does the proposal shed any light on the third problem, namely why other than subject wh-words cannot front to the complement of FOR'? I believe it does. Notice that the coercion of FOR into FOR' is now closely tied to subject-licensing, whether by a structural change of its complement as in Spanish or by a change in the "direction" of case-marking as in Russian. In either case, FOR' is only motivated if the edge of its complement contains an expression that also must be licensed at that edge. Now, in all other cases, i.e. in non-subject wh-words, this is not the case, the wh-word is always licensed independently and hence, there is no motivation for FOR to shift. Intuitively, this makes a lot of sense. Think of FOR as a sort of non-functional complementizer for a while. Then it makes sense that wh-words move to the specifier of FOR with a single exception, namely those wh-words that can/have to be formally licensed at the edge of its TP complement, namely subjects.

6. Conclusion

This paper is a defense of the property analysis of control constituents, as opposed to the more standard proposition analysis. To the extent that the property analysis entails a semantic treatment of control, this paper also supports the latter. The argument comes from a novel observation from the domain of modal existential wh-constructions, which, being replicated fairly steadily across typologically very different languages, gives rise to a generalization, which I called the *PRO-wh generalization*. This generalization entails a very close relationship between obligatorily controlled PRO and wh-expressions. I argued for a particular explanation of this generalization, which is based on the conjunction of three, previously independently made assumptions: (i) a property-type construal of control constituents (ii) a property-type construal of wh-clauses, and (iii) a strict *type-theoretical* construal of control predicates. The last assumption was discussed at some length in subsection 5.3, where it was argued that a control predicate retains its type-theoretical construal even if it loses its control abilities due to a structurally motivated semantic coercion.

Acknowledgements

To be added

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