

*De dicto omnibus*<sup>\*</sup>  
OR  
How to control PRO

Dominique Sportiche<sup>†</sup>  
UCLA

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**Abstract**

A study of the behavior of obligatorily or non obligatorily controlled PRO yields the conclusion that PRO and its antecedent must have the same semantic value for the (unique) thinker whose attitude report is the smallest such report including the control relation, the *de dicto omnibus* requirement. This uniform behavior of obligatorily and non obligatorily controlled PRO as well as how this requirement holds is incompatible with a movement theory of Control. I propose to reduce the mandatory *de te* and *de se* readings found in obligatory control constructions under attitude control predicates and, as I show, also in some non obligatory control cases, to subcases of this *de dicto omnibus* requirement. I attribute the existence of these readings to that of particular descriptions that attitude holders must have, as a matter of cognitive necessity, of themselves and others in relation to the content of their thoughts. The *de dicto omnibus* property is directly attributed to the control relation as involving concept identity.

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<sup>†</sup>Email contact: dominique.sportiche@ucla.edu

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# 1 PRO

I take PRO to be the silent subject found in obligatorily controlled constituents in French and English, and, as a consequence of what will be discussed here, as the silent subject of non obligatorily controlled constituents as well, or at least these non obligatorily controlled cases I will discuss. A theory of the syntax and semantics of PRO should answer at least the following questions:

1. Why does PRO have such a restricted distribution?
2. What determines what controls PRO?
3. How is PRO interpreted relative to its controller(s)?

I will not discuss why PRO has such a limited distribution, but this observation imposes boundary conditions on how to answer the third question and I will make occasional remarks capitalizing on this fact when relevant. I will not discuss the second question either, taking as given what the controller(s) is or are. I will focus on the third question documenting the *de dicto omnibus* requirement and concluding control involves concept identity for a particular attitude holder and that PRO can be seen as the silent argument of a.

## 1.1 Introduction

Chierchia (1990) expanding on observations made in Morgan (1970) connected conceptual discussions in the philosophy of language (Castañeda, 1967, Perry, 1977, Lewis, 1979) with grammatical phenomena by analyzing PRO in (1a) as mandatorily read *de se*:

- (1) a. Oedipus expects PRO to be identified
- b. Oedipus<sub>m</sub> expects he<sub>m</sub> will be identified

The context is one in which Oedipus wants to identify the killer of Laius but does not know that he Oedipus is this killer. Unlike what happens in (1b), in (1a) Oedipus must be thinking "I will be identified" for this sentence to be a true report of his expectations and is thus false: Oedipus has expectations about himself *de re* but not *de se*. This is a robust observation (although not all agree, see Cappelen and Dever, 2013) holding crosslinguistically in comparable structures.<sup>3</sup>

An explanatory analysis of this observation should derive why independently motivated lexical properties of the elements in the syntactic environment, and the properties of PRO, after all as an ordinary DP showing ordinary morphosyntactic Case and featural properties (cf. Landau, 2013), wherever it occurs syntactically, compositionally combine to yield this mandatory reading. In Chierchia's 1990 analysis and all subsequent ones, as far as I know, that this reading must arise is simply posited directly or indirectly instead of being derived (see section 3.3.2).

I will propose a way to derive this property, by attributing a general property to PRO (or more precisely to the relation between PRO and its controller(s)), independently of the particular syntactic context.

A brief summary of this article is then that we will look in more detail at how PRO functions in cases of non obligatory control (NOC) **and** of obligatory control (OC). This will suggest a view of PRO that provides a way to derive why the *de se* reading must arise in such cases as (1a), or why so called *de te* readings arise with certain verbs, as subcases of a more general requirement, the *de dicto omnibus* requirement.

## 1.2 The central ideas and motivations

### 1.2.1 main ideas

In this section I briefly describe the main ideas of this article without argument in order to provide a roadmap of where I am going. There are three ideas. The first is that a control relation must function in a certain way based on a new observation regarding how control relations (obligatory or not) must be interpreted.

<sup>3</sup> I will however limit my discussion here to French and English only.

The second is how these observations relate to the mandatory *de se* readings in obligatory control under attitudes that the literature discusses. The third is about how to characterize the control relation.

1. The first idea is discussed in section 2. It is based on a new observation about PRO. The observation is that PRO is like reflexives in being anaphoric but its anaphoricity is satisfied differently. It suffices that a reflexive have the same semantic value as a local antecedent for some thinker(s) (in simple cases the speaker) - this is discussed further in Sportiche (2019). PRO however must have the same semantic value as its controller in the smallest “worlds” containing the control relation: there must be covaluation for the thinker whose attitude report is the smallest possible in the following sense:
  - (2) In a control relation R, PRO has the same semantic value as its controller for the thinker  $\alpha$  such that
    - a.  $\alpha$ 's attitude report is a constituent  $S_P$  that includes R (that is the controller and the controllee)
    - b. There is no  $\beta (\neq \alpha)$ , where  $\beta$ 's attitude report  $S_Q \subsetneq S_P$  s.t.  $S_Q$  includes R.

This requirement on PRO yields what I will call the *de dicto omnibus* requirement: because of (2), PRO and its controller will be reported as having the same semantic value for  $\alpha^4$  by any thinker  $\beta$  whose attitude report  $S_Q, S_Q \supseteq S_P$ .

For example in simple cases as in sentence (1a) where R (= *Oedipus*  $\rightarrow$  *PRO*) is unembedded,  $\alpha$  is the speaker.<sup>5</sup> If we embed (1a) once under *John thinks that ...*,  $\alpha$  is John and R is read *de dicto*, that is as a relation holding for John. And if we embed (1a) twice, as in *Mary believes that John thinks that ...* or *According to Mary, John thinks that ...*,  $\alpha$  is still John and R is read *de dicto*, that is as holding for John according to Mary, and as holding for John according to Mary according to the speaker.

2. The second idea is discussed in section 3 and deals with is how to reduce mandatory *de se*-ness to the *de dicto omnibus* requirement. This is done by modifying how to think about modal (e.g. doxastic) alternatives attitude predicate quantify over. In current approaches, these alternatives are specified in the lexical entries of attitude predicates as being centered worlds where a world center is the *de se* coordinate of the attitude holder. I argue that this property should not be lexical. Instead, I propose that (i) attitude predicates say nothing about the identity of the center of a centered world; (ii) That the center of a centered world is the *de se* coordinate of the attitude holder in this world comes from a cognitive property that thinkers possess: a **thinker**  $\tau$  always takes himself to be the center of his modal alternatives. This description of himself that a thinker must have yields a concept  $\tau$ . If T denotes  $\tau$ , this concept will, because of (2), hold of the denotation of PRO controlled by T and this will derive why PRO must be read *de se* when it does (which is both in some OC cases and in some NOC cases). Section 4 applies the same general idea (but this time to world centers addressees rather to world centers) to derive why mandatory *de te* readings arise as a subcase of the *de dicto omnibus* requirement. Section 5 explores the possibility that the identity of the world centers and their addressees is itself encoded, and thus derived, syntactically through a relation of Control.
3. Why do control relations function as in (2)? The third idea discussed in section 6 discusses this question and attributes the crucial property to the **control relation**. Thus PRO or mandatorily controlled overt pronouns (of Hungarian) do not have special interpretive property, the control relation does: the control relation is an intensional relation: it mandates not merely identity of denotation but identity of concepts for the thinker  $\alpha$  mentioned in (2).

<sup>4</sup> This characterization does not take into account the existence of partial or split control, which I will basically ignore unless directly relevant. I will thus discuss cases of exhaustive control only, see footnote 12.

<sup>5</sup> To simplify, I will use PRO to refer either to the sign PRO, or its referent, unless the distinction matters, in which case I will use *PRO* for the sign and *PRO* for its denotation.

### 1.2.2 Motivations quickly, and the logic of the reasoning

PRO can occur in obligatory control contexts without any overt attitude predicate present (e.g. *John deserves PRO to be rewarded*) or controlled by inanimates (e.g. *This book deserves PRO to be nicely bound*); PRO can also occur in a variety of non obligatory control contexts, controlled by animates or inanimates without any (overt) attitude predicates present (e.g. *After PRO being damaged, the house was repaired, After PRO having smoked, John went back in*).

One new observation reported here is that when the structures just mentioned are embedded in an attitude report (e.g. *Mary thinks that this book deserves PRO to be nicely bound*), the *de dicto omnibus* requirement must be met by the control relation between PRO and its antecedent, whether or not the attitude holder antecedes PRO, and in particular whether PRO is animate or not. I take the existence of this requirement to mean that PRO and its antecedent enter in a certain kind of pre-existing relation - the control relation - the nature of which gets revealed by the embedding.

PRO can also occur in non obligatory control contexts. Another observation reported here, motivating our proposal regarding *de se*-ness, is that mandatory *de se* readings are also found in such contexts when PRO is controlled by an attitude holder, regardless of the syntax of the construction.

By itself this *de dicto omnibus* requirement that the control relation must meet does not derive the mandatory *de se* requirement found in (1a) (covaluation for Oedipus) or the mandatory *de te* requirement found with object control communication verbs (covaluation for the communicator), or *de nunc* requirement, the temporal counterpart of *de se*, see e.g. Anand (2006), or, finally, the mandatory *de se* cases with NOC we discuss. I will nevertheless argue these cases all are subcases of the *de re omnibus* requirement: the *de se* cases arise because PRO shares with its controller a particular implicit description that every attitude holder has of herself - something **in fact** assumed, but in different forms, under any other attempted account of *de se* reading I know of - and of other thinkers. Similarly, the *de te* reading arises because of descriptions that attitude holders must have of their own, or of other people's addressees qua addressees.

Plan: I will discuss in order:

1. Cases in which an infinitive is not in a local attitude context (not a complement of an attitude predicate), and illustrate the *de dicto omnibus* requirement.
2. Cases in which a *de se* reading is mandatory in non obligatory control cases.
3. Why the *de se* requirement found in cases such as (1a), as well as other cases in non obligatory control contexts can be derived.
4. Why the *de te* requirement arises and how this could be extended to the *de nunc* requirement.
5. Why these requirements arise, in the context of the *de re omnibus* requirement, because certain thoughts are immune to error.
6. Why we can think of the relation between an attitude holder and the center of her modal alternatives as a relation of obligatory control.
7. How the control relation should be analyzed to account for the reported observations.

The differences between PRO and anaphors such as reflexives is discussed in Sportiche (2019).<sup>6</sup>

<sup>6</sup> In Sportiche (2019), I discuss:

1. How reflexives and bound pronouns differ from PRO in only requiring covaluation for some relevant thinkers, and what it means for the Binding theory.
2. How this construal of the Binding Theory leads to a different way of addressing Heim's 1994 puzzling reflexive pronouns in *de se* reports, in the context of which I will discuss some cases found in Sharvit (2011) or Pearson (2016).

The main conclusion of this article is precisely that reflexives and bound pronouns must be covalued with its (their) antecedent(s) for some particular thinkers only (but crucially not in a way that satisfies the *de dicto omnibus* requirement), while pronouns cannot be covalued with local potential antecedents for any of these thinkers.

## 2 The observation: the control relation must be read *de dicto*

### 2.1 Preliminaries about Control

Descriptively, control comes in two kinds: Obligatory Control and non Obligatory Control. As Landau, 2013 shows, there is a fairly clear signature for what constitutes Obligatory Control (henceforth OC). While there is controversy about how to precisely analyze the control relation in OC cases (is it movement or not?), there is agreement that the controlled position is a silent ordinary DP occupying a standard argument DP position. Call this DP  $PRO_{OC}$  (taking no stand on whether it is a trace or not). Major OC cases are cases in which  $PRO_{OC}$  is the subject of complement clauses and requires some designated dependent(s) of the embedding control predicate to be a (possibly partial) controller, cf. Landau, 2013, chapters 1, 6 and 7. Non obligatory control (henceforth NOC) cases are the complement cases: cases involving a silent DP (with a restricted distribution) that can be anteceded by some other DP in the same sentence, or be a case of arbitrary control. It is not clear that NOC cases form a natural class and if not, how to break down the set of such cases in smaller coherent subsets. In particular, the questions arises as to whether the NOC silent DP, call it  $PRO_{NOC}$  has the same internal structure as the OC silent subject, that is, a  $PRO_{OC}$ , or something else (e.g. a silent pronoun *pro*). I will not take a **general** stand on this point either.

What the following will show is that  $PRO_{OC}$  and **some** instances of  $PRO_{NOC}$  behave similarly from an interpretive standpoint. To simplify, I will simply notate all of them PRO. I do think this extends to **all** instances of PRO but only a systematic investigation of all case types, something I will not do here, would establish this.

