How (not) to control PRO[*]

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May 2024

Abstract

Certain standard treatments (e.g. Chierchia, 1990, Stechow, 2003, Anand, 2006, Schlenker, 2011, Pearson, 2012, Landau, 2015) of why OC (Obligatory Control) PRO with attitudinal control verbs must be read *de se* yield truth conditions that are too weak, predicting false sentences to be true. A proposal is made to fix this problem, namely that PRO is a strong anaphor in the sense that it must be both extensionally and intensionally identical to its controller (and partially so in partial control cases). This would fall out most naturally if OC was movement as proposed in Hornstein (1999). A view of OC as movement is therefore explored, under assumptions somewhat different from those of Hornstein (1999) and descendants, attempting to circumvent objections to such a view, noting some assets and problems.

Keywords: obligatory control, partial control, movement, *de se* readings.

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1 Preamble

The problem addressed here is that current semantic treatments of obligatory controlled PRO in complement clauses makes wrong predictions. A different proposal is put forth, according to which Obligatorily Controlled PRO in complement clauses behave like a strong anaphor, that is the same concept(s) as its controller for all relevant attitude holders. This property, it is argued is at the source of why some of these PROs must be read *de se*, or *de te*. This view, that attitude holders must view the denotations of PRO and its controller the 'same way' is the main conclusion of sections 3 and 4.

As being a strong anaphor in this sense is something that would fall out PRO if was a trace of its controller, section 5 discusses how to analyze Obligatory Control, and in particular a proposed version of Hornstein's Movement Theory of Control (somewhat distinct from existing ones). Sections 6.2 and 6.3 discuss some other control cases of relevance (Control into adjuncts or indirect questions).

Sections 5, 6.2 and 6.3 can be read without having read sections 2, 3 and 4 (which can be more technical) simply keeping in mind that OC PRO is assumed to be a strong anaphor.

2 Introduction

With attitudinal verbs, OC PRO as in (1) is mandatorily read *de se*.

(1)   John hopes [PRO to win]

This is a remarkable, and a remarkably subtle, observation. It imposes a serious explanatory burden on grammatical models. What is needed is a theory of the ingredients composing such structures, e.g. the syntax and semantics of *hope*, of infinitivals with silent subjects, and the nature of PRO etc.. such that this result necessarily emerges from these ingredients being put together. Current analyses are not close to meeting this explanatory burden, in addition to being descriptively inadequate.

I would like to make a proposal regarding what underlies the mandatory emergence of such readings meant to progress towards this explanatory goal. This proposal still falls short but less so, I believe, than current alternatives and is descriptively more adequate.

This proposal would be quite natural if Hornstein's movement theory of control was right. A version of such a theory is explored in sections 5, 6.2 and 6.3.

3 Problems for Standard views

3.1 The attitudinal case

To account for the interpretation of (1), a common view is to analyze PRO as a function of the variable standing for its antecedent that says nothing about who PRO denotes for the speaker of (1). Here is how.

First, if John hopes to win, he hopes: 'I will win'. Viewed from the speaker's perspective, John's hope is that John will win. But John may believe that he is someone else, e.g. Ann. In this case, from John's point of view, John hopes is that who he thinks he is, namely, Ann, will win. As a result, PRO can't be simply treated as having the same value as

its antecedent, or being the same variable as its antecedent, else PRO would mean John. Rather it must be treated as a function of the value of its antecedent, as least as far as John is concerned. As John may believe he is Ann, or Sue, or Henry or... depending on circumstances, how to represent his hopes must be made contingent on what he believes depending on possible relevant circumstances.

The intuition of the treatment is that: *John hopes to win* means that John hopes to live in a world w in which who he thinks (in the actual world) he is in w wins, or more succinctly, John hopes that whoever he is wins.

More technically, here is how a representative case like (1) is nowadays commonly treated (see Pearson, 2012, essentially going back to Lewis, 1979 and Chierchia, 1990): it has the structure shown in (2a), partially interpreted as (2b), where a C-like head introduces lambda abstracts over worlds and individuals:

(2) a. $[C_0 \text{ John}_m \ [_{VP} \text{ hopes } [\ C_1 \text{ PRO}_m \text{ to win}]]$
     b. $\text{John}_m \ [\text{hopes } [\ \lambda a_1 \ \lambda w_1 \text{ PRO}_m \text{ to win in } w_1 \ ]]$

Assuming the following standard lexical entry for *hope* for such accounts, and the definition of the relevant (bouletic) alternatives $HOPE$:

(3) Lexical entry for *hope*:
     $[[hope]]^{g,w} = \lambda P \in D_{<s,et>}. \ \lambda x \in D_e. \ HOPE_{x,w} \subseteq P$
     Where $HOPE$ denotes alternatives as follows (Chierchia/Lewis style)
     $HOPE_{x,w} = \{(a_i, w_i)| \ f_{w_i,w}(x) = a_i\} = \{(f_{w_i,w}(x), w_i)\}$
     with $f_{w_i,w}(x) = a_i$ iff x being a_i in w_i is consistent with x's hopes in w.

Now, given the additional stipulation (found in one way or another under all accounts I am aware of, from Chierchia, 1990, Stechow, 2003, Anand, 2006, Schlenker, 2011, Pearson, 2012, Landau, 2015), including mutatis mutandis for Landau's 'predicative control') that PRO in (2b) is bound by λa_1 in (2b), the truth conditions of (2a) are, simplifying, computed as follows:[1]

1. $[\![CP_1]\!]^{g,w'} = \lambda w' \lambda a.a$ will win in w'
2. $[\![VP]\!]^{g,w} = $ (by intensional function application)
3. $[\![hope]\!]^{g,w}([\![CP_1]\!]^{g,w'}) =$
4. $[\![hope]\!]^{g,w}(\lambda w'. \ \lambda a. \ a$ will win in $w') =$
5. $\lambda x.HOPE_{x,w} \subseteq \{< a, w' >: a$ will win in $w'\}$ hence
6. $\lambda x. \forall < a, w' > \in HOPE_{x,w}, \ a$ will win in w'
7. $\lambda x. \forall < f_{w_i,w}(x), w' > \in HOPE_{x,w}, \ f_{w_i,w}(x)$ will win i in w'
8. $[\![CP_0]\!]^{g,w} = John \ \lambda x. \forall < f_{w_i,w}(x), w' > \in HOPE_{x,w} \ f_{w_i,w}(x)$ will win in w'

Note that a in line 6 corresponds to PRO which (as shown in line 7) is a function of x, namely $f_{w_i,w}(x)$ (and ultimately, by β conversion, of the attitude holder subject of *hope* and the controller of PRO as in line 8). If John only hope is that some person x wins, where x is him unbeknownst to him, he would only hope that someone who he does not think he is will win. This representation correctly predicts that if John does not have a *de se* hope, the sentence would be false.

There are a number of problems with such accounts that I will discuss in turn. A first problem is that it is too weak. The second - well known - problem is that it predicts no

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[1] Intuitively here, *hope* is treated as a universal quantifier quantifying over its subject's alternatives, and says that any such alternative is one in which who he thinks in the actual world he is in this alternative wins.

agreement between PRO and its controller. The third problem is that it overgenerates: it predicts the existence of attitude verbs that do not, in fact cannot, exist.

Too Weak One central intuition about obligatory control under attitude verbs is that the embedded infinitive must report a first personal thought in such cases as below:

(4) a. John hopes to win
     b. John hopes: 'I will win'

These two sentences mean the same thing. If these sentences mean the same, for me to believe (4a), I must believe (4b). But what do I believe when I believe that (4b) is true? I take it that the person that John hopes to win is the person picked out by *I*: for John, this is who John thinks he is (which may depend on circumstances) but for me, this is a particular person, the speaker, who I take to be John. If we examine the meaning of (2a) represented in line #8 above, this latter information is absent. Does this representation therefore incompletely represent the desired meaning. Perhaps not. Perhaps it is wrong to think as these two sentences as synonymous. Perhaps the first sentence has a weaker meaning than the second. I now discuss why I think this is incorrect. Consider the following scenario: *John mistakenly thinks he is Ann. Peter is not aware of this, but he is aware of the fact that John's hope is that Ann wins (for example I told him so and he trusts me). I am aware of John's delusion, as well as of the fact that John hopes that Ann wins.*
In this scenario, Consider again example (4a). Is the proposition expressed by *John hopes to win* true? It is predicted true by the semantics given for *hope* because it is true that John hopes that whoever he is wins. I would judge the sentence true. But Peter would not. Peter only knows that John hopes for Ann to win. Peter would not even though it is true that *(i) Peter believes that John hopes that who John thinks he is will win.* Peter is missing a crucial piece of information, namely that John thinks he is Ann. The problem is that (i) is true with *who John thinks he is* read *de re*, but false when read *de dicto*. We get the following paradigm:

(5) a. Peter thinks John$_k$ hopes that he$_k$ will win
     b. Peter thinks John$_k$ hopes 'I will win'
     c. Peter thinks John$_k$ hopes to win

In the given scenario, sentence (5a) is true where the binding relation holds for me the speaker. Sentences (5b) and (5c) are both false but predicted true. To capture these judgments, we must enrich the representation of the meaning of (4a) to make it more like that (4b) so that (5b) and (5c) are true and false together.

Agreement This problem has been long be noted (see e.g., Schlenker 1999, p. 98-99): PRO can (for some authors must - but I disagree) agree with its antecedent.[2] Suppose for example that John, genetically male but feeling female, is waiting for results of a genetic test, to determine his genetic gender. He hopes the test will show he is genetically female: so in all his alternatives compatible with his hopes, he is female. Because PRO is basically understood as the value of a function mapping John onto who John hopes to be, PRO should be feminine. This is the only option predicted to be possible by the semantics given

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[2] For the purpose of illustrating agreement, I assume here a simple bijection between grammatical gender and biological sex. Reality is more complex.

above. But that prediction is incorrect. The following is actually the default:[3]

(6)   John hopes to (be a female and to finally) be proud of **himself**

This problem remains unsolved.[4] This is a facet of the same problem general as problem #1: the reason why this is possible (and normally preferred) is that we understand PRO to be an incarnation of the person who is in fact John : the ϕ-features on the pronoun reflect this interpretation (pace Schlenker, 2011, p. 1575's claim to the contrary). This said, I think (agreeing here with what Sudo 2012, chapter 2, reports for English, but disagreeing with Schlenker, 2011) that the French equivalent of the following sentence is (dispreferred but) acceptable:

(7)   John hopes to (be found to be a female and to finally) be proud of **herself**

More generally, I accept both of *John thinks that he is a woman and that* **he** *is too tall* and *John thinks that he is a woman and that* **?she** *is too tall*.
The feminine gender in such cases is not freely available. This requires some appropriate discourse context. Thus, default agreement seems to generally be agreement with *John*. But agreement with what denotes who John thinks he is also possible (which incidentally shows that agreement cannot be a purely PF phenomenon).[5,6]

3.2   The non attitudinal case

In the case of non attitudinal verbs, like *deserve* or *force*, PRO can be taken to have the same semantic value as its controller, and can be treated as being the same variable as its

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[3] See Sportiche (2022) for why the reflexive here must be analyzed as locally bound by the PRO subject of the infinitive and cannot be analyzed as locally bound by *John* as in some treatments.

[4] Landau (2017) claims to solve this problem but I do not understand how the proposed analysis works exactly so as to both solve the agreement problem and deliver the right semantics.

[5] And indeed, there are cases in which feminine agreement is required. Thus consider the following scenario: *John, a male, took a competitive exam where only the best male and the best female will win a prize. He is ranked second overall behind a male ranked first overall, and a female ranked third overall. John mistakenly believes he is female, which would make him first female overall, thus winning a prize. He ordered a genetic test hoping that he will be found to be female.*

a.   *Jean espère   être qualifié de femme et être classé   premier
      John hopes to be   classified as a woman and be   ranked-msc first-msc
b.   Jean espère   être qualifié de femme et être classée   première
      John hopes to be   classified as a woman and be   ranked-fem first-fem

   Here the feminine gender on *first* can yield the presupposition that John is first among females, while the masculine gender would infelicitously yield the presupposition that John would be first overall.

[6] In the latter case, variable binding is similarly possible with mismatching features as in:

(i)   Every man in this group thinks *(that he is a woman and) that **?she** is too tall

   Given that the material in parenthesis cannot be omitted without making the result unacceptable, the most natural interpretation of what is happening here is that the pronoun *she* is analyzed as an E-type pronoun, standing for *the woman he thinks he is*. Alternatively, the sentence is analyzed as:

(ii) λw. Every man in this group (λx. (x thinks in w ($\lambda w'$. x in w is a woman in w' and ($\lambda w"$. x in w:(female in $w"$) is too tall in $w"$))))

   This would mean that binding does not guarantee featural identity. What would be important to note if such is a case, is that, as argued in detail in Sportiche (2022), binding (here of the pronoun by the quantifier) holds for someone. Here it holds for the speaker: even if the pronoun *she* carries the presupposition that its denotation is female - which holds for each man but not for the speaker - the denotation of this pronoun *de re* is the variable bound by *every man*.

controller, as is customarily assumed (see e.g., the analysis of 'predicative control' in Landau (2015, p.24)[7], Pearson (2016, p.12) or Chomsky (2021, p. 23 ex. 10)):

(8)   a. John deserves [PRO to win]
     b. John λx. x deserves [x to win]

More precisely for example, *deserve* can be treated as a modal quantifier, e.g.:

(9)   a. $[[\text{deserve}]]^{c,g} = \lambda P_{<e,<i,<s,t>>}\lambda x_e \lambda t_i \lambda w_s. \forall <w',t'> \in Deserve_{x,w,t}, P(x)(t')(w')$
      Where
     b. $Deserve_{x,w,t} = \{<w',t'>: \text{ in } w' \text{ at } t', x \text{ gets what } x \text{ deserves in } w \text{ at } t\}$

We can compute the truth condition of a sentence such as (8a) as follows:

1. $[_{CP_1}\lambda t_1 \lambda w_2 [w_2 t_1 \text{ John } [_{VP_1} \text{ deserves } [_{CP_2} \lambda x_3 \lambda t_4 \lambda w_5 [_{IP} w_5 t_4 \text{ PRO}_3 \text{ to win}]]]]]$
2. $[[\text{CP}_2]]^{c,g} = \lambda x \lambda t \lambda w. \ x \ wins \ in \ w \ at \ t$
3. $[[\text{VP}_1]]^{c,g} = \lambda x \lambda t \lambda w. \forall <w',t'> \in Deserve_{x,w,t}, x \ wins \ in \ w' at \ t'$
4. $[[\text{CP}_1]]^{c,g} = \text{John } \lambda x \lambda t \lambda w. \forall <w',t'> \in Deserve_{x,w,t}, x \ wins \ in \ w' at \ t'$
5. $[[\text{CP}_1]]^{c,g} = \text{John } \lambda x \lambda t \lambda w. \forall <w',t'> \ s.t. \ in \ w' \ at \ t', x \ gets \ what \ x \ deserves \ in \ w \ at \ t, \ x \ wins \ in \ w' at \ t'$

As shown in line 5, the subject of *win* and the subject of *deserve* end up being the same variable. But this does not specify who this variable identity holds for. This leads to incorrect predictions as we now document.

3.2.1 Subject Control

Consider the following scenario:
Oedipus kills a stranger, unbeknownst to him his father Laius. Oedipus becomes king of Thebes. The gods, unhappy that Laius's killer went unpunished send a plague on Thebes. Oedipus is a good, deserving king of Thebes whose reward would be for Thebes's plague to disappear or equivalently, given the gods's demand, that Laius's killer be punished. So Oedipus killed Laius not knowing it was Laius. In his mind he is not Laius's killer.
Suppose now that the following is true: The reward Oedipus deserves is that the killer of Laius be punished and consider the following reports (with nearest translations in French which work the same but where pairs are minimal) in (10):

(10)   a. Oedipus$_k$ is so deserving that we should punish him$_k$
       Oedipus$_k$ mérite   qu' on le$_k$ punisse
     b. Oedipus$_k$ deserves PRO$_k$ to be punished
       Oedipus$_k$ mérite d' PRO$_k$ être puni

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7   Landau's treatment is a bit different from what is shown below but encodes the same relation never-theless. Landau provides the following analysis for *John began to paint the wall*:

a. $IN_w =_{def} \{w' : w' \text{ is an inertia world of } w \}$ (what this means precisely does not matter here)
b. $e \subset e'$ if and only if e is an initial subevent of e'.
c. $[[\text{begin to paint the wall}]]^{w,g} = \lambda d'.\lambda x.\lambda e'. \ e'$ is an event of x painting the wall to degree d' in w and x causes e' in w and $\exists <e",w",d"> [w" \in IN_w \wedge e' \subset e" \wedge d' \subset d"]$, $e"$ is an event of x painting the wall to degree $d"$ in $w"$.

  It should be clear that by β conversion, the subject of *paint* is bound by *John*, (as is the subject of *begin*).

In this scenario, both sentences in (10) are true: Oedipus_k is both a good king and Laius's killer. As king, he deserves a reward namely that he *qua killer of Laius* be punished.

Now suppose Oedipus says: (i) 'The reward I deserve is that the killer of Laius be punished'. Since he is not aware of being Laius's killer, he couldn't instead say: (ii) 'I deserve to be punished'. Indeed, in such a case under any treatment, *PRO* is interpreted as covalued with *I* for the speaker, so (ii) is equivalent to: ' What I deserve is that I be punished' which is not what Oedipus means.

Now consider my reporting (i) as:

(11) a. Oedipus_k claims PRO_k^1 to be so deserving that he_k should be punished
         Oedipus_k prétend PRO_k^1 mériter   qu' on le_k punisse
      b. Oedipus_k claims PRO_k^1 to deserve PRO_k^2 to be punished
         Oedipus_k prétend PRO_k^1 mériter d' PRO_k^2 être   puni

Sentence (11a) is true. Oedipus says he deserves as reward that the killer be punished, where I, who knows that he is killer, replaces this description by a pronoun picking him out as referent. But sentence (11b) is judged false. In it, PRO^2 is (OC-)controlled by PRO^1; PRO^1 must be understood *de se*. This means that Oedipus thinks that it denotes him. In other words, we can paraphrase 'Oedipus_k prétend PRO_k^1 mériter ...' as *Oedipus claims: 'I deserve ...'*. So sentence (11b) is equivalent to: *Oedipus says: I deserve to be punished* and is perceived as false.

Under the semantic treatment of *deserve* outlined above, this sentence is not predicted to be false. The only requirement on PRO^2 is that it be a variable bound by PRO^1. But, as noted, it suffices for this to be possible that both PRO^1 and PRO^2 denote the same person for the speaker even if Oedipus does not see them as meeting the same descriptions.[8] Thus, Oedipus must see PRO^1 as himself *de se*, but need not see PRO^2 as himself *de se*: this sentence should be able to mean: Oedipus claims that $\text{he}_{de\ se}$ deserves for $\text{him}_{de\ re}$ to be punished.

3.2.2   Object Control

The same pattern is found in object control cases under non attitudinal cases, here with an inanimate controller:

(12) Wrong ball scenario: *There is a white ball, which Gottfried sees as gray, on a rail forming a down and up curve. The ball must be forced down to move along the rail. What really happened: Gottfried forced the white ball downward making it go down and up again.*
      Gottfried can't see the lowest portion of the rail which is hidden by a screen. A blue light was turned on right when the ball was behind the screen making the ball moving up look blue. My view is unimpeded by the screen: I know there is no blue ball, it is the same white ball lit blue.
      What Gottfried thinks happened: 'I forced the gray ball downward so that it hit and thus forced another ball, a blue ball, to move upward.'

(13) a. Gottfried a forcé [la   boule blanche]$_k$ à PRO_k monter
         Gottfried forced [the white ball]$_k$ PRO_k to   move up
         'Gottfried forced the white ball to move up'

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[8]   This is also visible in examples such as *Oedipus wants to punish himself*, which are true even if *himself* does not denote Oedipus for Oedipus - see Sportiche, 2022, for discussion.

    b.   Gottfried prétend avoir   appliqué une telle force à [la   boule grise]$_k$ qu' elle$_k$
          Gottfried claims   to have applied a   such force to [the gray   ball]$_k$ that it$_k$
          est montée
          moved up
          'Gottfried claims to have applied such a force to the gray ball that it moved up'

    c.   Gottfried prétend avoir   forcé [la   boule grise]$_k$ à PRO$_k$ monter
          Gottfried claims   to have forced [the gray   ball]$_k$ PRO$_k$ to move up
          'Gottfried claims to have forced the gray ball to move up'

The facts are similar. The first two sentences are true in this scenario. The first one is straightforward. In the second, *the gray ball* is Gottfried's description. It designates a ball which is the white ball *de re*, and this ball did move up. The sentence can be paraphrased as: Gottfried claims that he applied such force to the ball he describes as the gray ball so that it moved up.