Since I am going to be concerned with interpretive properties of PRO, note that all the judgments that I will report should be considered judgments about both French and English, the only two languages for which native speakers were systematically consulted. As some judgments about English have been reported differently by some authors from what is reported here, possibly due to potential confounds or possible variation (particularly the fact that French uses bare infinitives which do not tolerate lexical subjects, in cases in which English uses gerunds which may), I discuss some such judgments in part in appendix 7.

### 2.2 Preliminary about Binding

Consider the following well formed sentences, with indexing as indicated:

- (3) a. Charles thinks that Flora<sub>k</sub> saw herself<sub>k}</sub>  
 b. Charles thinks that Flora<sub>k</sub> saw her<sub>k}</sub> mother

Coindexing is interpreted as the reflexive and its antecedent having the same semantic value, an identity relation between the denotations of the coindexed elements. The words used are the speaker's. In such simple cases, a speaker not believing that this identity relation held would use a pronoun instead. So such sentences always conveys identity of semantic value according to the speaker, and I will now drop the qualification "according to the speaker". But this does not say who, according to the speaker, covaluation holds for. The key notion that binding conveys is that there is covaluation **for someone**.

This person can be the speaker himself only. This would arise in the following situation #1: Suppose that Flora was watching TV and saw someone X. Charles thinks that X is Lydia, when in fact X is Flora herself. Charles could not truthfully report his thoughts as 'Flora saw herself'. But I could truthfully use sentence (3a) to report Charles' thinking.<sup>7</sup> In this case, the meaning of (3a) is consistent with the interpretation: Charles thinks that Flora saw a person who he thinks is not Flora but who in fact is Flora. So *herself* and *Flora* have the same semantic value for me only, not for Charles. Call this sameness of semantic value for the speaker *de re* covaluation.

But the speaker could convey that there is sameness of semantic value for someone else only, e.g. the attitude

<sup>7</sup> Some speakers find this degraded, some (including me) do not. This difference may be due to a preference for a "de dicto" construal of the sameness of semantic value (reminiscent of the preference for *de se* construal of pronouns reported in Pearson (2015a)).

holder. This can be illustrated as follows. Suppose that Charles thinks that unicorns exist (but I don't) and he says: 'A unicorn grooms itself every morning'. I can say:

- (4) Charles thinks that a unicorn<sub>k</sub> grooms itself<sub>k</sub> every morning

In (4), sameness of semantic value cannot mean covaluation for the speaker since *a unicorn* has no value for the speaker. Rather, this is expressing that in Charles's thoughts, *a unicorn* and *itself* have the same semantic value. What the speaker conveys then is identity of semantic value for Charles. Call this *de dicto* covaluation or *de dicto* covaluation relative to Charles.

*De dicto* covaluation can also be exemplified in the following situation #2: Suppose that Flora was watching TV and saw someone X. Charles thinks that X is Flora, when in fact X is not Flora but someone else, Lydia. Charles can truthfully report his thoughts as 'Flora saw herself'. But I could not describe Flora as having seen herself. However, I could truthfully use sentence (3a) to report Charles' thinking. Covaluation holds for Charles, not for me.

It should also be possible to have *de re* and *de dicto* covaluation simultaneously but it is harder to show that a sentence actually means this rather than being compatible with situations in which both hold. I will not worry about this question here.

In the terms of this section, the main observation I will document is that covaluation of PRO and its controller must be read *de dicto* for all in a sense I will make precise, the *de dicto omnibus* requirement, and explore some consequences of this observation.<sup>8</sup>

## 2.3 Non obligatory Control

The following sentences with temporal adjunct clauses illustrate non obligatory control structures:

- (5) a. Après PRO<sub>p</sub> les avoir bouillies, Hector<sub>p</sub> goûta les pommes de terre  
 After PRO<sub>p</sub> them having boiled, Hector tasted the potatoes  
 b. Après PRO<sub>p</sub> les avoir bouillies, les pommes de terre sont plus molles  
 After PRO<sub>p</sub> them having boiled, potatoes are softer  
 c. Les pommes de terre sont plus molles après PRO<sub>p</sub> les avoir bouillies  
 Potatoes are softer after PRO<sub>p</sub> them having boiled (having boiled them)

Such temporal adjunct infinitives structures, whether clause initial or clause final, are classified as non obligatory control (NOC) (cf. Landau, 2013) because they allow control as in the first sentence but do not require it as shown by the other two sentences which are acceptable without visible control.

Furthermore, the use of the control relation is the speaker's choice: when there is (exhaustive) control as in the first example, the speaker expresses the fact that PRO and its controller have the same semantic value for someone, here for the speaker himself.

### 2.3.1 Introducing *de dicto omnibus*

Assume we are within the Greek mythology story about Oedipus:

- (6) Oedipus Scenario:  
 a. Oedipus, raised as King Polybus's only son, kills someone he does not know, Laius his real father, whose only son he in fact is. Having solved the sphinx's riddle, he becomes king of Thebes, Laius being reputed to be childless.  
 Later, an oracle reveals that, to end a god sent plague on Thebes, Laius's killer must be punished. Oedipus, king of Thebes, searches for Laius's killer, expecting to find him and to punish him in

<sup>8</sup> *De dicto* covaluation recalls the behavior of logophors - see Charnavel, 2013, Charnavel, 2019b and reference therein, or reflexives in Free Indirect Discourse, which unlike indirect discourse, require covaluation for the thinker whose thoughts are being reported. This is further discussed in Sportiche (2019).

order to satisfy the gods and end the plague.

- b. Antigone, (one of ) Oedipus’s daughters, is in the same epistemic state as Oedipus. I, the speaker of sentences, as well as my hearers, know the actual truth and that we all know it.

Assume that nobody is mistaken about names: *Oedipus* means Oedipus, that very person, for all, and that names are rigid designators as in Kripke (1972). Now consider the following, with PRO controlled by *Oedipus*:

- (7) a. Oedipus says/thinks: I will have satisfied the gods after the killer of Laius is punished  
I can truly report this in any of the following ways:  
b. Après qu’ il<sub>k</sub> aura été puni, Oedipe<sub>k</sub> aura satisfait les dieux  
After he<sub>k</sub> has been punished, Oedipus<sub>k</sub> will have satisfied the gods  
c. Après PRO<sub>k</sub> avoir été puni, Oedipe<sub>k</sub> aura satisfait les dieux  
After PRO<sub>k</sub> having been punished, Oedipus<sub>k</sub> will have satisfied the gods  
d. Oedipe<sub>k</sub> aura satisfait les dieux après PRO<sub>k</sub> avoir été puni  
Oedipus<sub>k</sub> will have satisfied the gods after PRO<sub>k</sub> having been punished

All of (7b), (7c) and (7d) are true in this context because it is true of the actual killer Oedipus, that once he is punished, he will have satisfied the gods.

First a clarification: there are (at least) two distinct notions used in the syntactic and semantic literature.

- (i) One’s awareness that PRO is self.  
(ii) One’s awareness that PRO is self **within one’s attitude report**.

What I assume when talking about *de se* ascriptions is the second notion, not the first.<sup>9</sup> Note that sentence (7c) is true in this context even though Oedipus is not aware of who PRO is but by (ii), this does not mean that controlled PRO<sub>NOC</sub> need not be read *de se*.

Recall we assume Antigone is in the same epistemic state as Oedipus.<sup>10</sup> Suppose now that I report:

- (8) a. Antigone pense qu’ Oedipe<sub>k</sub> aura satisfait les dieux après qu’il<sub>k</sub> aura été puni  
Antigone thinks that Oedipus<sub>k</sub> will have satisfied the gods after he<sub>k</sub> has been punished  
b. Antigone pense qu’ Oedipe<sub>k</sub> aura satisfait les dieux après PRO<sub>k</sub> avoir été puni  
Antigone thinks that Oedipus<sub>k</sub> will have satisfied the gods after PRO<sub>k</sub> having been punished

Sentence (8a) is true.

Sentence (8b) however, is false. It wrongly reports that Antigone has the following thought: ‘Oedipus<sub>k</sub> will have satisfied the gods after he<sub>k</sub> is punished’, that is that she takes Oedipus to be the killer of Laius. PRO controlled by *Oedipus* behaves differently from *he* covalued with *Oedipus*.

Let us make explicit what is happening by controlling how Oedipus is thought about by me and others. Assume that I do not know that Oedipus and Antigone think of him as the son of Polybus. Such a description yields Oedipus for Oedipus or Antigone. I believe that Polybus had no son, but I understand that they have someone in mind (I am not sure who) when they use this description. Truth or falsity will arise only if this description is read *de dicto*. If it was read *de re*, it would yield a presupposition failure. Now consider:

- (9) Suppose Antigone says:  
‘The son of Polybus will have satisfied the gods after the killer of Laius is punished.’  
Suppose I reported it as:

<sup>9</sup> This notion is the notion used in some works, e.g. Safir (2010), Sundaresan (2010) cited in Landau (2013), and Landau (2013) to conclude that some PROs need not be read *de se* or for some other reason (e.g. Reuland, 2018). A priori, there is no reason why this notion of awareness is not linguistically significant but I do not know of any convincing evidence that it is.

<sup>10</sup> We switch to Antigone to alleviate potential concern about Condition C which could arise if the reports were *Oedipus pense...* in (9a) and (9b).



- a. Antigone pense qu' après qu'il<sub>k</sub> aura été puni, le fils de Polybe<sub>k</sub>, qui qu' il soit,  
Antigone thinks that after he<sub>k</sub> has been punished, the son of Polybus<sub>k</sub>, whoever he is,  
aura satisfait les dieux  
will have satisfied the gods
- b. Antigone pense qu' après PRO<sub>k</sub> avoir été puni, le fils de Polybe<sub>k</sub>, qui qu' il soit,  
Antigone thinks that after PRO<sub>k</sub> having been punished, the son of Polybus<sub>k</sub>, whoever he is,  
aura satisfait les dieux  
will have satisfied the gods

Given that I have no idea who the son of Polybus might be for Oedipus or Antigone (and I in fact believe that there is no actual individual meeting this description), I take the pronoun or PRO to mean *whoever Antigone takes the son of Polybus to be*. Both sentences would thus convey that according to me, the speaker, for Antigone, the son of Polybus is both the person satisfying the gods and the killer. Both sentences would be true if Antigone means that the son of Polybus is the killer, and both would be false otherwise: in such a case where the description is read *de dicto*, PRO and a pronoun behave the same.

But pronouns and PRO diverge in the reverse case in which the description of Oedipus can only truthfully be read *de re*, that is as a description holding true of a particular person for the speaker only. Let us modify these sentences by making one *de re* description explicit as below. Suppose:

- (10) Antigone says/thinks: 'Oedipus will have satisfied the gods after the killer of Laius is punished.'  
I report her belief as follow:
- a. Antigone pense qu' après qu'il<sub>k</sub> aura été puni, le fils de Laios<sub>k</sub> aura satisfait les dieux  
Antigone thinks that after he<sub>k</sub> has been punished, the son of Laius<sub>k</sub> will have satisfied the gods
- b. Antigone pense qu' après PRO<sub>k</sub> avoir été puni, le fils de Laios<sub>k</sub> aura satisfait les dieux  
Antigone thinks that after PRO<sub>k</sub> having been punished, the son of Laius<sub>k</sub> will have satisfied the gods

Here, the description *the son of Laius* cannot meaningfully be read *de dicto* as for Antigone, Laius was childless. But it can of course be read *de re*: this is one of the ways \*I\* think of Oedipus.

The judgments are as in (8).

Sentence (10a) is true, as (8a) was. It is interpreted as meaning that there is a person, namely the son of Laius, who is such that Antigone thinks of this person: 'after he<sup>1</sup> is punished, he<sup>2</sup> will have satisfied the gods' where *he*<sup>1</sup> and *he*<sup>2</sup> refer to the same person but Antigone does not realize it.

Sentence (10b) is false, as (8b) was. It says that there is a person, namely the son of Laius, who is such that Antigone thinks: 'this person is such that after he is punished, he will have satisfied the gods', however she identifies this person for herself. This is false as Antigone has no such thought.

The same holds if we explicitly remove the description from the scope of the intensional predicate (as a hanging topic, thus in such a way that it cannot reconstruct in the scope of the attitude verb): (11a) is true but (11b) is false.