But the third sentence is judged false: the intuition here is that it is because Gottfried does not think that the ball he forced down moved up. It is predicted true however. According to a semantic analysis of *force* along the lines of the one for *deserve*, the object of *force*, which denotes the grey ball *de dicto*, but the white ball *de re* only needs to bind *PRO*. In particular, nothing prevents both it and *PRO* from meaning the white ball *de re* non *de dicto*. This should make the sentence true since both the gray ball and the blue ball are the white ball *de re*. A semantic treatment of *force* similar to that of *deserve* gives the wrong result here.

4   A proposal

4.1   The general idea

Given the agreement pattern discussed above in the attitudinal case, the right proposal should be able to treat PRO both as agreeing with its controller, or as having the features compatible (agreeing with) with its denotation for the attitude holder, the controller. The account proposed here takes advantage of Kaplan's 1968 acquaintance relations.We can informally express the idea as follows. Consider again:

(14)   John hopes PRO to win

If this sentence expresses a belief of mine, I must be acquainted with John, I must have an idea of who John is. I must hold true some (possibly indexical) description which for me uniquely identifies him (e.g. the guy in the red coat over there). Such descriptions of John for me are acquaintance relations between me and John. I the speaker holds a description of the denotation of *PRO* as John.

In addition, I would like to propose that in control cases, a human controller, here John, holds a description of the denotation of the controlled *PRO* as himself *de se* 'directly' (that is not mediated by quantification over centered worlds). This means we could roughly paraphrase this sentence as:[9]

(15)   John hopes that *the person who John self identifies as and who I take to be John* will win.

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[9]   Sportiche (2022) discusses different reasons to want PRO to denote John *de re*, having to do with problematic facts discussed in Heim (1994) and Sharvit (2011).

Such an approach solves the first two problems for the attitudinal case. First, in the given scenario on page 5, Peter cannot judge sentence (4a) to be true since PRO (=Ann for John, John for me) does not denote John for Peter. And sentence (5c) is now false too, for the same reason. And agreement can be variable, with a (usual) preference for the *de re* construal, depending on whether we favor syntactic agreement or semantic agreement (so in this scenario, masculine agreement with PRO would be preferred over feminine agreement).

But, this treatment still falls short. First, since *de se* ascriptions are mandatory with attitudinal OC verbs, it is not sufficient to postulate that the right descriptions held by the speaker and the attitude holder yield the right truth conditions, we must also explain why these descriptions are mandatorily present. Abstractly, not doing so is a flaw similar to stipulating that PRO must be bound locally as discussed on page 4, although it is a lesser flaw since it is at least descriptively correct. Furthermore, this does not solve the problem for the non attitudinal case.

I would like to suggest a solution to both problems as a consequence of a solution for the overgeneration problem, the fact that the standard analysis of *hope* overgenerates. Once this is done, we will see how the problems with non attitudinal control is also solved.

4.2   Fixing what attitudes verbs are predicted to exist

Let's return to how the verb hope is lexically defined.

(16)   Lexical entry for *hope*:
       $[[hope]]^{g,w} = \lambda P \in D_{<s,et>}.\ \lambda x \in D_e.\ HOPE_{x,w} \subseteq P$
       Where $HOPE$ denotes alternatives as follows (Chierchia/Lewis style)
       $HOPE_{x,w} = \{(a_i, w_i)|\ f_{w_i,w}(x) = a_i\}$
       with $f_{w_i,w}(x) = a_i$ iff being a_i in w_i is consistent with x's hopes in w.

The domain of quantification of the attitude verb is defined by appealing to the function in red. A first overgeneration problem is the following. The literature on indexical shift argues that attitudes verbs quantify over tuples $c = < a_c, w_c, ... >$, where a_c has a distinguished property: it is the author of the context. The defining property of the author of a context is being what the first person pronoun uttered in this context picks out as referent. So if a first person indexical 'shifts' in an embedded context c, it denotes a_c (instead of the speaker of the utterance). This happens in some language where unlike in English, the indirect discourse *John thinks I will win* means *John thinks: 'I will win'*.
Now we must make sure in the characterization of $HOPE$ that in the pairs $< a_i, w_i >$, a_i is actually the center of w_i, or, in terms of context, the author of the context. Indeed, imagine that in context c_i, a_i in w_i is not a_{c_i}, is not the author of the context c_i. This makes the following prediction: it predicts that if John were expressing his hope as 'I will win in c_i', the sentence *John hopes to win* would mean that someone else that who he thinks in c_i will win. There are no attitude verbs 'shmope' with this property. So we could fix the function f by stating:
$f_{w_i,w}(x) = a_i$ iff being a_i in w_i, a_i the center of w_i, is consistent with x's hopes in w.

But now, given the ingredients that enter into how f is defined, we can imagine all sorts of attitude verbs where this function is different. For example, could there be a verb 'schnope', where this function is defined as:
$f_{w_i,w}(x) = a_i$ iff being **NOT** a_i in w_i, a_i the center of w_i, is consistent with x's hopes in w

If this was possible, the sentence *John shnopes to win* would mean that John hopes that whoever he is not wins. Such verbs are not possible verbs. Or we could define this f as: $f_{w_i,w}(x) = a_i$ iff being a_i in w_i, a_i the **addressee** of w_i, is consistent with x's hopes in w, where addressee in w_i is who *you* picks out in w_i. Such verbs are not possible verbs.

These considerations suggest that how *hope* and alternatives are lexically defined cannot use ingredients that could lead to such impossibilities. We want to guarantee that with John an attitude holder, the corresponding attitude predicate only quantifies over centered alternatives whose author is who John thinks he is in these alternatives. In Sportiche (2019), I proposed that this property of the domain of quantification of attitude predicates is a conceptual property: it is a necessary property of (human) thinkers, not a linguistic property, but in Chomsky's terms a third factor property, a property of how (human) thinking in general is structured.

(17) **Self Centering**: John (any thinker) has a necessary description of himself, a necessary acquaintance relation with himself, by which in the actual world, John identifies who John thinks John is in any of John's centered alternatives as the author of this alternative.

Making this assumption allows one to simplify how $HOPE_{x,c}$ (now written as quantifying over contexts rather than worlds) is defined, where we now understand compatibility as requiring (among other things) that self-centering be satisfied:

(18) $HOPE_{x,c} = \{c_i = <a_{c_i}, w_{c_i}, ...> \mid c_i \text{ is compatible with } x\text{'s hopes in } c\}$

As a final comment, note this does not exhaust problems of overgeneration given (16). The discussion above looked at how the domain of quantification is defined. The same question arises regarding the type of quantifiers that are allowed. Attitudes predicates are taken to be universal quantifiers. Are there attitude verbs which are existential quantifiers? proportional quantifiers? etc... (the same way modals predicates are thought to be existential, universal, or other kinds of quantifiers). If yes, examples should be provided. If not, explanations as to why they do not exist should be provided (especially given that modal verbs do not show such restrictions).

4.3 Deriving the presence of *de se* ascriptions

Returning to the example where PRO must be read *de se*, and their paraphrases spelling out relevant descriptions that yield the right truth conditions:

(19) a. John hopes PRO to win
      b. John hopes that *the person who he self identifies as being and who I take to be John* will win

There is no reason why these particular descriptions should be mandatorily present: while an approach in these terms gets the right result, it is insufficient.
The idea of the proposal I would like to make is as follows: John is necessarily acquainted with himself by the self-centering description. If John is similarly acquainted with who *PRO* denotes, the *de se* reading would be derived. More precisely, John takes to be the author of any of John's centered alternatives who John thinks John is in this alternative. If this holds of *PRO*'s denotation, John would take to be the author of any of John's centered alternatives who John thinks PRO is in this alternative. In other words, *PRO* would have

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to denote the center of any of the centered alternatives of John's: this is the mandated *de se* property or *PRO*, derived.

But in order to get this result, we must make a particular assumption about *PRO*.

First note that normally, the denotation of a pronoun say, coreferential or bound by a name does not necessarily satisfy the same descriptions as its antecedent for all involved. Thus in *John/every boy$_k$ thinks you will see him$_k$*, the speaker takes John and him to be the same person or takes each boy to have a thought about himself; but while John may think of John as himself, he does not necessarily think of *him* as denoting himself: the pronoun *him* need not be read *de se*. So assuming as is standard that *PRO* is anaphoric on *John* is insufficient to have John think about PRO as himself. To get the desired result, we must assume that **PRO is more strongly anaphoric**: it must inherits *all* descriptions holding of its controller. In particular, if John holds a particular description true of John, of himself, e.g. self-centering, he must hold true the same description of PRO, deriving why *PRO* must be read *de se*. Or to say to differently, *PRO* and its antecedent must not only have the same extension, but also the same intension.

Note furthermore that I, the speaker, must hold true some description of John in one way or another, that uniquely identifies him to me as John. Therefore, I am acquainted with who *PRO* denotes in the same way, identifying this person as John as well: *PRO* denotes John *de re*.

The question now is how to derive that *PRO* is a strong anaphor.
Interestingly, strong anaphoricity would follow under a movement theory of OC: an antecedent and its trace are tokens of the same object; they therefore enter into all the same acquaintance relations. This makes such an option appealing although there are difficulties. I discuss this further below in section 5.
Under a non movement theory of OC, *PRO* would have to be stipulated to be a "concept" anaphor inheriting all descriptions true of its controller. It is unclear however how this could be derived. Perhaps *PRO* being underspecified?[10]

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[10]   Hungarian shows the relevant properties of the control relation are independent of whether the controllee is silent or not. Szabolcsi (2009) shows that in Hungarian, obligatory control allows the controllee to be overt. Szabolcsi (2009) remarks that an overt pronoun in such OC constructions is possible only if this pronoun is modified (e.g. by *only* or *too*.

i.   Context: A group of friends boards a crowded bus that has only one vacant seat.

Senki   nem akart   csak ö   leül-ni
Nobody not wanted-3SG only he/she sit-INF

Nobody wanted it to be the case that only he/she takes a seat

Crucially, in such a case this controlled pronoun must be read *de se* as well, an observation due to Marta Abrusán:

ii.   A(z amnéziás) hös nem akart   csak ö kap-ni   érdemrend-et
the amnesiac hero not wanted-3SG only he get-INF medal-ACC
The (amnesiac) hero did not want: 'only I get a medal'   only *de se*

In our terms, this means that this overt pronoun is a strong anaphor. So mandatory *de se*-ness can't be a property just of silent controlled elements like PRO: it can also be a property of obligatorily controlled overt pronouns (in appropriate contexts). This indicates that we are not dealing an intrinsic property of these elements, rather it seems to be a property induced by there being a **control relation**, which again would be consistent with a movement approach to OC (which would require here spell out of a trace when narrowly focused (by *only, too*).

4.4 Back to the non attitudinal case

The assumption about *PRO* being a strong anaphor also solves the *deserve* case and the *force* case. Proceeding in steps, we would end with the following informal paraphrase of (11b):

(20) a. Oedipus$_k$ claims PRO$_k^1$ to deserve PRO$_k^2$ to be punished
      b. Oedipus claims *Oedipus* deserves for *Oedipus* to be punished

Here Oedipus sees PRO$_k^1$ as denoting Oedipus. Since PRO$_k^2$ is controlled by PRO$_k^1$, it is also seen as denoting Oedipus for Oedipus yielding the paraphrase in (b) above. In the given context, this leads to the sentence being false. In the *force* case:

(21) a. As for the white ball, Gottfried claims it$_k$ to have forced PRO$_k$ to move up
      b. Gottfried claims to have forcefully acted on the gray ball so that this gray ball moved up

Gottfried sees *it* as denoting the grey ball. Given the control relation, *PRO* inherits this description and is thus seen by him as the grey ball. This yields as part of the meaning the paraphrase given in (b), which is false.

4.5 Extension to *de te*

Mandatory *de se* readings have so-called *de te* 'counterparts' as can be illustrated with object control verbs such as *tell, ask, urge, recommend, order,* etc... in which the infinitive complement clause contains a *PRO* controlled by the object, but describes an attitude of the subject.[11]

Thus, the following sentence will be true only if Mary told John: 'you have to go'.

(22) Mary told John to go

This shown by considering the following branching scenario (from Schlenker, 1999 and Anand, 2006):

(23) Bad waiter scenario:
      Mary is hosting a party. She hears that a certain waiter named John is being a nuisance.
      S1: Mary tells the nearest waiter, "John has to go." Unbeknownst to her, she's talking to John.
      S2: Mary tells John, "You have to go."

We get the following judgments:

(24) a. Mary told John$_k$ that he$_k$ had to leave.   S1: TRUE, S2: TRUE
      b. Mary told John$_k$ to PRO$_k$ to leave.   S1: FALSE, S2: TRUE

The fact that the second sentence is false in the scenario S1 illustrates why *de te* attitudes are taken to crucially involve the indexical *you* in the attitude.[12]

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[11] Object control verbs such as *persuade* in *The oracle persuaded Oedipus$_m$ PRO$_m$ to leave Corinth* can take infinitives expressing an attitude of the object with PRO controlled by this very object. And they behave as expected: PRO must be read *de se* for the referent of the object.

[12] The pair in (24) is not a minimal finite/infinitive pair, first because *PRO* must be read *de te* while there

What is different about this case as compared to the classic *de se* case is that Mary is the attitude holder and there is an interpretive requirement on *PRO*, but *PRO* is controlled by *John*. The required *de te* reading here is that *PRO* must be coreferential with its controller *John* for Mary.

Extending the standard treatment to such cases, we would assume (i) that *tell* quantifies over triplets (at least) $< author, addressee, world >=< a, u, w >$ such that, being a in w addressing is compatible with what she said in the actual world, and (ii) that *PRO* must be bound by λu. Note first that this would be another stipulation, and one that raises questions about what determines whether PRO is bound by the author of the context or by the addressee of the embedded context. And it would be subject to the same criticisms: It would fail to say anything about the identity of PRO *de re*, would fail to explain agreement patterns and would predict in principle the existence of impossible communication verbs. To illustrate the first point, consider the following sentence in the given scenario:

(25)   *Context: Mary is watching a video shot in the dark of herself with John and Bill in it. In the video, she says: John, let me tell you, you should pick up the trash pointing at the person who she thinks is John, but is in fact Bill.*
       Mary told John to pick up the trash

In this scenario, Mary addresses John, but mistakenly directs her command at Bill. This would be predicted true in standard accounts since in her mind, she is pointing at John so she rightly thinks: I told John to pick up the trash. But we perceive this sentence as false. Our reaction would be: she addressed John all right, but she told John that Bill should pick up the trash. What is missing is that *PRO* should denote John *de re*. The agreement problem would be the same as before because the standard accounts would treat PRO's value as a function of a variable bound its controller ranges over, thus possibly with different ϕ features. Finally, it would predict the existence of impossible verbs like *schtell*, where *Mary schtold John to leave* is true if Mary told John that someone else that John should leave...

To solve these problems and reduce the *de te* requirement in example (22) to *PRO* being a strong anaphor, the reasoning is parallel to what was done in the world center/*de se* case. First, I, the speaker of (24), have to have a description of John uniquely identifying him for me. This description also holds of PRO, meaning that it is John *de re*, as required. Next, given the previous discussion of the *de se* cases, we expect that Mary holds true some description of John that derives the *de te* requirement.

To begin, the notion of Adressee (goal) of some directed speech, as is the case with a verb like *tell* or *say to* is intensional. John is the adressee of Mary's words only if Mary thinks

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is no such requirement in the finite case. But also because the finite case is ambiguous in a way that the infinitive case is not. In (24a), Mary may simply be relaying some information to John or issuing a demand or an order. In (24b), she cannot just be relaying some information: she is issuing a command. This is disambiguated in French: the verb *dire à/ say to* plus infinitive means order/demand and is an object control verb and the infinitive is introduced by the particle *de*. Otherwise, the infinitive is bare, it is a subject control verb and it means report information.

i.   a.   Marie$_m$ a dit PRO$_m$ être   prête à Pierre
          Mary   said PRO   to be ready to Pierre
          'Mary said to Peter that she was ready'
     b.   Marie a dit d' PRO être   prêt à   Pierre
          Mary said   PRO to be ready to   Pierre
          'Mary told Peter to be ready'

so. Mary must intentionally direct her words to John: she must think of John as 'my addressee'. This is the source of the requisite description that Mary must have of John. Verbs of communication like *tell* require their object to denote an addressee of the teller (goal arguments with *give, promise* are similarly intensional albeit not addressees).

Next, we define the verb *tell* as quantifying over triplets (at least) $< a, u, w >$ but simplify the definition of lexically specified accessible alternatives, call them **Phematic**[13] alternatives Phe, concerning the nature of the center/author or addressee:

(26) Phematic Alternatives for Mary in w are defined as:
$Phe_{Mary}^w = \{(a_i, u_i, w_i) | a_i$ is the center of w_i, u_i is a_i's addressee in w_i, and w_i compatible with what Mary says in $w\}$

And finally, we need some counterpart to the *self-centering* description that will necessarily hold true of John for Mary and be part of how 'compatible' is understood in the definition above, thereby excluding impossible verbs like *schtell*. The idea is the same as earlier: if John is Mary's actual addressee, who she thinks John is in some alternative is the addressee of who she thinks she is in this alternative.

(27) *Addressee Description*
$\forall(a_i, u_i, w_i) \in Phe_{Mary}^w$, u_i in w_i, u_i is [who Mary believes in w that John is in w_i].

We take this to be a necessary part of the concept of addressee, a description that Mary must have of John. Since *PRO* is a strong anaphor, it inherits this description: $\forall(a_i, u_i, w_i) \in Phe_{Mary}^w$, u_i in w_i, u_i is [who Mary believes in w that **PRO** is in w_i], that is her adressee in w_i.

It should be clear that with all these ingredients in place, the *de te* requirement is derived.

4.6 A short summary of the proposal

In sum, here is the proposal. In OC subject control into complements:

(28) John verbed $[_{infinitive}$ PRO to xxx $]$

PRO inherits all descriptions (acquaintance relations) holding of its controller. However the speaker of this utterance sees John, it sees similarly the denotation of PRO. This yields a *de re* property of this denotation, identifying it. However John necessarily sees himself, John also sees the denotation of PRO. Since an attitude holder necessarily sees himself *de se* as the center of its modal alternatives, he sees PRO's denotation similarly, yielding PRO's *de se*-ness in such cases. The *de te* cases function similarly, building on a necessary acquaintance relation any attitude holder holds of his addressee(s).

5 Control as Movement?

If OC is mandatorily movement, the movement theory of control or MTC, as proposed in Hornstein (1999), we derive that PRO is a strong anaphor in the requisite sense. Under the copy theory of movement, an antecedent and its trace are the same syntactic object, with a single extension and intension. They thus satisfy all the same descriptions any attitude

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[13] Thanks to David Goldstein for suggesting this term from the Greek word $\phi\tilde{\eta}\mu\alpha$ meaning 'what is said'.

holder holds true. Hence they share the *self*-centering description or the addressee description, as needed. This adds to the virtues of the MTC catalogued by its proponents, not the least of which is to have a non ad hoc analysis of *PRO*, a requirement that alternative analyses struggle with. This is a remarkable result which warrants thoroughly investigating the limits of the MTC which I will do below.

This said, it is worth noting that from the point of view of *explaining* why complement OC constructions display the interpretive properties they do, it does not suffice to assume that the *self*-centering description holds true, or the MTC, we also need to derive that the MTC is only option that the theory allows for the OC cases under discussion. Boeckx and Hornstein (2007) propose that this follows from a principle favoring Move over Merge: If movement is possible from the controlled position to its controller, the movement option must be chosen. Else, *pro* is used.[14] As far as I can see, alternatives to the MTC struggle to provide a principled answer to this question: after all, even if movement can't always underlie (the relevant cases of) OC, what prevents the MTC to hold in some cases? Surely, this potential analytical duplication is undesirable.