- (11) a. Quant au fils de Laios<sub>k</sub>, Antigone pense qu' après qu'il<sub>k</sub> aura été puni, il<sub>k</sub> aura satisfait les dieux  
As for the son of Laius<sub>k</sub>, Antigone thinks that after he<sub>k</sub> has been punished, he<sub>k</sub> will have satisfied the gods
- b. Quant au fils de Laios<sub>k</sub>, Antigone pense qu' après PRO<sub>k</sub> avoir été puni, il<sub>k</sub> aura satisfait les dieux  
As for the son of Laius<sub>k</sub>, Antigone thinks that after PRO<sub>k</sub> having been punished, he<sub>k</sub> will have satisfied the gods

What is it about PRO that makes (10b) or (11b) false? It can't be because PRO and its antecedent have the same semantic value for me, the speaker, as this happens in (10a) and (11a), which are both true. Instead, unlike a pronoun and its antecedent, PRO and its antecedent must be understood to have the same semantic value for Antigone: covaluation must be a *de dicto* property relative to Antigone. This is what leads to the truth values we observe.<sup>11</sup>

So control, the antecedent/PRO relation, is different from the antecedent reflexive relation in (3a). According to the speaker, PRO and its antecedent must have the same semantic value for Antigone.

This makes correct predictions.

Suppose Tiresias, the blind prophet, knows the truth, just like me, and thus could truthfully utter (7c). Now consider the following (I use English only to simplify presentation):

- (12) Tiresias (knowing that Oedipus is the killer) tells Antigone ‘after the killer has been punished, Oedipus will have satisfied the gods’ and Antigone reports to me ‘Tiresias thinks that after the killer has been punished, Oedipus will have satisfied the gods’. I report:
- a. (i) Antigone believes that [<sub>P</sub> Tiresias thinks that after he<sub>k</sub> has been punished, Oedipus<sub>k</sub> will have satisfied the gods].
  - (ii) As for the son of Laius<sub>k</sub>, Antigone believes that [<sub>P</sub> Tiresias thinks that after he<sub>k</sub> having been punished, he<sub>k</sub> will have satisfied the gods].
  - b. (i) Antigone believes that [<sub>P</sub> Tiresias thinks that after PRO<sub>k</sub> having been punished, Oedipus<sub>k</sub> will have satisfied the gods].
  - (ii) As for the son of Laius<sub>k</sub>, Antigone believes that [<sub>P</sub> Tiresias thinks that after PRO<sub>k</sub> having been punished, he<sub>k</sub> will have satisfied the gods].

Both sentences in (12a) are true, as the pronoun can be read as meaning Oedipus *de re* only. But the sentences in (12b) are false. There could be two reasons:

Reason #1: it could be because these sentences entail that according to Antigone, PRO and *Oedipus* are covalued for Tiresias (something she does not know). Reason #2: it could be because these sentences entail that according to Antigone, PRO and *Oedipus* are covalued for her (something she does not believe).

Only the first reason is right:

Antigone must believe that PRO and its controller have the same semantic value for Tiresias. Indeed, if we assume that Antigone knows that Tiresias believes that the killer is Oedipus, but she doesn't, the sentences in (12b) become true. And this is predicted: if the control relation must be read *de dicto* relative to Tiresias, it means that covaluation of PRO and its controller holds in Tiresias's thoughts (in his doxastic alternatives). If Antigone is aware of the content of Tiresias's thoughts, she must believe that covaluation of PRO and its controller holds for him (this follows from standard meaning composition).

That reason #2 is incorrect can be shown by using an example similar to example (4). Assume Tiresias unlike Antigone, believes in the existence of centaurs and furthermore believes that they eat after waking up. If Antigone believes this about Tiresias, I could truthfully report:

- (13) Antigone believes that [<sub>P</sub> Tiresias thinks that after PRO<sub>k</sub> waking up, a centaur<sub>k</sub> eats].

This is true even though *a centaur* and PRO do not have the same semantic value for Antigone: they have no semantic value for her.

<sup>11</sup> Crucially, thinking of PRO as bound by its antecedent, the *de dicto* requirement does not follow from the binding relation itself. Indeed, modifying the scenario so that Laius has in fact several sons, who all participated in killing Laius. In such a scenario, changing *the son of Laius* to *every son of Laius* in (10a) or (10b) with the pronoun or PRO bound would not change their truth values. The *de dicto* requirement is not a property of bound pronouns, it is a property of **controlled PRO**.

### 2.3.2 Summary

The general conclusion is the following (limiting ourselves to exhaustive control<sup>12</sup>):

- (14) a. There is a unique syntactically smallest (for inclusion) attitude report A that includes the control relation. PRO and its controller must have the same semantic value for the (unique) attitude holder  $\alpha$  of this attitude. For  $\alpha$ , PRO and its controller must be covalued.  
 b. By meaning composition, PRO and its controller must be reported to have the same semantic value for  $\alpha$  by any attitude holder  $\pi$  whose attitude report includes A.

(14a) is the *de dicto omnibus* requirement, the requirement that PRO and its controller must be read *de dicto* for all attitude holders whose attitude report includes the control relation in the sense above.<sup>13</sup> For ease of reference, I will call the thinker  $\alpha$  in (14a) the **control attributing** thinker or attitude holder (or CA thinker for short).

## 2.4 How general is the *de dicto omnibus* requirement?

When does this *de dicto* requirement hold?

- Nothing in what was said relies on anything other than someone having thoughts about semantic identity. It does not matter that PRO is animate (inanimates can't be read *de se*), or that PRO is in an OC context, whether under an attitude or not.
- And indeed, the *de dicto omnibus* requirement can be shown to hold of OC and NOC PROs regardless of whether they are inanimate PROs (so non *de se*) or OC under non attitude predicates (so non *de se* either). This is what this section shows.
- This means that when it comes to this interpretive property, there is no (obvious) OC/NOC, attitude, non attitude etc.. dividing line. But, assuming that we have a reliable way of identifying a silent DP as a PRO, that is as having the same internal make up as what we did take to be PRO here, does this requirement hold of any pair antecedent/PRO? It looks likely for OC cases, and it may be for all NOC cases but work on each individual case type is needed to decide.

### 2.4.1 *de dicto omnibus* with inanimate PROs in NOC

Consider the following scenario:

- (15) Damaged House Scenario:

A (unique) house, the house on the hill, was damaged and it was subsequently repainted, as I am aware. Lydia sees date-stamped pictures of this house from different angles and thinks there are two houses, a green house, which she does know is in fact the house on the hill, and another one. She thinks that:

- a. The green house was repainted (True) after another house was damaged (False: in fact after the same house, the house on the hill, was).  
 b. Another house was damaged (False: it is the house on the hill that was).

<sup>12</sup> This should be modified when non exhaustive (partial/split) control is involved. In split or partial control, there can't be simple identity. Intuitively, we can think of PRO as an implicit sum or conjunction, where each member of this sum or conjunction is exhaustively controlled and thus subject to the *de dicto omnibus* in relation to its antecedent. In part because of this, the *de dicto omnibus* requirement is similar to but weaker than Anand's 2006 *Referential Equivalence*, or Gluckman's 2018 *Intensional Chain Uniformity* if antecedent(s)/PRO relations form a chain in the requisite sense. I assume that *Intensional Chain Uniformity* does not hold of such control relations. Indeed, the existence of referential overlap in antecedent(s)/PRO relations (partial control, split control), or with pronominal binding, that are not available for some of the core constructions Gluckman (2018) analyzes (e.g. *tough*-movement) suggests that such relations should not fall under *Intensional Chain Uniformity*.

<sup>13</sup> Literally read, *de dicto omnibus* is stronger than the text states: it would require reason #2 to hold. The text interpretation is the minimal way in which *de dicto* for all is satisfied.

As seen earlier, the crucial case is when we use a description read *de re*. Suppose:

(16) Lydia says/thinks: The green house was repainted after another house was damaged.

I report

- a. Après PRO<sub>k</sub> avoir été endommagée, la maison sur la colline a été repeinte  
After PRO<sub>k</sub> getting damaged, [the house on the hill]<sub>k</sub> was repainted  
Quant à [la maison sur la colline]<sub>k</sub> /As for [the house on the hill]<sub>k</sub>,...
- b. ...Lydia pense qu' elle<sub>k</sub> a été repeinte après qu' elle<sub>k</sub> ait été endommagée  
...Lydia thinks that it<sub>k</sub> was repainted after it<sub>k</sub> got damaged
- c. ...Lydia pense qu' elle<sub>k</sub> a été repeinte après PRO<sub>k</sub> avoir été endommagée  
...Lydia thinks that it<sub>k</sub> was repainted after PRO<sub>k</sub> getting damaged

In both (16b) and (16c), we overtly scope the description *the house on the hill* out (by using a hanging topic structure so that it cannot totally reconstruct) so that it must be read *de re*. The contrast between them remains: the pronoun case is a true report of Lydia's thinking, while the PRO case is not. In the latter, Lydia would have to believe that the damaged house is the house on the hill.

This follows from the *de dicto omnibus* requirement: Animacy plays no role.

#### 2.4.2 *de dicto omnibus* with OC PRO in non attitudinal complements - Subject Control

Let us return to the Oedipus scenario (6) and modify it as follows:

(17) 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.

Suppose Oedipus claims:

(18) The reward I deserve is that the killer of Laius be punished.

Now consider the following reports in French in (19) with their nearest translations in English:

- (19) a. [Le roi de Thèbes]<sub>k</sub> mérite qu' on le<sub>k</sub> punisse  
[The king of Thebes]<sub>k</sub> is so deserving that we him<sub>k</sub> should punish
- b. [Le roi de Thèbes]<sub>k</sub> mérite d' PRO<sub>k</sub> être puni  
[The king of Thebes]<sub>k</sub> deserves PRO<sub>k</sub> to be punished

In this scenario, both sentences in (19) are true: The king of Thebes deserves a reward namely that he *qua killer of Laius* be punished.

Consider next:

- (20) a. [Le roi de Thèbes]<sub>k</sub> prétend PRO<sub>k</sub><sup>1</sup> mériter qu' on le<sub>k</sub> punisse  
[The king of Thebes]<sub>k</sub> claims PRO<sub>k</sub><sup>1</sup> to be so deserving that he<sub>k</sub> should be punished
- b. [Le roi de Thèbes]<sub>k</sub> prétend PRO<sub>k</sub><sup>1</sup> mériter d' PRO<sub>k</sub><sup>2</sup> être puni  
[The king of Thebes]<sub>k</sub> claims PRO<sub>k</sub><sup>1</sup> to deserve PRO<sub>k</sub><sup>2</sup> to be punished

Sentence (20a) 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 (20b) is false. In it, PRO<sup>2</sup> is (OC-)controlled by PRO<sup>1</sup>; PRO<sup>1</sup> must be understood *de se*. This means that Oedipus thinks of its reference as being him. In other words, we can paraphrase 'Le roi de Thèbes]<sub>k</sub> prétend PRO<sub>k</sub><sup>1</sup> mériter ...' as *the king of Thebes claims: 'I deserve ...'*. Because PRO<sup>2</sup> is controlled by PRO<sup>1</sup>, it must be understood as meaning 'I' too (hence *de se*). Sentence (20b) can be paraphrased as: *the king of Thebes says: my reward is that I should be punished*, which is false. In other words, in this subject OC PRO case under a non attitude verb (*mériter/ deserve*), the *de dicto* requirement must be met mandating semantic identity for the king of Thebes Oedipus.

### 2.4.3 de dicto omnibus with OC PRO in non attitudinal complements - Object Control

The same pattern is found in object control cases under non attitudinal cases:

(21) 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.

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.’

Why does Gottfried think so? 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.

- (22) a. Quant à [la boule blanche]<sub>k</sub>, Gottfried l’<sub>k</sub> a forcée à PRO<sub>k</sub> monter  
 As for the white ball, Gottfried it<sub>k</sub> forced [PRO<sub>k</sub> to move up
- b. Quant à [la boule blanche]<sub>k</sub>, Gottfried prétend lui<sub>k</sub> avoir appliqué une telle force qu’  
 As for the white ball, Gottfried claims to-it<sub>k</sub> to have applied a such force that  
 elle<sub>k</sub> est montée  
 it<sub>k</sub> moved up
- c. Quant à [la boule blanche]<sub>k</sub>, Gottfried prétend l’<sub>k</sub> avoir forcée à PRO<sub>k</sub> monter  
 As for the white ball, Gottfried claims it<sub>k</sub> to have forced PRO<sub>k</sub> to move up

The facts are similar. The first two sentences are true in this scenario. But the third one is false. PRO must be understood as referring to the white ball for Gottfried, but Gottfried does not think that the white ball moved up. This means that this object OC PRO under a non attitude verb (*forcer/ to force*) must meet the *de dicto* requirement, mandating semantic identity for Gottfried.

## 3 Why must PRO be read *de se*

The *de dicto omnibus* requirement does not entail that PRO must be read *de se* (or *de te*) in the relevant classical contexts. The reason is simple: in, say, (1a), Oedipus is not a relevant attitude holder because Oedipus’s attitude report does not include the control relation since the controller *Oedipus* is outside of the scope of the attitude verb *expect*. As a result, PRO and its controller *Oedipus* need not be coreferential for Oedipus, hence need not be read *de se*. But the similarity between the *de se* requirement found in such cases and the *de dicto omnibus* requirement seems too strong to be accidental. The *de se* requirement would follow if the control relation had to be one of semantic identity for Oedipus.