A point of notation: I will continue calling the controlled silent subject PRO, and the partially controlled silent subject PC PRO, regardless of how it is analyzed, e.g. as a trace of its controller for PRO.

5.1   Comparing with Hornstein and Pietroski (2010)

Assuming movement, the proposal we end up with is conceptually closest to that found in Hornstein and Pietroski (2010) with which I now do a brief comparison.[15] Hornstein and Pietroski 2010's proposal:

1. treats PRO as a trace/copy of its controller in OC, and assumes therefore that they must instantiate the same individual concept (they satisfy the same uniquely identifying description) and thus map to the same individual.

2. posits that this individual concept is a first personal one for the controller hence for PRO, thus deriving the mandatory character of *de se* reading in simple cases.

The present proposal agrees with point # 1 above but not with point #2. The agreement with point #1 entails that Hornstein and Pietroski's account has the virtue (undiscussed in their paper, I think) of not being subject to the failure of entailing *de re* covaluation for PRO and its antecedent. Indeed, in a simple case like (1), the intensional identity between PRO and its antecedent means that any (uniquely identifying) concept that the speaker has of the antecedent *John* will also hold of PRO.
Disagreement about point #2 is based on the fact that the postulated concept cannot be a first personal one for two reasons.
1. The first reason is the existence of *de te* cases which shows that being first personal is insufficient: sometimes, a second personal concept of the controller by some other attitude

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[14]   This principle is also advocated for in Chomsky (2021) on computational simplicity grounds. It is implemented differently however, with different effects. Chomsky (2021) treats it is a grammatical bottom up requirement, while Boeckx and Hornstein (2007) treats it as a top down parsing requirement. This recalls Tanya Reinhart's idea that coreference is excluded when binding is possible: Move guarantees binding of PRO (as trace) by its antecedent; Merge allows coreference as well is thereby excluded if Move is allowed.

[15]   Thanks for Paul Pietroski for directing me to this work

holder is needed. Other similar cases (e.g. *de nunc*) require further concepts. At best, PRO would have to be one of several concepts, raising the question of why it has to be the one it is in particular structures (why first personal with *hope* but second personal with *tell*.
2. The second reason is the existence of the non attitudinal or inanimate OC control cases (as with *force*) where no first or second personal concept is involved: what matters is that some attitude holder having the same conception of both controller and controllee.

Furthermore, when a first personal concept is in play, it remains unclear under Hornstein and Pietroski's 2010 account what exactly this first personal concept is and why it is mandatorily present. This said, there is agreement that in such cases, a first personal concept is involved, as the self-centering description is the relevant first personal concept.[16]

5.2 Dealing with some objections to Control as Movement

I take to be fundamental to the MTC the fact that there is movement from *PRO* to its controller. I argue elsewhere (Sportiche, 2024a) that movement to a θ-position:

1. is available by default (agreeing with Hornstein, 1999, pace, e.g., Chomsky, 2021)
2. is not feature driven. I do not assume θ-roles to be features, I take θ-roles to just be names for relational notions and θ-assignment to be nothing but the independently required functional application. As a result of *not* being feature driven (unlike standard A-movement), it is not linked to Agree, thus expected not to be, and is not, subject to intervention effect, and as a result:
3. Re locality, it is only subject to Phase theory.
4. Finally, it does not obey the Coordinate Structure Constraint (which is not a constraint on movement, cf. Sportiche, 2024b).

In this context, I am not reviewing all the arguments against the MTC. One reason, apart from space, is that many objections do not deal with this fundamental property of MTC, but rather with auxiliary assumptions which are dispensable. Furthermore, precisely because MTC movement is to a θ-position unlike standard A-movement, systematic differences are predicted under the barest minimalist assumptions about which is allowed when. Arguments against the MTC based on the fact that MTC movement and standard A-movement diverge would have to be examined under the light of these independently predicted differences. Before proceeding, let me clarify that there are additional assumptions regarding the treatment of OC as movement that I am not making:

1. I leave open whether control into adjuncts, OC or NOC - some of which would require sideward movement, raising questions of overgeneration - is movement. I will not discuss this in detail here but it is unclear to me in what cases such control functions like OC into complements in the relevant ways, namely that PRO functions as a strong anaphor in the present text's sense (see section 6).
2. It's been argued that movement theory cannot predict what movement is to (which should always be the controller). I depart from standard views of the MTC in not assuming that constraints on movement is what determines what the controller is. I

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[16]   Much like Hornstein and Pietroski (2010), Landau (2017) adopts the idea that in simple attitudinal OC cases, the *de se*-ness of PRO arises from PRO (indirectly) being a first personal concept (and a second personal concept in it de te cases). Its origin however remains as mysterious as Hornstein and Pietroski (2010).

assume that movement freely operates (not subject to the minimal distance principle because assumption 2 above) but the output must meet the lexico-semantic constraints the control construction imposes. This is discussed in the next section.

5.3   Predicting the controller

There are both semantic and syntactic constraints at play in how OC functions. The semantic dimensions are discussed in e.g. Farkas (1988), Jackendoff and Culicover (2003) or Rooryck (2007) and references therein. These considerations clearly show that the choice of controller depends on the semantic relations between the OC verbs and its arguments, including what the infinitival clause complement of the OC verb denotes. Thus indirectly, the meaning of a predicate could enforce a relation between two of its arguments, one of which, the infinitive clause, having to denote an entity compatible with the meaning of this predicate. Thus, consider:

(29)   a.   Sue persuaded every boy$_k$ [PRO$_k$ to leave]
       b.   Sue promised every boy$_k$ [PRO to call his$_k$ mother]
       c.   Sue$_m$ proposed to every boy$_k$ [PRO$_{m,k,m+k}$ to call his$_k$ mother]

With *persuade* roughly meaning *cause to intend*, the content of the infinitive must be something that the object can intend. Similarly, with *promise* denoting a commitment, the infinitive either must be something that the subject can carry out to fulfill this commitment, yielding subject control, or something describing the content of the commitment towards the object yielding object control (as in *Sue a promis à Bill d'être autorisé à partir/Sue promised Bill to be allowed to leave* although the permission granting is still understood to result from the subject's actions). The control flexibility of *propose* is similarly unsurprising since the verb *propose* does not semantically bias the content of the infinitive towards a property of or an action by one or the other of its individual arguments.

But there are clear syntactic constraints as well simply illustrated by pairs such as:[17]

(30)   a.   John remembers Bill leaving early / John remembers PRO leaving early
       b.   John expects Bill to win / John expects PRO to win
       c.   John wants Bill to win / John wants PRO to win
       d.   John hopes for Bill to win / John hopes PRO to win

Unless one is prepared to claim that there are two verbs *remember, expect, want, hope* with different semantic properties, an unappealing option at best, the first example shows that the meaning of the verb does not impose that the content of the dependent clause be a property of John. Yet in the second example of each pair, PRO is obligatorily controlled by *John*: PRO has an intrinsic property requiring it to have a local antecedent in such structures, since, as Landau (2013) extensively documents, OC is local.

The challenge raised by examples such as (30) is to make sure that whatever ends up controlling PRO by these syntactic mechanisms ends up being a controller allowed by the semantic properties of the control verb.[18] In the cases in (30), locality would take care of

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[17]   Incidentally, such examples clearly demonstrate that the simple observation of the possibility of an overt counterpart to PRO does not preclude OC.

[18]   Note also that *Sue$_m$ proposed to every boy$_k$ [PRO$_{m,k,m+k}$ to call his$_k$ mother]* and *Ann did too* is unambiguous: control must be understood in the same way in both conjuncts, a reflection of an independent 'parallellism' constraint on Ellipsis, discussed in Fox (2000).

the problem: there is only one controller that is local enough. In cases like:

(31) a. John$_k$ promised Bill PRO$_k$ to win
      b. John$_k$ pleaded with Bill PRO$_k$ to be allowed to leave
      c. John persuaded Bill$_k$PRO$_k$ to leave
      d. Sue$_m$ proposed to Bill$_k$ [PRO$_{m,k,m+k}$ to call his$_k$ mother]

The third and fourth case shows that an object can be a controller. In all cases, the infinitive is in the scope of the controller(s), as shown by the fact that it/they can bind into the infinitive, suggesting that the controller c-commands the infinitive and thus that movement into the controller position is allowed:

(32) a. Every boy$_k$ promised every girl$_m$ PRO$_k$ to keep their$_{m+k}$ selfies
      b. Every boy$_k$ pleaded with every girl$_m$ PRO$_k$ to be allowed to keep their$_{m+k}$ selfies
      c. Every boy$_k$ persuaded every girl$_m$ PRO$_m$ to keep their$_{m+k}$ selfies
      d. Every boy$_k$ proposed to every girl$_k$ [PRO$_{m,k,m+k}$ to keep their$_{m+k}$ selfies to himself/herself/themselves]

Control by *Bill* in the first two is thus syntactically possible, but ruled out as anomalous by the semantics of *promise, plead*, given the content of the infinitive (an action in the first, a permission in the second).

Challenging cases would be cases of subject control as in (30) where another DP could syntactically be the controller, a verb like *schmexpect* with the following properties:

(33) a. ✓ John schmexpected Bill [Sue leaving/ for Sue to leave]
      b. ✓ John$_k$ schmexpected Bill [PRO$_k$ leaving/ PRO$_k$ to leave]
      c. ∗ John schmexpected Bill$_k$ [PRO$_k$ leaving/ PRO$_k$ to leave]

The first example intends to illustrate a case similar to those in (30). In (30a), the interpretation of the dependent clause is subject to no semantic restriction with respect to the arguments of the verb, i.e., this verb does not semantically require anything to control the dependent gerund/infinitival: Bill's leaving is totally independent of whether anyone remembers it or not. This is what is intended in (33a). But in the presence of PRO, OC must be by (e.g.) the subject as in (33b). This would be unexplained. There are cases such as *John pleaded with Mary for Sue to leave her post, John asked Mary for Sue to leave her post* (thanks to Tom Meadows, p.c. for these examples), but they impose a semantic control relation between the object (here) and the infinitival content: somehow we must understand that Sue leaving her post is something that Mary has control/input over: Sue leaving is not independent of Mary's actions. Such OC predicates as *schmexpect* do not seem to exist, perhaps for principled reason, so the problem we describe does not arise.