In this section, I will make a proposal to cover mandatory *de se*-ness under *de dicto omnibus* requirement. Before doing so however, let me illustrate that mandatory *de se*-ness is required in other syntactic contexts than OC under attitudes.

### 3.1 NOC *de se* subcases of *de dicto omnibus*

One such context is found, as discussed above, in obligatory control cases as in example (20b), where *de se*-ness arises indirectly with a PRO subject of a clause complement of the non attitude verb (*mériter/deserve*): this PRO must be identical to its controller, another PRO, itself mandatorily read *de se*. Interestingly, in such a case, that PRO<sup>2</sup> must be read *de se* does follow from the *de dicto omnibus* requirement given that PRO<sup>1</sup> must be read *de se*. This reinforces the suspicion that all cases of *de se* PRO should fall under this requirement.

We can also document the existence of mandatory *de se* readings of PRO in NOC contexts. Still in the simple Oedipus scenario, consider the following:

- (23) a. Oedipus thinks or says: ‘after the killer is punished, the plague will disappear’  
 I report  
 b. Oedipe<sub>k</sub> pense qu’ [après il<sub>k</sub> aura été puni, la peste disparaîtra ]  
 Oedipus<sub>k</sub> thinks that [after he<sub>k</sub> has been punished, the plague will disappear ]  
 c. Oedipe<sub>k</sub> pense qu’ [après PRO<sub>k</sub> avoir été puni, la peste disparaîtra ]  
 Oedipus<sub>k</sub> thinks that [after PRO<sub>k</sub> having been punished, the plague will disappear ]

In the current scenario, sentence (23b) is true (with the pronoun read as *de re* pronoun. But sentence (23c) is false. Truth would require Oedipus’s thoughts to be: ‘after I am punished, the plague will disappear’ which of course is not what Oedipus thinks. This is a straight *de se* requirement but in the context of Non Obligatory Control.<sup>14</sup> This behavior is found in even more complex cases. Speakers like me accept long distance control in the following cases (reported fine by many: [Lebeaux, 1984](#), [Chierchia and Jacobson, 1986](#), [Landau, 2013](#), ch.7, i.a.):

- (24) Oedipe<sub>k</sub> pense qu’ il est important que /Oedipus<sub>k</sub> thinks that it is important that...  
 a. [après que le tueur<sub>k</sub> aura été puni, la peste disparaisse]  
 [after the killer<sub>k</sub> has been punished, the plague disappear]  
 b. [après qu’ il<sub>k</sub> aura été puni, la peste disparaisse]  
 [after he<sub>k</sub> has been punished, the plague disappear]  
 c. [après PRO<sub>k</sub> avoir été puni, la peste disparaisse]  
 [after PRO<sub>k</sub> having been punished, the plague disappear]

Sentences (24a) and (24b) are true. Sentence (24c) is well formed but false in this scenario. For (24c), given our characterization of the control attributing attitude holder, the CA thinker is the speaker, the only thinker whose attitude report include the control relation. The *de dicto omnibus* requirement requires that there be coreference between PRO and Oedipus for the speaker which is true: that PRO need to be read *de se*, that is that PRO mean Oedipus for Oedipus is not predicted.<sup>15</sup> Consider now the more complex case:

- (25) Oedipe<sub>k</sub> pense qu’Antigone croit que ... / Oedipus<sub>k</sub> thinks that Antigone believes that...  
 a. [après que le tueur<sub>k</sub> aura été puni, la peste disparaîtra]  
 [after the killer<sub>k</sub> has been punished, the plague will disappear]  
 b. [après qu’ il<sub>k</sub> aura été puni, la peste disparaîtra]  
 [after he<sub>k</sub> has been punished, the plague will disappear]  
 c. [après PRO<sub>k</sub> avoir été puni, la peste disparaîtra]  
 [after PRO<sub>k</sub> having been punished, the plague will disappear]

Sentences (25a) and (25b) are true. Sentence (25c) is well formed but false in this scenario. For (24c), given our characterization of the control attributing attitude holder, the CA thinker is again the speaker, the only thinker whose attitude report include the control relation. The *de dicto omnibus* requirement requires that there be coreference between PRO and Oedipus for the speaker which is true. But that PRO need to be read *de se*, that is that PRO mean Oedipus for Oedipus is not predicted. So an account is needed for both (24c) and (25c).

Note further that what Antigone thinks of the denotation of PRO is not relevant. To check this prediction, assume that Oedipus has discovered that he is the killer but has kept this from Antigone. Now there is

<sup>14</sup> In a sense, this is not unexpected if, as [Landau \(2013\)](#) suggests following others, some NOC PRO must be [+human] and logophoric. Indeed, logophors typically require to be read *de se* in the appropriate environments. This again suggests that something more general is going on, possibly encompassing all cases of PRO. Note also that there are grounds to conclude non controlled PRO is always logophoric, once we properly understand what logophoricity entails, see [Charnavel \(2019a\)](#). However, ([Landau, 2013](#), p. 32 and 234) disagrees, see the discussion in section 7.

<sup>15</sup> Example (23c) or (24c) show that an assumption made in [Pearson 2015b](#), p. 110ff - namely that PRO can only be read *de se* relative to a local controller - is not tenable : the mandatory *de se*-ness of PRO is unrelated to PRO being bound locally. See section 3.2.

coreference between PRO and *Oedipus* for Oedipus but not for Antigone. Sentence (25c) now becomes true in this scenario. It does not matter that she thinks the killer is not Oedipus. Judgments are difficult. To make them easier perhaps, imagine that Antigone thinks that after the killer behaves himself for a while, the gods will be satisfied and the plague will disappear. Could Oedipus (knowing that he is the killer) truthfully utter:

- (26) a. Antigone croit qu' après que je me sois bien comporté pendant un certain temps, la peste disparaîtra.  
 Antigone believes that once I have behaved myself for a while, the plague will disappear.  
 b. Antigone croit qu' après PRO<sub>k</sub> m'êtré bien comporté pendant un certain temps, la peste disparaîtra.  
 Antigone believes that after PRO<sub>k</sub> having behaved myself for a while, the plague will disappear.

These sentences seem true. In it, we force control of PRO by the speaker with the first person idiomatic reflexive. This sentence does not attribute to Antigone the knowledge that the speaker, Oedipus, is the killer.

If the treatment of all mandatory *de se* readings of PRO is to be unified, such cases show that this treatment should not rely on a lexical property of attitude predicate (as there is not lexical connection between the adjunct clause and the attitude verb in all these NOC cases). In addition, the standard treatments of the mandatory character of the *de se* readings in OC cases as in (1a) do not say anything about the required identity between PRO and its controller in non attitudinal OC cases embedded under attitudes such as (20) and (22). In section 3.2 below, we turn to the question of why the belief that there is covaluation between PRO and its controller must be ascribed to the controller in all these cases.

### 3.2 Back to the simple case: *de se* and Descriptions

The *de dicto omnibus* requirement mandates that PRO and its controller be covalued for the control attributing attitude holder. I now would like to ask: how does covaluation come about? I will limit the discussion to coreference here without loss of generality, I think. This question subdivides in two:

1. What is it about the thoughts of an attitude holder that triggers coreference for her?
2. How is the coreference requirement technically encoded?

The second question is a question about (presumably compositional) mechanisms. I will discuss it later in section 6. I will concentrate here on the first question.

Assume, perhaps controversially, that talking about some person  $\pi$  reporting intended or presupposed coreference between  $\alpha$  and  $\beta$  is equivalent to talking about implicit or explicit descriptions that  $\pi$  entertains of them: coreference of  $\alpha$  and  $\beta$  for  $\pi$  is equivalent to saying that  $\pi$  holds true a single description uniquely identifying both the referent of  $\alpha$  and the referent of  $\beta$ .<sup>16</sup> Considering again example (11b) repeated below:

- (27) Quant au fils de Laios<sub>k</sub>, Antigone pense qu' après PRO<sub>k</sub> avoir été puni, il<sub>k</sub> aura satisfait les dieux  
 As for the son of Laius<sub>k</sub>, Antigone thinks that after PRO<sub>k</sub> having been punished, he<sub>k</sub> will have satisfied the gods

I, the speaker, hold an identifying description of the son of Laius, namely *the son of Laius*, which is true of the referent of both PRO and *he*. Antigone holds an identifying description of the referent of *he*, namely *my father* or *the king of Thebes*, which must also hold of PRO.

Where do these descriptions come from? Either they are explicitly stated, e.g. *the son of Laius*, or they are supplied as background to the scenario, e.g. *the solver of the Sphinx's riddle*, *the father of Antigone*, or for proper names some indexical description, e.g. *the person talked about in this book reputed to have solved the Sphinx's riddle*, that is *that person* (cf. Kripke, 1972, Kripke, 2013).

<sup>16</sup> I thus assume that names or pronouns must be anchored to the world via implicit or explicit descriptions, crucially allowing descriptions containing indexical elements.

But consider one case of mandatory *de se* reading such as (1a) repeated below.

(28) Oedipus expects PRO to be identified

Coreference of *Oedipus* and PRO must hold for Oedipus. Clearly, this is not due to some contextual information. Regardless of context, we judge that such coreference must hold for Oedipus. The only property supplied in the present case is grammatical: PRO is controlled by *Oedipus*. But there must be a description shared by PRO and its controller yielding coreference for Oedipus. What description must be true so that coreference holds for Oedipus? This is what I turn to in the next section.

### 3.3 How the *de se* reading arises

Given that PRO must have the same semantic value as its controller for Oedipus, it must be that PRO shares a description with its controller that requires it to be read *de se*.

Here is in a nutshell a first implementation of the idea of where this description comes from:<sup>17</sup>

Attitudes predicates quantify over centered worlds. The standard treatments take it that attitude verbs have a lexical property according to which the center of any such centered world is the *de se* coordinate of the attitude holder in that world. I will argue that such a lexical treatment is implausible and that instead, centered worlds are so centered because of a central cognitive property: any attitude holder must have a description of **himself** according to which the center of any centered world over which any of his attitudes can quantify is him *de se*. I hold such a description of myself. But by standard theory of mind assumption, I assume other thinkers hold such a description of themselves too. So I hold such a description of Oedipus. Therefore (by *de dicto omnibus*), I hold such a description of PRO. Applied to PRO, this description will make it the center of any centered world PRO's controller's attitudes quantify over, which means that it has to be read *de se*.

#### 3.3.1 Centered worlds: the intuition<sup>18</sup>

I begin by summarizing some standard ideas about attitude predicates quantifying over sets of centered worlds.

A centered world is a pair (individual, world) providing a context of evaluation, a context within which a proposition is situated to be evaluated. A world is a fully specified state of affairs down to the number of atomic particles in the universe. Fundamentally, we are uncertain as to which world we live in but we believe that there are certain worlds in which we do not live, worlds inconsistent with our beliefs, e.g. a universe in which there is only particle. My holding a belief about the world means excluding some conceivable worlds, leaving other possibilities as candidates for the world I believe I live in. We may also be uncertain as to who we are: I could be confused or amnesiac. What I believe about myself would for example exclude my believing that I am Andromache of Troy. Holding a belief about myself means excluding some candidates for myself, leaving other possibilities open. Attitude predicates are assumed to quantify over sets of pairs (center, world)= centered worlds where the world is a world the attitude holder believes she could be in and the center is who she takes herself to be in that world.

To illustrate, suppose I want to decide whether I could truthfully report what I believe by saying:

(29) 'I was in Bear Canyon on 12/08/2018'

I am not sure whether this is true because my memory is hazy. So I ask you to prove to me that I was. I will be convinced by you showing me incontrovertible pictures of Flora and Leila in Bear Canyon on that date if:

(30) I take the actual world to be one in which:  
 a. I think I am either Flora or Leila &

<sup>17</sup> I will modify this idea in section 5.1.

<sup>18</sup> See e.g. Pearson (2015a) and the references therein for more in this topic.



- b. Both Flora and Leila were in Bear Canyon on that date (as shown in the pictures)

So for me to evaluate the truth of this statement, what's relevant are the pairs (Flora,  $w_{Flora}$ ) (Leila,  $w_{Leila}$ ), where  $w_{Flora}$  is a world in which I take myself (*de se*) to be Flora,  $w_{Leila}$  is a world in which I take myself (*de se*) to be Leila. Each of these pairs is a centered world, a world in which there is a distinguished individual, its center, who is who I take myself to be in this world, my *de se* coordinates in this world. To say it differently, the center of a world is the person picked out by the singular first person pronoun uttered by me in this world, namely me.

Of course, what is needed is much more general (as I could be so much in doubt as to who I am that I have infinitely many candidates for who I take myself to be). So what is relevant is a set of pairs of a world and its center ( $a, w$ ) where given what I believe,  $w$  is a world I could be in and  $a$  is who I take myself to be in  $w$ . Call the set of all such ( $a, w$ ) pairs my **doxastic alternatives** (*doxastic* because these are alternatives consistent with my *beliefs*), and  $a$ , my *de se* coordinates in  $w$ , **the center (or author) of  $w$** .<sup>19</sup>

Assume that sensitivity to my doxastic alternative worlds and their centers is syntactically represented as properties of a complementizer that introduce  $\lambda$  abstracts over the two individual coordinates, where the pairs range over my doxastic alternatives.

- (31) a. C I was in Bear Canyon on 12/08/2018  
 b.  $\lambda a \lambda w$  I was in Bear Canyon on 12/08/2018 in  $w$   
 This sentence will be true for me if  
 for any ( $a, w$ ) in my Doxastic Alternatives,  $a$  is in Bear Canyon on 12/08/2018 is true in  $w$ .

Suppose now someone reports Lydia saying (31a) as:

- (32) Lydia <sub>$m$</sub>  believes that she <sub>$m$</sub>  was in Bear Canyon on 12/08/2018

Knowing that Lydia in this instance expressed a *de se* thought, I will take the sentence to be true if it is true that:

- (33) Lydia believes: ' I was in Bear Canyon on 12/08/2018'

To decide whether this is true, I need to hold certain beliefs about what it means for Lydia to believe this. This means that the content of the embedded clause will have to be evaluated relative to (what I take to be) Lydia's doxastic alternatives (what she actually believes, she may believe she is Flora or Leila). This means that the syntax of this sentence should be like:<sup>20</sup>

- (34) a. Lydia <sub>$m$</sub>  believes [  $C_1$  she <sub>$m$</sub>  was in Bear Canyon on 12/08/2018 ]  
 b. Lydia <sub>$m$</sub>  believes  $\lambda a_1 \lambda w_1$  she <sub>$m$</sub>  was in Bear Canyon on 12/08/2018 in  $w_1$

where  $C_1$  codes the necessity to take Lydia's doxastic alternatives into account to evaluate truth.

As needed, this representation codes that in any  $w_1$ ,  $a_1$  is Lydia for Lydia, that is who Lydia takes herself to be in  $w_1$ , that is, Lydia's *de se* coordinate in  $w_1$ .

For this sentence to be a true report of what Lydia meant, it would be necessary that in any  $w_1$ , she <sub>$m$</sub>  =  $a_1$ , that is that she <sub>$m$</sub>  be the center of the embedded centered world.<sup>21</sup>

Why in *any*  $w_1$ ? Why not in some only? Because the verb *believe* is a universal quantifier, it universally quantifies over the attitude holder's doxastic alternatives (cf. Hintikka, 1969).

<sup>19</sup> As I may also be in doubt as to who I am talking to, and where and when I am, we would in fact need not pairs but tuples, *contexts*, ( $a, u, t, l, w$ ) where in  $w$ ,  $a$  is who I think I am,  $u$  is who I think I am talking to,  $t$  is when I think I am, and  $l$  is where I think I am), etc... I am ignoring this for now but will come back to it.

<sup>20</sup> I would also have to take into account my own doxastic alternatives. Since I am not mentioned in this sentence, who I think I am does not matter, but because the present tense is used in the main clause, when I think I am would). I ignore this here.

<sup>21</sup> That is that *she* is read *de se*. Note however that the sentence would be true if Lydia believes of X who unbeknownst to her is her that X was in Bear Canyon, with *she* read *de re non de se*.

### 3.3.2 Previous accounts of *de se* PRO in OC

There are different current accounts for the semantic treatment of attitude verbs. I choose one standard one to illustrate the kind of boundary conditions I think they all have to meet. One such account builds on the treatment of attitude verbs as manipulating a centered world parameter. Let us take as example the French verb *croire/believe*. Under such a treatment, the following sentence intended to mean that Oedipus believes the killer to deserve punishment:

- (35) Oedipe croit PRO mériter un châtement  
 Oedipus believes PRO to deserve a punishment  
 ‘Oedipe believes himself (*de se*) to deserve a punishment’

receives the following treatment:

**Assumption 1:** First, a belief report is true just in case the meaning expressed by the embedded clause returns truth when applied to each of the attitude holder’s doxastic alternatives, where these doxastic alternatives are world-individual pairs. The intension of a clause embedded under *croire* is a set of world-individual pairs, a property of type  $\langle s, et \rangle$ , over which *croire* universally quantifies.

- (36) Lexical entry for *believe*.<sup>22</sup>  
 $[[believe]]^{g,w} = \lambda P \in D_{\langle s, et \rangle}. \lambda x \in D_e. Dox_{x,w} \subseteq P$   
 Where  
 $Dox_{x,w} = \{(a_i, w_i) \mid \text{being } a_i \text{ in } w_i \text{ is consistent with } x\text{'s beliefs in } w\}$

A standard way to code the embedded clause as a property is as follows (where some C-like head introduces the lambda abstracts and a null world pronoun is present in the embedded clause):

- (37)  $[_{CP_0} \text{ Oedipe } [VP \text{ croit } [_{CP_1} \lambda a \lambda w [ \text{ PRO mériter un châtement in } w ] ] ] ]$

**Assumption 2:** In (37), PRO is bound by  $\lambda a$ , so we replace PRO by the  $a$  yielding:

- (38)  $[_{CP_0} \text{ Oedipe } [VP \text{ croit } [_{CP_1} \lambda a \lambda w [ a \text{ mériter un châtement in } w ] ] ] ]$

The conjunction of these two assumptions codes the fact that PRO must be read *de se* in such structures: the center  $a$  of a doxastic alternative of Oedipus’s  $(a, w)$  is who Oedipus takes himself to be in  $w$ , his *de se* coordinate in this world. Binding PRO by  $\lambda a$  in (38) is coding the fact that PRO must also be interpreted as who Oedipus takes himself to be in this world, i.e. be Oedipus *de se*.<sup>23</sup>

Consider first Assumption 1.

The attitude verb e.g. *croire/believe* is lexically defined so that it quantifies over doxastic alternatives of  $\pi$ ’s as defined in (36).

This definition of doxastic alternatives involving centered worlds  $(a_i, w_i)$  conjoins two properties:

<sup>22</sup> It is sometimes assumed that alternatives are centered worlds only in case of *de se* ascriptions, so that verbs such as *believe* are ambiguous, either quantifying over worlds, or centered worlds. This is both uneconomical and unnecessary.

<sup>23</sup> Simplifying, we compute the truth conditions of (35) as follows:

Given that:  $[[CP_1]]^{g,w} = \lambda x.x \text{ deserves punishment in } w$   
 $[[VP]]^{g,w} = (\text{by intensional function application with the embedded C introducing abstraction over worlds and centers})$

$[[croit]]^{g,w} ([[CP_1]]^{g,w'}) =$   
 $[[croit]]^{g,w} (\lambda w'. \lambda a. a \text{ deserves punishment in } w') =$   
 $\lambda a. Dox_{x,w} \subseteq \{ \langle a, w' \rangle : a \text{ deserves punishment in } w' \}$

Hence:  $[[CP_0]]^{g,w} = Dox_{Oedipus,w} \subseteq \{ \langle a, w' \rangle : a \text{ deserves punishment in } w' \} =$

$\forall \langle a, w' \rangle \in Dox_{Oedipus,w}, a \text{ deserves punishment in } w'$

Since Oedipus does not actually think he is the killer, he does not ascribe to all who he thinks he may be the property of deserving punishment: (38) is false.

Property P1:  $a_i$  is a world center. A world center  $a_i$  is who the first pronoun ‘I’ picks out when uttered in  $w_i$ .

Property P2:  $a_i$  is who the attitude holder takes *de se* herself to be in  $w_i$ . Given P1, this amounts to meaning that  $a_i$  is who the first pronoun ‘I’ would pick out when uttered by attitude holder  $w_i$ . This comes from defining doxastic alternatives, with the red part in (36).

There is conceptual evidence that we need this conjunction of properties, that is, referencing the center  $a$  as the *de se* coordinates of the attitude holder in the embedded clause (e.g. Lewis, 1979 which shows X holding a belief that P means that X believes: ‘I live in a world in which P is true’, that is in the present terms, attributing a property to  $a$ , that is to himself *de se*).

There is also empirical evidence that this conjunction of properties is needed. There are languages (e.g. in Amharic, Uyghur, Turkish, etc..) in which the pronoun ‘I’ embedded in the complement of an attitude verb can shift: it can refer not or not only to the actual speaker *de se*, but also to the attitude holder *de se* (cf. Schlenker’s 2003 work on shifted indexicals). In pseudo English, we can get:

- (39) a. Lydia thinks [ $I_{speaker}$  was in Bear Canyon on 12/08/2018].  
 b. Lydia thinks [ $I_{Lydia}$  was in Bear Canyon on 12/08/2018].  
 c.  $\lambda a_1 \lambda w_1$  Lydia thinks in  $w_1$  [ $\lambda a_2 \lambda w_2$  I was in Bear Canyon on 12/08/2018 in  $w_2$ ].

A unified treatment of the meaning of ‘I’ can be given by letting it pick out the center of some (or the smallest) context of evaluation containing it where it is the *de se* coordinate of the attitude holder whose modal alternatives this context encodes: here as being bound either by  $a_1$  (so ‘I’ means  $I_{speaker}$ , the speaker for the speaker), or by  $a_2$  (so ‘I’ means  $I_{Lydia}$ , Lydia for Lydia ) in (39c).

This conjunction of properties amounts to a **Self Centering** property. That attitudes quantify over self centered alternatives is a stipulation but one that is required. Indeed, there is no (possible) attitude verb *schmelieve* where *Lydia schmelieves to be in Bear Canyon* means for anyone including Lydia that Lydia believes that someone who is not (or some group that does not include<sup>24</sup>) her is in Bear Canyon (this someone could be me the speaker, the addressee or the sentence, some discourse prominent referent, etc..<sup>25</sup>). For Lydia, this Self Centering property means that her accessible doxastic alternatives have to be centered around herself.

If this property failed, I could imagine being in a world in which my uttering ‘I’ does not pick out who I think I am in this world. Or said differently, the existence of verbs like *schmelieve* predicts there could be a language with shifted indexicals where in ‘Lydia schmelieves that I am in Bear Canyon, ‘I’ would shift, but to someone else than Lydia.

Such non existing predicates do not seem to be linguistically possible predicates: they should be excluded in principle. But coding the Self Centering property as a **lexical** property of attitude verbs creates an expectation that there could in principle be attitude verbs lacking it. I conclude that the Self Centering property should not be coded lexically but as a property that tolerates no possible exception.

Consider next Assumption 2.

The key property of (38) yielding the *de se* reading is to have PRO bound by the local individual abstractor  $\lambda a$ , but how does this arise from the syntax of (38)?<sup>26</sup> This is simply stipulated in one way or another under all accounts I am aware of (from Chierchia, 1987, to Landau, 2015).<sup>27</sup>

Further, such accounts in terms of local binding of PRO by a  $\lambda$  operator fail to generalize to:

<sup>24</sup> Because attitude verbs do allow partial control. the meaning : John believes: ‘we were in Bear Canyon’ is allowed (cf. Landau, 2013, Pearson, 2016).

<sup>25</sup> Another example would be the verb *schdream*. Oedipus’ dreaming that he is Laius. Uttering I in his dream would pick out Laius in the dream. If *schdreaming* existed, uttering I in his *schdream* would pick out Oedipus.

<sup>26</sup> One option we are not considering is that the embedded infinitive never projects a PRO subject, as this is syntactically implausible. See e.g. Landau, 2013, chapter 3.

<sup>27</sup> The account provided here does not eliminate all stipulations. It replaces this stipulation by a different, more general one, the *de dicto omnibus* requirement which takes PRO to be coreferential with its controller for the control attributing thinker.

1. The NOC cases requiring *de se* construal under control. Indeed consider cases (23c), (23c), (24c), or (25c) which illustrates the problem clearly and which we repeat below:

- (40) a. Oedipe<sub>k</sub> pense qu’ Antigone croit qu’ [après PRO<sub>k</sub> avoir été puni, la peste disparaîtra]  
 b. Oedipus<sub>k</sub> thinks that Antigone believes that [after PRO<sub>k</sub> having been punished, the plague will disappear]  
 c. Oedipus<sub>k</sub> thinks [  $\lambda a \lambda w$  Antigone believes in  $w$  [ $\lambda a_1 \lambda w_1$  [after PRO<sub>k</sub> having been punished, the plague will disappear in  $w_1$ ]] ]

Here we would need to guarantee that PRO is bound by  $\lambda a$ , which would be non local binding.