Now how does control work? The relation between the controller and PRO could hardly be lexical: no lexical property should be able to directly encode a relation between two arguments of different predicates: this would violate a fundamental locality property, namely Locality of Selection (see Sportiche, 2005). Excluding ad hoc 'transmission' mechanisms (A selects B which selects C), the mechanism by which OC PRO is controlled could be any local syntactic mechanism: it could be coreference or binding under Condition A, it could be Agree, or it could be, most relevantly here, movement, mandated by or consistent with properties of PRO, e.g. it being underspecified or anaphoric, or a possible A-trace site.

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A modular approach would let movement operate subject to movement constraints[19] with the result filtered out as semantically anomalous (due to the lexical semantics of the OC predicate) when relevant. This is what I assume.

5.4 Partial or Split Control

I now turn to split or partial control in OC which raises serious challenges for a movement analysis, in addition perhaps to the claimed inexistence of partial raising. As noted earlier, the fact that A-movement to θ-position and A-movement to a non θ-position have different licensing properties, the relevance of the putative absence of partial raising to this issue would have to be established to bear on this issue, so I will ignore this question here.

I will discuss how OC could be made compatible with straight split or partial control.

Partial Control is relevant   The first thing to check is that cases of partial (or split) control satisfy what we take to be the criterial property of movement, namely that the controllee is (partially) read *de se* in attitudinal cases. This is what Landau (2000, p.42-43) concludes. To illustrate, consider for example:

(34) *Context: John is in love with Mary. He is watching a video of Mary and someone seen from the back, who it turns out is him, unbeknownst to him. They seem to get along quite well. Jealous, he tells Mary: 'I hope they will not kiss'.* Someone asks: what did he say? Mary, smiling because she realizes that John did not recognize himself replies:
  a. John hopes not to kiss
  b. John hopes [PRO not to kiss]

This would be false (as PRO is not partially read *de se*). Assuming that such examples are representative, this supports the conclusion that the controllee must meet the *de se* requirement in split cases.

Is the subject of the infinitive singular or plural?   Most of the literature on Partial Control (PC) assumes that PC PRO controlled by a singular controller is syntactically singular.[20]   Most proponents of the MTC take such a PC PRO to also be semantically singular (denoting an individual) and appeal to various versions of a comitative analysis. One version takes PC to involve a covert comitative PP as in *John wanted PRO to meet (with others)*; another invokes a covert adjunct stranded under movement as in *John wanted PRO$_k$ to [adj t$_k$] meet*, where [adj t$_k$] is interpreted as a plurality (cf. Boeckx et al., 2010, Rodrigues, 2007).This second analysis leaves much unclear, e.g. why such structures are restricted to appear in PC contexts only (in English or French). The PP comitative analysis on the other hand, while it may be an option sometimes (nothing rules it out in principle, although the question of when it is available does arise), is not always available, e.g. for example (34) since *kiss* does not allow a comitative. The following kind of cases also raise problems for both options:

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19   Recall that I conclude in Sportiche (2024a) that this type of movement is not triggered (feature driven), hence not subject to Closest Attract / intervention effects.
20   Some exceptions are Modesto (2010), whose analysis is controversial, cf. Rodrigues and Hornstein (2013), and Sheehan et al. (2018), both looking at inflected infinitives.

(35) a. *je suis huit à   table (avec mes amis) pour mon anniversaire
           *I am eight at the table with my friends for   my   birthday
      b. Je veux   être huit à   table pour mon anniversaire
          I   want to be   eight at the table for   my   birthday
          'what I want is for us to be eight at the table for my birthday'

Comitative analyses cannot underlie all cases of PC PRO, albeit they could underlie some.

Non MTC proponents e.g. Landau (2000) or Pearson (2016) assume that such PC PROs are syntactically singular but denoting a plurality (in different ways, Landau appealing to an associative morpheme, which raises the unanswered question of when this morpheme is available, Pearson defending a semantic analysis which ties PC to how quantification over centered worlds functions). This conclusion is based on the following kind of examples from Landau (2007, p. 298-300):

(36) a. (i)   The committee gathered before the vote.
          (ii) *The committee consulted each other before the vote.
      b. (i)   The chair preferred to gather before the vote.
          (ii) *The chair preferred to consult each other before the vote.

Semantic plurality of its subject is all that is needed to license the verb *gather* in the (i) examples and they are well formed. Syntactic plurality of the local subject anteceding *each other* is required (since *each* is a mandatory distributor) in the (ii) examples to license the reciprocal, and they are ill formed. Agreeing with Landau (2000) Pearson (2016, p. 695) writes: '... Landau (2000) shows convincingly that the understood subject fails to license a host of configurations associated with plural subjects...' namely the following with reciprocals (a), plural reflexives (b), predicates including plural morphology (c) and floated quantifiers (d):

(37) a. *John wanted to meet each other in the hall.
      b. *John expected to pamper themselves on vacation.
      c. *John voted to become members of the new club.
      d. *John promised to all be careful when they moved the piano.

To explain these observations Landau's 2016a, p. 576 states that: 'PC PRO ... is not distributable' consistent with Landau (2000) conclusion that PC PRO controlled by a singular antecedent is a collective singular NP/DP such as *committee, family, government*. The assumption them must be that what rules out the (b) examples in (36) is the presence of mandatory distributors such as *each* mandating distributive readings.

Before proceeding, note that it is not entirely clear what exact notion of distributivity is relevant. More precisely, it is not clear whether the relevant notion is taking a VP as a property of individuals as opposed to pluralities, in which case the nature of predicates is crucial: distributed subjects would be excluded. Or what matters is the existential quantification over the event denoted by the VP outscoping a plural subject in which case the subject could distribute but there would be a single event comprised of more than one individual action. In addition, it is also not entirely clear where the semantics/pragamatics line should be drawn regarding what meaning is avaialble when (see Higginbotham and Schein, 1989, Schwarzschild, 1996, Schwarzschild, 2011, Schein, 2017, and Champollion, 2020, in particular). The data simply is not in, and a (future) systematic investigation is needed to decide. Under either option, overt distributors such as *each, each other* floated *all* (viz. *they all are heavy* cannot mean that the sum of their weights is high, it must mean that each of

them is heavy) would mandate excluded distributive readings, however this is understood. In what follows, I will distinguish distributivity, which is assumed to be excluded from distributed subjects, which may or may not be.

Now, if the characteristic property PC PRO is to resist distributive readings, these observations do not obviously bear on the syntactic plurality of singular controlled PC PRO: being a singular collective noun neither precludes the binding of plural reflexives, nor the availability of distributed subject readings, which undermines the rationale for analyzing these PC PROs as singular collective nouns in the first place. Indeed, the following type of examples for British English are reported in Jespersen (1914) reports for (38a) and (38b), and in from Smith (2017, p. 826, (10c)) for (38f):

(38)   a. The/this committee congratulated themselves.
        b. The choir knelt and covered their faces
        c. This choir knelt and covered their faces
        d.%The committee is voting themselves a raise
        e.%The committee has congratulated themselves
        f. The government has offered ?themselves / each other up for criticism

Example (38a), (38d) and (38e) exemplify a singular subject (viz. singular *this, is, has*) binding a plural reflexive. In examples (38b) or (38c), the interpretation must involve a distributed subject, each choir member covering their own face. The judgements in (36), (37), (38) ((38d) and (38e) accepted by some only), have been confirmed by a small informal polling of American English (except for (38)) or British English speakers (consistent with Landau's generalization - but not always consistent with what is reported in Landau, 2000, p. 48-53).[21]

Regarding (37), deviance in the presence of overt subject distributors like *each, each other, all* as discussed (all consulted speakers in English or French agreed) is expected no matter what. In (b) and (c) the predicates *pamper, become member* most naturally (at least in these examples) involve distributed subjects and also most naturally multiple events (e.g. becoming a member of club means filling out individual paperwork etc...).

Clearly, all of these questions remain to be systematically investigated.

This said, I will now argue these subjects are (or at least can be) syntactically plural. I now turn to French facts (and facts in other languages too - see section 6.1) casting doubts on the two previously mentioned assumptions, namely:

(i) the assumption that partial control by a singular controller always involve a singular subject of the infinitive.

(ii) the assumption that partial control by a singular controller involve a semantically plural but syntactically singular subject.

French, pace Pitteroff and Sheehan (2018), shows clear cases of partial control, for example, the following are fully acceptable to me (and some other speakers I consulted):[22]

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[21]   Note that the mixed agreement cases in (38e), (38e) and (38f) raises difficulties for an account such as Sauerland (2004)'s, which assume that plural agreement is triggered when the DP is treated as a definite plural.

[22]   The equivalent is also acceptable to at least some English speakers, Hebrew speakers, German speakers, etc... see (Landau, 2007, p. 298).

(39)   a.   On$_k$ m'a   persuadé de bien nous   comporter, toi et   moi
             one   me has persuaded to well ourselves behave,   you and me
             'someone persuaded me to behave ourselves, you and me
   b.   Pierre t'avais   conseillé de bien vous   comporter, toi et   tes   amis
             Pierre you had advised   to well yourselves behave,   you and your friends
             Pierre had advised you to behave well, you and your friends

Reflexives clitics like *nous, vous* are subject oriented, and require syntactic number agreement with the subject. Note in passing that these are not cases of split control as shown by the intended meaning. Even though *on*, which is syntactically 3rd person singular, can mean *nous / us*, and can bind 1st person plural pronouns as in (a), the 1st person plural reflexive clitic is out if its antecedent is the 3rd person singular *on*.[23]

(40)   a.   On a fini   nos devoirs,   et   lui aussi
             on   is done with our homework, and he too
             'we are done with our homework and he is too'   ✓ sloppy reading
   b.   On se/*nous   comporte bien
             on   himself/*ourselves behave   well
             'we behave ourselves well'

Note further that in cases like (39), the PC PRO is partially bound by a first or a second person pronoun.

     In (my) French then, the subject of the infinitive controlled by a singular controller can be syntactically plural. Now surely, we do not want to assume that partial control in French somehow works differently than in other languages. So let us assume that this controlled subject is a run of the mill plural subject. One immediate advantage is that the question of its distribution does not arise since it is in no way special (apart from it having to be silent, but this is an independent question about PRO).