2. Say nothing about the cases discussed in section 2.4, that is about the relation between PRO and its antecedent (*de dicto omnibus*) in obligatory control cases under non attitude verbs, as these verbs do not quantify over centered worlds, and thus do not introduce a potential  $\lambda$  binder for PRO.

Finally, note that the first point shows that a unified treatment of *de se* readings via the *de dicto omnibus* requirement must in principle allow unbounded distance between controller and controllee. This casts doubts on taking the control relation to be a movement relationship or property saturation. Something else seems needed.

### 3.3.3 Why does *de se* reduce to *de dicto omnibus*

I am now going to discuss why *de se* reduces to *de dicto omnibus* in the context of an analysis taking attitude verbs to quantify over centered worlds. I will discuss in section 5.1 how to implement this reduction syntactically. Consider again the following sentence, where Lydia believes she is Flora:

- (41) Lydia<sub>m</sub> croit [ C<sub>1</sub> PRO<sub>m</sub> être dans Bear Canyon]  
 Lydia<sub>m</sub> believes [ C<sub>1</sub> PRO<sub>m</sub> to be in Bear Canyon]  
 ‘Lydia believes herself (*de se*) to be in Bear Canyon’

1. In (41), PRO must be understood *de se*
2. Calling *PRO* the linguistic sign and PRO its denotation, the *de dicto omnibus* requirement mandates that in (41), all descriptions that I have of Lydia, the referent of *Lydia*, the antecedent of *PRO*, must be hold of PRO, the referent of *PRO*.
3. Logic of the analysis: I must have a description of Lydia which, when holding of PRO, yields the *de se* reading.
4. What is this description?<sup>28</sup>
5. In the context of centered worlds, this description of PRO should make it the center of Lydia’s doxastic alternatives for Lydia, no matter which one is chosen, hence Lydia *de se*.

So first, my description must reference a belief held by Lydia since she must be ascribed the thought that PRO is the center of any of her doxastic alternatives. This description must apply to Lydia since *Lydia* and *PRO* have the same semantic value. So this description should make Lydia the center of Lydia’s doxastic alternatives, no matter which one is chosen.

Placing ourselves in the actual world  $w$  (but this will generalize to any world), Lydia has thought about herself, that is about the actual Lydia (the actual Lydia may think that Lydia in  $(a_i, w_i)$  is someone else than the actual Lydia). More specifically, assume that the actual Lydia has the following description of the **actual Lydia** (in red to distinguish who is described from who describes):

- (42)  $\forall(a_i, w_i)$  in Lydia’s doxastic alternatives in  $w$ ,  $a_i$  in  $w_i$  is who Lydia in  $w$  thinks in  $w$  **Lydia in  $w$**  is in  $w_i$ .

This description simply encodes that Lydia takes herself to be the center of any of her doxastic alternatives. Now this illustrates a property that all thinkers should have, namely:

<sup>28</sup> As any singular proposition true of a particular individual  $\pi$  can be construed as a true property of  $\pi$  ( $P(\pi)$  iff  $\pi \lambda x.P(x)$ ), I may provide the relevant singular propositions instead of writing descriptions in the form of descriptions.

- (43)  $\forall \pi$ ,  $\pi$  a thinker in  $w$ , and  $\forall (a_i, w_i)$  in  $\pi$ 's doxastic alternatives in  $w$ ,  $a_i$  in  $w_i$  is who  $\pi$  in  $w$  thinks in  $w$   **$\pi$  in  $w$**  is in  $w_i$ .

But if everyone holds such a belief, by a standard assumption of the theory of mind, everyone should believe that all thinkers hold this belief. In particular, \*I\* believe that Lydia has such a belief:

- (44) I in  $w$  take it that  $\forall (a_i, w_i)$  in Lydia's doxastic alternatives in  $w$ ,  $a_i$  in  $w_i$  is who Lydia in  $w$  thinks in  $w$  **Lydia in  $w$**  is in  $w_i$ .

But I am the control attributing thinker. This means that any description of **Lydia in  $w$**  that I hold, I must have the same of *PRO* since *PRO* is controlled by *Lydia*. In particular:

- (45) I in  $w$  take it that  $\forall (a_i, w_i)$  in Lydia's doxastic alternatives in  $w$ ,  $a_i$  in  $w_i$  is who Lydia in  $w$  thinks in  $w$  **PRO in  $w$**  is in  $w_i$ .

So first, this means that (I take it that) *PRO* exists in  $w$ , which is of course the case as *PRO* is Lydia. This also means that for any of Lydia's doxastic alternatives, I ascribe to Lydia the thought that *PRO* is the center of this alternative, that is, is Lydia's *de se* coordinate in this alternative.

In other words, I ascribe to Lydia the thought that she takes *PRO*, the referent of *PRO* to be who she thinks she is: this is the *de se* requirement, derived.

6. A bit more precisely:

- (a) The definition of doxastic alternatives stipulates a (*de se*) identity relation between an attitude holder, Lydia, and the center/author  $a_i$  of her doxastic alternatives. Lydia's doxastic alternatives are defined as:

- (46)  $Dox_{Lydia,w} = \{(a_i, w_i) \mid \text{being } a_i \text{ in } w_i \text{ is consistent with Lydia's beliefs in } w\}$ .<sup>29</sup>

The property in red in this definition encodes that the center  $a_i$  (cf. property P1 in section 3.3.2) is Lydia's *de se* coordinates in  $w_i$  (cf. property P2 in section 3.3.2), and is part of the lexical entry of the verb *croire/believe* which

- i. I argued should not be a **lexical** property.
  - ii. Establishes no direct connection between  $a_i$  and *PRO* **both** being understood mandatorily *de se* for Lydia, a point I will return to in section 5.1.
- (b) Proposal: Remove property P2 from the definition of Lydia's doxastic alternatives and define them but **without** requiring that she be the center *de se* of her doxastic alternatives. We abandon the conjunction properties P1 and P2 discussed in section 3.3.2 : we no longer require that who she thinks she is in some alternative is who her uttering 'I' in this alternative picks out in this alternative. We separate the notion of center of one's modal alternative from the notion of one's own counterpart in this alternative.

- (47) a.  $Dox_{Lydia,w} = \{(a_i, w_i) \mid w_i \text{ is consistent with Lydia's beliefs in } w\}$   
 b.  $a_i$  is who 'I' in  $w_i$  picks out in  $w_i$  when 'I' is uttered by who Lydia takes herself to be in  $w_i$

- (c) More generally: make the red part a (**special**) **description** that any attitude holder  $\pi$  must have of herself: when  $\pi$  thinks of any of  $\pi$ 's doxastic alternatives,  $\pi$  takes the center of this alternative to be herself *de se*. In other words:

- (48) a.  $\forall \pi \in w$ ,  $\pi$  a thinker,  $\forall (a_i, w_i) \in Dox_{\pi,w}$ ,  $\pi$  takes  $a_i$  to be who  $\pi$  in  $w$  takes  **$\pi$  in  $w$**  to be in  $w_i$   
 b.  $Dox_{\pi,w} = \{(a_i, w_i) \mid w_i \text{ is consistent with } \pi\text{'s beliefs in } w\}$   
 c.  $\forall (a_i, w_i) \in Dox_{\pi,w}$ ,  $a_i$  is who 'I' in  $w_i$  picks out in  $w_i$  when 'I' is uttered by who  $\pi$  takes himself to be in  $w_i$

<sup>29</sup> Note that the *de se* ascription is linguistically implicitly coded in such definitions as a case of NOC *de se* *PRO*:  $PRO_m$  being  $a_i$   $w_i$  is consistent with  $Lydia_m$ 's beliefs in  $w$ .

(48c) defines the center of a modal alternative for a thinker. I will assume this definition in what follows.

(d) By the theory of mind,

- (49) a.  $\forall \pi \in w, \forall \rho \in w, \pi, \rho$  thinkers,  $\rho$  takes it in  $w$  that  $\forall (a_i, w_i) \in Dox_{\pi, w}$ ,  $\pi$  takes  $a_i$  to be who  $\rho$  in  $w$  takes  $\pi$  in  $w$  to be in  $w_i$   
 b.  $Dox_{\pi, w} = \{(a_i, w_i) | w_i \text{ is consistent with } \pi\text{'s beliefs in } w\}$

(e) For sentence (41) above, that is, applied by me ( $\rho = me$ ) to Lydia ( $\pi = Lydia$ ) and to the denotation of PRO controlled by Lydia,  $w^*$  the actual world:

- (50) a. I take it that  $\forall (a_i, w_i) \in Dox_{Lydia, w^*}$ , Lydia takes  $a_i$  to be who Lydia in  $w^*$  takes **Lydia** in  $w^*$  to be in  $w_i$   
 b. I take it that  $\forall (a_i, w_i) \in Dox_{Lydia, w^*}$ , Lydia takes  $a_i$  to be who Lydia in  $w^*$  takes **PRO** in  $w^*$  to be in  $w_i$   
 c.  $Dox_{Lydia, w^*} = \{(a_i, w_i) | w_i \text{ is consistent with Lydia's beliefs in } w^*\}$

(50b) is the *de se* ascription.

In (41): Lydia in  $w^*$  must have a thought with the following content: 'the center of any of Lydia's doxastic alternatives is who the Lydia in  $w^*$  takes **Lydia in  $w^*$**  to be in this alternative (namely Flora), hence who Lydia in  $w^*$  takes **PRO in  $w^*$**  to be in this alternative, namely Flora.

In other words, Lydia thinks of herself both as Flora and as center of her doxastic alternatives; she therefore also thinks of the reference of PRO as this center hence as Flora: the part in blue amounts to Lydia's thinking of PRO as herself *de se*. This conclusion holds as long as this special description holds true.

7. But is this special description in (48a) necessarily true?

As should be clear, this special description is nothing else than a way to code the Self Centering property. Recall that this property lexically limits the doxastic alternatives that a verb like *believe* quantifies over and thus ends up attributing to the attitude holder the property that her beliefs are about so restricted doxastic alternatives. We eliminated the Self Centering Property from the definition of doxastic alternatives and replaced it by the special description, which I call the **Self Centering Description**. It attributes the Self Centering property directly to the attitude holder, and thus must be assumed to be true (since verbs like *schmelieve* do not exist), but as a **cognitive property** of attitude holders, not as a property of linguistic signs.

(51) **Self Centering Description**

For any attitude holder  $\pi$  in some world  $w$ ,  $\pi$  has the description  $\Delta_w(\pi, \pi)$  of  $\pi$  in  $w$  :

$\Delta_w(\pi, \pi)$ : For any of  $\pi$ 's (doxastic) alternatives  $(a_i, w_i)$  in  $w$ ,  $a_i$  in  $w_i$  is who  $\pi$  in  $w$  takes  $\pi$  in  $w$  to be in  $w_i$ .

As a necessary property of what it means for a thinker to be a thinker, this description cannot fail to hold. This description  $\Delta_w(\pi, \pi)$  provides a function  $SC_{w, \pi}$  mapping any  $w_i$  compatible with  $\pi$ 's beliefs in  $w$  into a properly centered doxastic alternative:

$SC_{w, \pi}: w_i \rightarrow (w_i, a_i)$ , where  $a_i$  is who  $\pi$  takes  $\pi$  in  $w$  to be in  $w_i$ .

Here is the effect that my believing that this Self Centering description holds for anyone will have: it will identify the center  $a_i$  of any centered world  $w_i$  over which a controller's attitude quantify with this controller's *de se* coordinates in  $w_i$  regardless of the syntax of the construction. As the value of  $a_i$  in  $w_i$  is derived from that of  $w_i$ , there is no need to lambda abstract over it.

(52) Oedipus<sub>m</sub> expects [ $\lambda w_i$  PRO<sub>m</sub> to be punished in  $(a_i, w_i)$ ]

(53) a. Oedipus<sub>m</sub> thinks [ $\lambda w_i$  that after PRO<sub>m</sub> turning himself<sub>m</sub> in, the plague will disappear in  $(a_i, w_i)$ ]  
 b. Oedipus<sub>m</sub> thinks [ $\lambda w_i$  Antigone believes in  $(a_i, w_i)$  [ $\lambda \omega_k$  that [after PRO<sub>m</sub> turning himself<sub>m</sub> in, the plague will disappear in  $(\alpha_i, \omega_i)$ ]]]]

In all such cases, the center  $a_i$  of  $w_i$  will be identified to the *de se* coordinate of the controller of PRO in each  $w_i$  because of the Self Centering description Oedipus holds of himself in  $w^*$  the actual world (namely  $\Delta_{w^*}(Oedipus, Oedipus)$ ). And the referent of PRO in  $w^*$  will be identified to that center in  $w_i$  because  $\Delta_{w^*}(Oedipus, PRO)$  holds, hence, by transitivity to the *de se* coordinate of its controller.

This extends straightforwardly to embedded cases, that is, cases in which I am not the control attributing thinker. For example in:

(54) Tiresias thinks that Oedipus<sub>*m*</sub> expects [PRO<sub>*m*</sub> to be punished]

The control attributing thinker is Tiresias. Whoever he takes Oedipus to be, he takes him to hold true the self centering description of himself. This will derive Tiresias ascribing a *de se* thought to who Tiresias take Oedipus to be.

### 3.3.4 Summary

The **de dicto omnibus** requirement is a property of PRO requiring that PRO be coreferential (or covalued) with its controller have the same semantic value for a particular, control attributing thinker. For this thinker, PRO and its controller are covalued. In non *de se* cases, covaluation is achieved by the sharing of descriptions supplied in the assumed context of utterance. For *de se* cases, I suggested that they arise because the necessary existence of special descriptions, Self Centering descriptions, that people have of themselves and believe others have too, as a cognitive property. Standard analyses encode the effect of such descriptions as a lexical property coding what attitude verbs quantify over. Instead, I took attitude verbs to quantify over centered worlds (as in Lewis, 1979), but I removed from the lexical entry of such verbs any stipulation concerning the identity of the center of such worlds. This yields for e.g. *believe*:

(55) Lexical entry for *believe*:  
 $[[believe]]^{g,w} = \lambda P \in D_{\langle s,et \rangle} . \lambda x \in D_e . Dox_{x,w} \subseteq P$   
 Where  $Dox_{x,w} = \{(a_i, w_i) | a_i \text{ is the center of } w_i, \text{ and } w_i \text{ is compatible with what } x \text{ believes in } w\}$   
 and by definition of  $a_i$  as center,  $a_i$  is who uttering ‘I’ in  $w_i$  picks out in  $w_i$ .

We attribute the fact that the center of such worlds is the attitude holder *de se* to the existence of a special description - the Self Centering description that people have of themselves - that restricts in principle what attitude verbs end up quantifying over. This description ultimately yield *de se* readings of PRO via the *de dicto omnibus* requirement, because it entails that PRO is also interpreted as being this center.

Nothing in what was discussed is specific to the verb *believe* and can thus be generalized to all attitudes. Given some simple transitive attitude verb *tau* noted  $\tau$ , its lexical entry will look like:

(56)  $[[\tau]]^{g,w} = \lambda P \in D_{\langle s,et \rangle} . \lambda x \in D_e . ACC_{x,w}^\tau \subseteq P$   
 Where the accessible modal alternatives  $ACC_{x,w}^\tau$  for  $\tau$  are defined as:  
 $ACC_{x,w}^\tau = \{(a_i, w_i) | a_i \text{ is the center of } w_i \text{ and } w_i \text{ is } \tau\text{-compatible}\}$ ,  $\tau$ -compatibility defining accessible worlds for  $\tau$ .

The Self Centering description generalizes as:

(57) The **Self Centering description**  $\Omega$   
 For any attitude  $\tau$  and the accessible worlds it quantifies over in  $w$  for  $\pi$   $ACC_{\pi,w}^\tau$  The description  $\Omega_w^\tau(\pi, \pi)$  that any  $\pi$  has of  $\pi$  in  $w$  holds true in  $w$ :  
 $\Omega_w^\tau(\pi, \pi) = \forall (a_i, w_i) \in ACC_{\pi,w}^\tau$ , the center  $a_i$  of  $w_i$  is [who  $\pi$  believes in  $w$  that  $\pi$  in  $w$  is in  $w_i$ ].

## 4 Deriving ”de te” as a special case of *de dicto omnibus*

Mandatory *de se* readings have so-called *de te* ‘counterparts’ as can be illustrated with object control communication verbs such as *tell*, *ask*, *urge*, *recommend*, *order*, etc... in which their infinitive complement

clause contains a PRO controlled by the object, but expresses an attitude of the subject.<sup>30</sup> Thus consider the following branching scenario (from Schlenker, 1999 and Anand, 2006):

- (58) 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:

- (59) a. Mary told John<sub>k</sub> that he<sub>k</sub> had to leave. S1: TRUE, S2: TRUE  
 b. Mary told John<sub>k</sub> to PRO<sub>k</sub> 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 essential indexical *you* in the attitude.<sup>31</sup>

What is interesting and 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*. However, this type of relation is unsurprising from the point of view of the *de dicto* requirement.

Indeed, Mary has an attitude of the referent of PRO, so she is relevant. This means that PRO must be coreferential with its controller John for Mary. This is the *de te* reading. But as in the *de se* cases, coreference must arise because there is some description that Mary must hold of both the referent of *John* and PRO. This description does not come from the context: where does it come from?

If I, the speaker reports something that happened as Mary telling John something, I must minimally have as implicit description for John something of the form 'the person I take to be who Mary is talking to', otherwise this is not a 'telling', a 'saying to'. But this is not all. Regardless of what I believe, if Mary is simply talking out loud without any intention of directing her words to John, and John happens to hear her words, this is not a telling, even though the speaker may believe that it is. Mary must intentionally direct her words to John, that is, Mary must think of John as who the utterance is directed to, her goal: she must think of John as 'my addressee'. This is the source of the requisite description, rooted in lexical properties of verbs of communication (and verbs taking goal arguments in double object construction, such as *give*, *promise*).

To evaluate the truth of sentences such as those in (59), we must take into account what Mary said, who she thinks she might be, and who she thinks she might be talking to given who she might be. This means that we need to take into account relevant alternatives. These would, in this case, be candidate worlds compatible with what Mary said, with candidates for herself and for her addressees in them compatible with what she believes, that is, these alternatives should be triplets (at least)  $\langle a, u, w \rangle$  such that, for all she believes she could be *a* in *w* talking to *u*, where *w* is a world compatible with what she said.

<sup>30</sup> Object control verbs such as *persuade* in *The oracle persuaded Oedipus<sub>m</sub> PRO<sub>m</sub> 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.

<sup>31</sup> The pair in (59) is not a minimal finite/infinitive pair, first because PRO must be read *de te* while there 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 (59a), Mary may simply be relaying some information to John or issuing a demand or an order. In (59b), 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<sub>m</sub> a dit PRO<sub>m</sub> 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 prête à Pierre  
 Mary said PRO to be ready to Pierre  
 'Mary told Peter to be ready'



The standard way to code this would be to take the verb *tell* to quantify over such alternatives and take sentence in (59b) for example to be true just in case in any such world, Mary tells John: ‘you have to go’. This means that in any such  $w$ , her candidate for herself  $a$  in  $w$  said to  $u$ , who Mary takes John to be in  $w$ , that  $u$  should leave.

However, we moved away from such an account in the case of world centers in part to account for the non existence of in principle imaginable attitude verbs. The same considerations apply to the present cases. Indeed, assuming the standard accounts which lexically code the nature of the alternatives the attitude verbs quantify over, it should be possible to have communication verbs such *schtell* where *Mary schtold John to leave* could mean that Mary said to John that someone else than who she thinks John is or could be should leave.

Such verbs do not and cannot exist and should thus be excluded in principle.

To exclude them and reduce the *de te* requirement to the *de dicto omnibus* requirement, the reasoning is parallel to what was done in the world center/*de se* case. We define the verb *say* as quantifying over triplets (at least)  $\langle a, u, w \rangle$  but simplify the definition of lexically specified accessible alternatives, call them **Phematic**<sup>32</sup> alternatives **Ph**e, concerning the nature of the center/author or addressee:

(60) Phematic Alternatives for Mary in  $w$  are defined as:

$Phe_{Mary}^w = \{(a_i, u_i, w_i) | a_i \text{ is the center of } w_i, u_i \text{ is } a_i\text{'s addressee in } w_i, \text{ and } w_i \text{ compatible with what Mary says in } w\}$

1. We want to guarantee that in any  $w_i \in Phe_{Mary}^w$ , there are two individuals  $a_i$  and  $u_i$  such that Mary thinks she is  $a_i$  in  $w_i$  and Mary thinks that  $u_i$  is who she takes John to be in  $w_i$ . In particular, we want to disallow in principle  $u_i$  being anyone who Mary excludes from being John in  $w$ .
2. Assuming this enforced, the *de te* reading would follow if  $PRO = u_i$  in  $w_i$  for any  $w_i$ .
3. I am the control attributing thinker. So the referent of PRO must satisfy all of the descriptions I attribute to its controller *John* does. So it must satisfy a description that guarantees that  $PRO = u_i$ . This description must be one that says that John is Mary’s addressee for Mary whoever Mary thinks that she is or that John is. So it must reference a cognitive property of Mary’s, a description that Mary has of John.
4. First the (generalized) Self centering description (57) will hold true:  $\forall (a_i, u_i, w_i) \in Phe_{Mary}^w$ , the center  $a_i$  of  $w_i$  is [who Mary believes in  $w$  that Mary in  $w$  is in  $w_i$ ].
5. Next we postulate a candidate description for addressees:  
 $\forall (a_i, u_i, w_i) \in Phe_{Mary}^w$ ,  $u_i$  in  $w_i$  is [who Mary believes in  $w$  that John in  $w$  is in  $w_i$ ].  
 This is a description that Mary must have of John. Or it could be modified to be a description I have of my own addressee. In addition, to use the verb *tell*, I must believe that John is Mary’s addressee, hence that Mary holds true the addressee description of her own addressee.
6. Since I am the control attributing thinker, by the *de dicto omnibus* requirement, the description I have of John, namely as meeting Mary’s addressee description, must be true of PRO (since *PRO* is controlled by *John*. In other words, the following is true:  
 $\forall (a_i, u_i, w_i) \in Phe_{Mary}^w$ ,  $u_i$  is who Mary believes in  $w$  PRO in  $w$  is in  $w_i$ .
7. This guarantees *de te* reading.

The *de te* reading is derived if this description of John by Mary is true. And it is. The truth of this description is what prevents the existence of verbs like *schtell*.

Generalizing, the Addressee description we postulate - as counterpart of the Self Centering description for addressee - is the following:

- (61) **The Addressee description**  $\Upsilon$ : The description  $\Upsilon_w(\pi, \rho)$  that  $\pi$  has of  $\rho$  in  $w$  holds true of any addressee  $\rho$  of an attitude holder  $\pi$  in  $w$ :  
 $\Upsilon_w(\pi, \rho) = \forall (a_i, u_i, w_i) \in Phe_{\pi}^w$ , the addressee  $u_i$  of  $a_i$  in  $w_i$  is who  $\pi$  thinks in  $w$  that  $\rho$  in  $w$  is in  $w_i$ .

<sup>32</sup> Thanks to David Goldstein for suggesting this term from the Greek word  $\phi\eta\mu\alpha$  meaning ‘what is said’.

## 5 Going further

### 5.1 One more step: Centering as control

Just like all previous treatments in terms of centered worlds, ours postulates two distinct *de se* ascriptions in controlled PRO configurations:

The first, Ascription<sub>1</sub>, is that in any of some attitude holder  $\pi$ 's modal alternatives (doxastic, bouletic, phematic, etc...), which is a centered world  $\langle a, w \rangle$  meeting some accessibility conditions,  $a$  is  $\pi$ 's *de se* counterpart in this world. The second, Ascription<sub>2</sub>, is that PRO controlled by (the expression returning)  $\pi$  refers to  $\pi$ 's *de se* counterpart in this world. In effect, we derive Ascription<sub>2</sub> from Ascription<sub>1</sub>, by having PRO pick out the world's center. But can Ascription<sub>1</sub> be derived too? I will now suggest a positive answer.

The main idea regarding the answer to the first question is that world centers are PROs in syntactic representations.

To account for the distribution of first and second person reflexives in English, Ross (1970) proposed that every declarative clause is embedded under an abstract performative verb like 'I declare to you that...'. But there is no a priori reason why the form of such an analysis could not be generalized to some embedded clauses.

Let's generalize a version of Ross's hypothesis to **all** embedded structures under attitudes, say CPs (although gerunds are probably categorially different).

1. Begin with a case of a simple transitive attitude like *croire/believe*. Such an embedded clause CP will now be introduced by a (small) clause like structure (which introduces a center/author, and also a place, a time, and possibly an addressee) for example:

$$(62) \quad \pi \text{ believes (in } w^*) [ \lambda w \text{ a be in } w \text{ s.t. } [PRO \text{ to be in Bear Canyon (in } w) ] ]^{33}$$

where  $a$  is the center of the world, and the embedding predicate (in a literal implementation of Lewis, 1979) is 'be in a world such that'.