Given the unsettled nature of the data (see also below, and section 6.1), how to proceed from here is unclear, and discussion can only be speculative. Let us assume that Landau's description is correct and that PC PRO cannot yield distributive readings. If PC PRO can be plural, the question becomes why can't this plural subject be understood distributively. Here is a way to rule distributive interpretations out.

Assume some OC structure with partial control where the controller *John* is singular and the PRO subject is a regular plural. Clearly this is compatible with OC. But assume next, that as a plural, PRO denotes the set, say {John, Mary}, and let us assume we force a distributed reading of the subject, e.g. by adding the distributor *each*. For example:

(41) *John hoped PRO$_{plural}$ to each run a mile

Representing the resulting meaning, we end up with a set of representations (where e$_x$ is like a PRO or a pro denoting x):

(42)   a.   John hoped e$_{John}$ to run a mile

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[23]   The status of:

(i)   On veut bien PRO   se/??nous comporter
       on   want well himself/*ourselves to behave
       'we want to behave ourselves well'

     is intermediate, where PRO here could be either a silent version of third person singular *on*, or more marginally, a bound silent first person *nous*.

b. John hoped e$_{Mary}$ to run a mile

By hypothesis, the construction mandates Obligatory Control, but the (b) representation is not OC. If what is excluded is Distributed PC PRO, the result is ruled out because the syntax and semantics of the construction requires OC but (b) is not. If what is excluded is for the infinitive not to be able to denote more than one event per singular subject controller, this would be excluded because, by hypothesis, distributors like *each* outscope the existential quantification over events over their clause.
This subject may well be syntactically plural but cannot yield distributive readings in the relevant sense.

Split Control   Does split control exist? The appearance of split control can in fact be a case of partial control where a plural PRO accidentally picks out a co argument of the controller as part of its denotation. But consider French examples like:

(43)   Jean a proposé à Marie de PRO s' écrire l'un à l'autre
       John proposed to Mary to PRO write to each other

In this example, either the subject or the direct object is naturally a controller. Remarkably, a reciprocal reading is well formed here, which requires distributing the subject. If this was a case of partial control, this would be unexpected. The set of representations we derive by distributing is:

(44)   a. John$_k$ proposed to Mary$_m$ PRO$_k$ to write to her$_m$
       b. John$_k$ proposed to Mary$_m$ PRO$_m$ to write to him$_k$

In this case, both are well formed since *propose* is flexible. Does this pose a problem for the MTC? We must first make sure that the PRO has the requisite property of behaving as a strong anaphor.
First scenario: John approaches Mary and showing her a picture of who he thinks is Mary's twin sister, he tells her: here is a proposal, let me and her write to each other! The picture was in fact Mary's. Under such a scenario, the sentence (43) is false.
Second scenario: John approaches Mary and showing her a picture of who he thinks is his twin brother, he tells her: here is a proposal, let you and him write to each other. The picture was in fact his. Under such a scenario, the sentence (43) is false.
The fact that we have a reciprocal guarantees that we are dealing with real split control, rather than with accidental split control via partial control. What these scenarios show that however this is done, one split controllee must be read *de se*, and the other must be read *de te*. In other words, both controllees are strong anaphors. How is this compatible with the MTC? We turn to this question next.

A partial/split control mechanism MTC consistent: Covert Conjunction
Before proceeding, I would like to separate two questions (which are, of course, intertwined): First, why is partial control allowed when it is allowed? There does seem to be interpretive correlates to PC (as discussed e.g. in Landau (2015), or Pearson (2016)).[24] This is a question I will not address. Second, what is the mechanism underlying partial control? This is the

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[24]   Landau (2000) notes an interesting correlation between the possibility of having PC and temporal shifts in the infinitives, namely that the embedded event can be interpreted as non-simultaneous with the event described by the control predicate. But no account actually explains this correlation: it is simply stipulated, therefore carries less force one could hope on constraining possible analyses.

question I am addressing.

Consider now the following proposal:

(i) In a partial control case such as in (45a), the subject is a covert conjunction (with silent *and*)[25] and

(ii) movement has proceeded from one conjunct only as in (45b):

(45) a. Mary$_m$ was happy; John$_k$ wanted e$_{m+k}$ to kiss despite their fight
      b. Mary$_m$ was happy; John$_k$ wanted [t$_k$ and pro$_m$] to kiss despite their fight

The verb *kiss* is chosen here, because it does not tolerate comitative *with* phrases, otherwise possibly an option if licensed. One immediate objection that this movement violates the Coordinate Structure Constraint is discussed in Sportiche (2024b), which shows that:

(i) the Coordinate Structure Constraint is not a condition on movement but on output and

(ii) the output of movement to a θ-position is immune to this constraint.

So I will not further discuss this objection here.

This proposal can immediately accommodate split control as involving movement as shown below if the second conjunct is not a *pro* but another trace:

(46) John$_k$ proposed to Mary$_m$ [t$_k$ and t$_m$] to write to each other

If OC of the kind we are discussing involves movement, the subject of the infinitive is a trace. This means that the subject of infinitives in other kinds of infinitival cases, e.g. Non obligatory Control, is different, e.g. a small *pro* as MTC proponents assume. This means that a priori, the conjunction observed in example (45b) above is well formed as both traces and *pro* are allowed to appear in such syntactic environments. Furthermore, recall that Boeckx and Hornstein (2007) propose that a general principle favors Move over Merge: If movement is possible from the controlled position to its controller, the movement option must be chosen. Else, *pro* is used. This leads to (45b) being the representation for (45a).

Several new questions arise.

First, there is no reason why conjunction should be limited to two conjuncts only. It thus should be possible in principle to have cases of split partial control, that is cases like (46), where there is split control by both *John* and *Mary*, but PRO is still PC, having a denotation strictly including John and Mary. Such cases would not be able to have a distributive PRO. It is not clear however how to show that such cases do arise rather than being cases of partial control only (without the split part). I leave this matter pending.[26]

A second question is whether there are constraints on how *pro* is interpreted in examples like (45b). Partial control literature typically mention that the non controlled part of a PC PRO denotes salient entities. But if the representation given in (45b) is on the right track, we would expect that, as a *pro* subject of an infinitive, it would qualify as an NOC (non obligatorily controlled) *pro*. Now what interpretative constraints there are on such NOC subjects remains rather murky (see Landau (2021, chapter 11, section 4)) although it seems clear that in the core cases, that the controller must be human. Now given that the

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25 As far as I can see, Landau's Landau (2016b) objections against a null NP comitative analysis of partial control along the lines of Rodrigues (2007) *(PC PRO = a with b, or [a [b]])* do not apply, given the conclusions of the text regarding the plurality and distributivability of PC PRO.

26 Another question if that the following representation is in principle possible for (45b): *John$_k$ wanted [t$_k$ and t$_k$] to kiss* with ATB movement. It is unclear what kind of scenario would make this felicitous.

control verbs licensing partial control are attitudinal (cf. Landau, 2015, Pearson, 2016), the controlled part of PC PRO must be human,[27] but there is no reason a priori that why the non controlled part of PC PRO could not be non human. An example to test this would have the following structure:

(47) I_k would prefer to PRO_{k+} to VP

The VP should not require its subject to distribute in the requisite sense. And the + part of the PC PRO denotation should include inanimates, which means that the VP should be compatible with both human and inanimate subjects simultaneously. An example perhaps is as follows:

(48) I want to take a picture of me and
      (i) Option 1: a bunch of friends of mine or
      (ii) Option 2: a bunch of Christmas trees
      forming a cluster in the middle of a meadow. I utter (a):
      a. I would prefer to be clustered in the middle of this meadow
      b. They are clustered in the middle of this meadow

Sentence (b) is fine describing the final scene under either option. But the few speakers consulted report that sentence (a) is much less acceptable under option 2 where the clustering comprises a person and trees, than option 1 where it is a clustering of people. The underlying intuition, which I share for corresponding PC examples in French, is that the PC PRO is interpreted as meaning us (in French, *nous* or *on*), only felicitous when denoting people (cf. e.g. *five of us, namely me and my four friends....*, vs. *# five of us, namely me and my four travel trunks*).[28]

Pursuing this matter, Landau (2021, chapter 11, section 4) takes the NOC *pro* in the core cases to be interpreted as (centered around) a logophoric center or, possibly a topic. This is consistent with what is typically reported about the interpretation of PC PRO, namely that the non controlled part denotes salient individuals, but again, a more careful investigation is needed, both regarding the core interpretation of NOC *pro*, and how PC PRO behaves.

6 Appendix: Some further matters

6.1 Remarks about Split Control data

6.1.1 Plurality

The analogue in Catalan of the French examples showing plural PC PRO functions similarly (with similar results for verbs such as *recomanar/convènçert, recommend, convince*:[29]

(49) a. L'Anna et va aconsellar de presentar-us   puntualment a la cita
          Anna   t' as conseillé de vous présenter à l'heure   au rendez vous

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[27] There are conceivable cases in *de te* cases such as: *God told the walls to crumble*, but it is unclear that the walls are not personified, here.

[28] The same would be true with *you / (French) tu* as partial controller. This incidentally suggest that first and second person plural pronouns are marked as +person, that is as denoting people including the speaker or addressee, and not just marked as including the speaker or the addressee and some other things.

[29] These are well formed although speakers report preferring the subjunctive to the controlled infinitive, viz. *L'Anna et va aconsellar que us presentessiu puntualment a la cita.*

'Anna advised you to present yourselves on time at the appointment'
b. L'Anna et va aconsellar de presentar-us juntes   a la cita
Anna   t' as conseillé   d'aller   ensemble au   rendez vous
'Anna advised you to go together to the appointment'

Note in particular that the 2nd person plural reflexive clitic *us*, and the plural agreement on *juntES / together*, both a reflex of the plurality of the infinitive subject. Note also that this is not (necessarily) a case of split control as the denotation of the infinitive subject does not necessarily include Anna.

European Portuguese might be another case according to Sheehan et al. (2018), which provides the following example:

(50) %O amnésico preferia   reunirem-se no   hospital *de se* only
      the   amnesiac preferred   meet.INF.3PL=SE.3 in the   hospital
     'The amnesiac would prefer/preferred to meet in the hospital.'

This looks like a partial control case, where the verb taking the controllee is marked plural but the controller is singular. Crucially, Sheehan et al. (2018) appears to report that the partial controllee must be read *de se* reading, which we take to be the signature that the controlled subject is, or includes a trace.
Consulted speakers of Brazilian Portuguese similarly report that such partially controlled inflected infinitives are unfelicitous unless the partially controlled element is (partially) read *de se*.

6.1.2   Other Problems

French, and Catalan, yield some unexpected puzzles. In section 5.4, I reported some French data involving obligatory object control showing that PRO had to be plural:

(51)   a. on m_k'a   persuadé   de PRO$_{k+}^{plural}$ bien nous   comporter, toi et   moi
        one me has persuaded to   well ourselves behave,   you and me
        'someone persuaded me to behave ourselves, you and me
   b. Pierre te$_k$ conseille de PRO$_{k+}^{plural}$ bien vous   comporter, toi et   elle
        Pierre you advises   to   well yourselves behave,   you and her
        'Pierre advises you to behave well, you and your friends'

One would expect on this basis, that such plural DP would be routinely available in other OC contexts. But the data with subject control is much less clear (and this is consistent with what is reported in Pitteroff and Sheehan (2018)). Thus consider the following sample:

(52)   a. Pierre te   conseille de PRO$_{k+}^{plural}$ vous exprimer   en français, toi et   elle
        Pierre you advises   to   express yourselves in   French,   you and elle
        'Pierre advises you to   express yourselves in French, you and me'
   b. Je veux   être huit à   table pour mon anniversaire (see (35))
        I   want to be   eight at the table for   my   birthday
        'what I want is for us to be eight at the table for my birthday'
   c.?*Je voulais PRO$_{k+}^{plural}$ nous exprimer   en français, toi et   moi
        I   wanted   to   express ourselves in French,   you and me
        'I wanted us to express ourselves in French, you and me'

French speakers have difficulties with the third example, but not with the first two. This

does not seem to be an idiosyncrasy of French, as the same configuration of data seems to be found in Catalan: as reported in Landau (2000), example (53) is deviant.[30],[31]

(53) (i) L'Anna Ii va dir a la   Maria que   prefereix treballar   juntes
           the-Ann CI told to the Mary that   prefers to-work together-Fm.Pl
           'Ann told Mary that she prefers to work together'
      a.   L'Anna Ii va dir a la   Maria que   prefereix trobar-se a   les sis
           the-Ann CI told to the Mary that   prefers to-meet   at   six
           'Ann told Mary that she prefers to meet at 6'

Clearly, some more systematic, controlled investigation is needed to formulate boundary conditions that a successful analysis must satisfy.

6.2   Control into adjuncts

I left open whether control into adjuncts, OC or NOC is movement. It is unclear in what cases such control functions like OC into complements in the relevant ways, namely that PRO functions as a strong anaphor in the present text's sense. To illustrate, in the typology of Landau (2021), exclusively OC adjuncts might not require sideward movement (because c-command could be respected), but at least some OC/NOC adjuncts such as rationale clauses would.

To test whether PRO is a strong anaphor, we need to construct cases of mistaken identity. Consider two cases, one classified as mandatorily OC in this typology and one classified as OC in a possibly OC/NOC context. So consider first result adjuncts as below (from (Landau, 2021, p.11 example (15a))):

(54)   Water flowed from a broken pipe to gather itself in a 1 foot deep pool in her basement

Control is possible by inanimates, and identity must be sloppy under ellipsis: under this typology, this is a case of OC. Now imagine the following scenario:
Mary is testifying about some damage caused to the foundation of her house. She says: Water flowed from a broken pipe. What resulted from this? she is asked. I am not sure, she says, the pool is clearly due to some water flowing into her basement, but this pool could have been created by rainwater. A subsequent investigation determines that indeed, the canals were created by the broken pipe water so that sentence (54) is true (de re).
In such a context, the following sentence is false even though the complement clause is true *de re*.

(55)   Mary thinks that water flowed from a broken pipe to gather itself in a 1 foot deep pool in her basement

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[30]   Its deviance is attributed to *juntes/together* being plural with a singular subject, but this is unpromising given example (49b) above.

[31]   Note, consistent with what is discussed in section 6.3, the following with an indirect question is judged better than (53):

(i)   L'Anna Ii va dir a la Maria que va preguntar on   viatjar juntes.
      the-Ann CI told to the Mary that inquired   where to travel together (Fm.Pl)
      'Ann told Mary that she inquired where to travel together'

This could suggest that the *PRO* subject of *gather* is a strong anaphor so that the water that Mary thinks flowed out of the broken pipe must be the water she thinks formed the pool.

But there could be another reason here. Charnavel (2019) brings attention to the fact that adjunct introducing elements such as *because* and *since* are intensional: there must be a judge believing that in *A since/because B*, B caused A. Similarly here, A resulting from B is a species of causal relationship, and thus an intensional notion: there has to be a judge of this result relationship. Here, the judge of the result relationship between the water flowing event and the pool creating event must be Mary. Depending on what 'result' means, suppose for example that it must be some kind of 'direct' causation, Mary would have to think the same water is involved even if *PRO* is not a strong anaphor.

More research is needed to decide here.

Consider next the following scenario, example (56a) from Landau (2021, p.40, (72c)), accepting here that rationale clause be classified as OC as claimed therein (in part because control is by an inanimate):

(56) *Context: Imagine that Ann is pointing at houses on pictures. She point at a house (house A) on some picture and says: this house was emptied. Then she points at a house on another picture and says: so that this house (house B) can be demolished (Ann may think that the demolition of house B may lead to damage of the content of house A). It turns out that unbeknownst to Ann, house A and house B are the same house seen from different angles.*
    a. This house was emptied [(in order) PRO to be demolished]
    b. Ann thinks that [this house was emptied [(in order) PRO to be demolished]]

PRO here must be controlled by *the house* but is it a strong anaphor? Trusting Ann, and realizing that this the same house, I can, pointing at house A, truly report (56a). Can I also truthfully report (56b)? According to a variety of speakers of English (or French for the counterpart examples), the answer is positive, even though it is false *de dicto*, for Mary, because it is true *de re*.[32] So even if this is OC, PRO is not a strong anaphor here and we thus do not expect the control relation to be one of movement. This would mean that there are different kinds of OC (or that this is really NOC, pace Landau (2021)). Clearly for each case of OC (or NOC for that matter) control into adjuncts, such a test must first be conducted.

6.3 Indirect questions

Control into infinitival indirect questions such as below raise different issues:

(57) a. John wondered how to present him to oneself
    b. It is unclear how much oxygen there is in this planet's atmosphere. The probe measured how often to breathe to survive on it.

Landau (2000, p. 39-42) argues cases like (a) are OC because of they do not display true arbitrary control as shown by the fact that a condition B effect is observed here, and concludes

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[32]   This contradicts what was mistakenly I now believe, claimed for comparable examples in Sportiche (2019).

that 'true arbitrary control, of the kind attested in NOC, is unavailable in interrogative complements, just as it is in all other infinitival complements'. If true, this may raise a challenge for the standard version of the MTC as noted in Landau (2007, p. 317). But questions remain. Example (b) is fine with arbitrary control. This suggests, given the inanimacy of *the probe* and the fact that arbitrary control is logophoricity sensitive, that the problem with (a) has to do logophoricity rather than arbitrary control. More precisely, when there is arbitrary control with *oneself*, the denotation of *one* must include a logophoric center - see Moltmann (2006) for relevant discussion. The data would fall out if with *wonder*, it is John.

Now assume, despite the evidence above that these cases are OC cases. Would this cause problems to the version of the MTC entertained here would depend on further facts, namely whether PRO is a strong anaphor in such cases. Consider:

(58)   *Context: John does not remember he is getting married on June 24th. He is reading instructions for the groom getting married on this date which says to think about when to start dressing etc.. to be ready in time for the ceremony. He says: 'I wonder when this groom should start dressing himself.' He then leaves the room to answer the phone. Someone asks: what was he doing? You answer:*

   a. He was wondering when to start dressing himself
   b. He was wondering [when [PRO to start dressing himself]]

Consulted speakers of English (and the equivalent for French) report that such a sentence is true in such contexts, suggesting that this is not the relevant species of OC (or is NOC, of course). Of course, further investigation is needed to assess the facts precisely, for example systematic comparisons between such cases and standard attitudinal control cases mandating *de se* PRO readings. Here I leave this general issue pending.

6.4   *de nunc*

We have restricted our attention to the center of accessible alternatives, or addressee when there is one relevant. But as should be clear, a contextual parameter of evaluation ranging over such alternatives should include (at least) a time coordinate and a location coordinate encoding for a given alternative, the time or location at which the attitude holder places herself in this alternative. Just like with centers, there are cases of *de nunc*, that is temporal *de se* attitudes (and there should be cases of *de hic - about here* as well. Consider the following case from Anand, 2006, p.16-17 (attributed to K. von Fintel) to test for obligatory *de nunc*. Just like an attitude holder can have an attitude about someone who is actually him without knowing that it is about him (thus a non-*de se* thought), an attitude holder can have an attitude about the actual time of the attitude without knowledge that it's about the time of the attitude (thus, a non-*de nunc* thought).

(59)   John wakes up at 4 a.m., hears a dripping noise, and says to himself "It's raining."
       He also thinks it's 3 a.m.
       At 4 a.m., John believed it to be raining.

This sentence is true. John's belief held at 4 a.m. for the speaker, but at 3 a.m. for him. John would consider true the statement 'it was raining at 3 a.m.' but possibly false

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the statement 'it was raining at 4 a.m.'. This means that attitude verbs quantify over times, and that for each of his doxastic alternatives, the value of the time coordinate in this alternative (which is what John thinks the time is in this alternative) must be the time at which the truth of the attitude is evaluated. To guarantee this under a binding view, we could generalize the standard treatment of centers, addressees etc.., that is, assume that the infinitive clause is introduced by a λt binding the t variable of the infinitive and have the attitude verb quantify over alternatives with a time coordinate.

Or we could generalize our treatment of *de te*. Without going into details, we could:

1. Postulate that an attitude holder π holds a necessary description of the time at which any if its doxastic alternatives holds: the time at which it holds is the time at which π thinks that it holds.
2. Represent event times as DPs (like *then*), and as a *PRO* the time at which the infinitive is evaluated.
3. Make the event time of the attitude a controller of the *PRO* encoding the time at which the infinitive is evaluated.

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