2. Define the accessible modal alternatives relative to an attitude  $\tau$  for attitude holder  $\pi$  in  $w^*$ :

$$(63) \quad \text{For } \tau \text{ some attitude, } \pi \text{ the attitude holder, addressee present or not depending on } \tau: \\ ACC_{\pi, w^*}^{\tau} = \{ (a, u, w) | a \text{ is the center of } w, u \text{ is } a\text{'s addressee in } w, \text{ and } w \text{ is } \tau\text{-compatible for } \pi \\ \text{in } w^* \}$$

3. Modify the self centering description (as shown by the part in red) to yield the **Error Free Self** description as follows:

$$(64) \quad \text{The Error Free Self description } \mathcal{E}_{w^*}(\pi, \pi): \\ \mathcal{E}_{w^*}^{\tau}(\pi, \pi) = \forall (a, w) \in ACC_{\pi, w^*}^{\tau}, [ \color{red}{\not{a} \pi \text{ in } w} ] \text{ is [who } \pi \text{ thinks in } w^* \text{ that } \pi \text{ in } w^* \text{ is in } w]$$

Instead of stating that **the center** of an accessible alternative of  $\pi$ 's is who  $\pi$  thinks  $\pi$  is in this alternative, we state  $\pi$ 's cognitive property as meaning that  $\pi$  is not mistaken about who he is in an hypothetical situation; he indeed is who he thinks he is.<sup>34</sup>

4. Assume now that in (62),  $a$  is syntactically a *PRO*, notated  $PRO_a$ , obligatorily controlled by the attitude holder.

$$(65) \quad \pi \text{ believes (in } w^*) [ \lambda w [ PRO_a \text{ be in } w \text{ s.t. } [PRO \text{ to be in Bear Canyon (in } w) ] ] ]$$

<sup>33</sup> Although I will not further elaborate on this point here, note that if the innermost bracketed constituent is a standard TP, this means that we take TP to be a world headed relative clause: *the world in which...*

<sup>34</sup> This is related to discussions in the philosophical literature about transworld identity, rigid designation and in relation to direct reference (see e.g. LaPorte (2018)) and recalls the discussions of the property of "immunity to error through misidentification" that (roughly) "internal" access to oneself displays, see for example Prosser and Récanati (2012) for recent discussion. My identifying myself *de se* in a situation imagined by me - the Self Centering description is "internal" access - it does not transit through perception - and thus can't fail.

5. My being the control attributing thinker leads me to
  - (i) take the error free description of  $\pi$  by  $\pi$  to be true and consequently
  - (ii) conclude that the error free description of  $\text{PRO}_a$  by  $\pi$  to be true as well. $a = \text{PRO}_a$  will now mandatorily inherit the description  $\mathcal{E}_{w^*}(\pi, \pi)$  yielding:  $\mathcal{E}_{w^*}(\pi, \text{PRO}_a)$ :  
 $\mathcal{E}_{w^*}(\pi, \text{PRO}_a) = \forall w \in ACC_{\pi, w^*}^\tau, [\text{PRO}_a \text{ in } w] \text{ is } [\text{who } \pi \text{ thinks in } w^* \text{ that } \pi \text{ in } w^* \text{ is in } w]$   
 Where  $\tau$  is *croire/believe* and  $ACC_{\pi, w^*}^\tau$  is  $Dox_{\pi, w^*}^{\text{croire}}$ .  
 This says that the center  $a = \text{PRO}_a$  of this alternative must be  $\pi$  for  $\pi$ , that is, must be read *de se*.
6. Note Self centering still holds but is derived now. It is derived from the necessary (cognitive) truth of  $\mathcal{E}$  and of a syntactic property: the center of accessible alternatives is a PRO obligatorily controlled by the attitude holder.
7. But it should be clear now that in (65), what makes  $\text{PRO}_a$  be read *de se* also makes PRO be read *de se* just because it is obligatorily controlled by  $\pi$ . There is no need for any direct relation between the two PROs.

Turn now to verbs of communication such as *tell, say to, ....*

1. With verbs of communication, the simplest would be for there to be an OC controlled PRO that stands for the addressee  $u$  and is controlled by the main clause addressee. At the same time, as the embedded clause expresses an attitude of the (reported) speaker, there has to be a second PRO centering the Pematic alternatives on who that speaker thinks he is.
2. We would therefore need for the embedding verb to select a different complement structure:

$$(66) \quad \pi \text{ told } \rho \text{ (in } w^*) [ \lambda w [ \text{PRO}_a \text{ say to } \text{PRO}_u \text{ in } w \text{ s.t. } [\text{PRO to leave (in } w)]] ] ]$$

Where  $\text{PRO}_a$  is controlled by  $\pi$  and is thus interpreted as the center of the Pematic alternatives.  $\text{PRO}_u$  (and PRO) should be controlled by  $\rho$  and be interpreted as the addressee of  $\text{PRO}_a$  in  $w$ .

3. We take  $\pi$ 's pematic alternatives in  $w^*$  to meet the template in (63) and we modify the addressee description as we did the self-centering description to:

$$(67) \quad \text{The Error Free Addressee description } \Upsilon: \text{ The description } \Upsilon_{w^*}(\pi, \rho) \text{ that } \pi \text{ has of } \rho \text{ in } w^* \text{ holds true of any addressee } \rho \text{ of a potential attitude holder } \pi \text{ in context } w^*:  
 \Upsilon_{w^*}(\pi, \rho) = \forall (a, u, w) \in \text{Phe}_{\pi}^{w^*}, [\rho \text{ in } w] \text{ is } [\text{who } \pi \text{ thinks in } w^* \text{ that } \rho \text{ in } w^* \text{ is in } w].$$

One difficulty here is syntactic as we postulate two distinct PROs (within the same minimal clause), each obligatorily controlled: this is not a configuration that is independently attested, in particular OC of  $\text{PRO}_u$  above. Furthermore,  $\text{PRO}_u$  occurs in a syntactic context (governed) normally not tolerating PRO.

Either this means that the syntacticization of the expression of the contextual coordinate 'addressee' (hence perhaps of any coordinate) is not warranted, or that OC PRO can have a wider distribution that usually assumed, or that the syntax is not as we have sketched it.

I can think of two directions to overcome this syntactic problem, both speculative, of course.

The first one is that  $\text{PRO}_u$  is a subject too. So (66) could in fact look like:

$$(68) \quad \pi \text{ told } \rho \text{ (in } w^*) [ \lambda w [ \text{PRO}_u \text{ hear } [\text{PRO}_a \text{ say in } w \text{ s.t. } [\text{PRO to leave (in } w)]] ] ] ]$$

The other is inspired by a construction extensively discussed in Gluckman (2018) illustrated below:

$$(69) \quad [\text{This book}]_m \text{ took } \text{John}_k \text{ three hours } [ e_m [ \text{PRO}_k \text{ to read } t_m ] ]$$

As Gluckman (2018) shows, the infinitive involves wh-movement (as in *tough*-construction cases) to  $e_m$ , which must take *this book* as antecedent, while PRO must be controlled by *John*. If we assume that  $e_m$  is a PRO, this ends up being a double OC situation. We could thus modify the syntax of (66) as follows, with movement of  $\text{PRO}_u$ :

$$(70) \quad \pi \text{ told } \rho \text{ (in } w^*) [ \lambda w [ \text{PRO}_u [ \text{PRO}_a \text{ say to } t_u \text{ in } w \text{ s.t. } [\text{PRO to leave (in } w)]] ] ] ]$$

Apart from overcoming the syntactic problem, an advantage of this analysis is that it treats addressees and centers differently. Addressee control is done via the interpretation of a PRO in an A-bar position. In such constructions as tough-movement, result clauses, purposives, etc... involving a silent A-bar category, this silent category never allows a long distance antecedent: it must be bound locally. Or to put it differently, they behave like Obligatorily Controlled PRO (and should thus be analyzed as PRO).<sup>35</sup> This in turn predicts that unlike long distance *de se* cases, there are no long distance *de te* cases, which seems true.

## 5.2 *de nunc* as a species of *de te*

We have restricted our attention to the center of accessible modal alternatives, or addressee when there is one. 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. Consider the following case from Anand, 2006, p.16-17 (attributed to K. von Stechow) to test for obligatory *de se*. 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 se* thought).

- (71) 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. He would consider true the statement 'it was raining at 3 a.m.' but possibly false 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  $\lambda t$  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  $\pi$  holds a necessary description of the time at which any of its doxastic alternatives holds: the time at which it holds is the time at which  $\pi$  thinks that it holds.
2. Represent times as DPs, 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.
4. A-bar move from this PRO to make this PRO locally controllable as we did in the *de te* case.

## 5.3 Still one more step: Immunity to Error<sup>36</sup>

We postulated that speakers are not and cannot be mistaken about who they think they are or about the identity of the addressee(s) of who they think they are in their doxastic alternatives. But this immunity to error is completely general: one can be mistaken about the world but one can't be mistaken about the content of one's thoughts, or about what one feels.

If I imagine a situation in which I am somewhere at some time talking to someone, I cannot be mistaken in my thoughts about who, where or when I am in this imagined situation, or who I am talking to. In other words, the Error Free Self or Addressee descriptions need not be postulated: they follow from a more

<sup>35</sup> Naturally, we are led to treating  $e_m$  in (69) as a PRO, and thus as subject to the *de dicto omnibus* requirement: this looks correct.

<sup>36</sup> Thanks to Carolyn Anderson for raising this point.

general cognitive property: a thinker is immune to error in relation to the content of his thoughts, and in particular, of his modal alternatives. This immunity to error is thus what ultimately underlies the *de se*, *de te*, *de nunc* readings.

## 6 Mechanism for Control

### 6.1 What is needed

The previous discussion makes it clear that some unique mechanism should underlie control of OC PROs and NOC PROs (at least the cases of NOC we have explicitly discussed) to yield the *de dicto omnibus* requirement. As mentioned earlier, given the lack of distance restrictions between a controller and an NOC PRO, a mechanism by which PRO is locally lambda abstracted over (as it must) is insufficiently general. The only independently available mechanism that allows this kind of non local dependencies is covaluation via coreference or binding.

In order to enforce the *de dicto omnibus* requirement, we want PRO to be covalued with its controller for the control attributing thinker  $\pi$ . One option would be to assume that PRO is the trace of its controller, as proposed in Hornstein (1999). However, two factors argue against this: first, the existence of partial control;<sup>37</sup> Second, the fact that the controller/PRO distance in NOC cases is not subject to movement constraints. There may also be a third reason: this type of requisite identity is weaker than the type of identity we expect in movement cases. Indeed, in movement cases, there is a single formal object which happens to have two occurrences. Even if both occurrences are interpreted, they should not differ in interpretation and in particular they should not diverge in any world. But this is not true of the controller/PRO relation. PRO and its controller can diverge for non control attributing thinkers. This would mean that PRO cannot generally a trace of its controller.

The alternative is to formulate this requirement as a binding requirement:

- (72) Binding of PRO  
PRO must be covalued with its controller, that is coreferential with, or bound by, its controller.

This is what I adopt. Before detailing how, I address the following point.

### 6.2 Neither OC nor NOC PRO need be bound

It might appear that this requirement is too weak for OC, which, unlike NOC, generally requires sloppy identity under ellipsis, if this property is assumed to require PRO to be a variable bound by its controller, cf. Landau (2013). The required sloppiness however follows from the independently required obligatoriness of control in OC (driven by a lexical property of the control verb). Thus, *Jean veut PRO partir et Mary aussi/ John wants PRO to leave and Mary does too want PRO to leave* must be read as sloppy because PRO in the second conjunct must be OC-ed by Mary, not because PRO is a bound variable.<sup>38</sup> This can be seen in the following type of examples:

- (73) de PRO<sup>1</sup> dormir 8 heures par nuit est bon pour la santé.  
to PRO<sup>1</sup> sleep 8 hours every night is good for health.  
C'est pourquoi Jean essaye de PRO<sup>2</sup> dormir 8 heures par nuit  
That's why Jean tries (to) PRO<sup>2</sup> sleep 8 hours every night

<sup>37</sup> Note that Partial Control cannot be hidden exhaustive control. Thus, in the sentence uttered by Juliet: *Romeo m' a proposé de nous suicider / Romeo proposed to me to commit suicide*, the presence of the 1st person plural intrinsic reflexive clitic *nous* requires the subject to be a plural of the form *Romeo and me*.

<sup>38</sup> The same remark applies to example (78) of (Landau, 2013, p. 30).

PRO<sup>1</sup> is not a bound variable (it is an arbitrary PRO or is controlled by the implicit possessor of *health*), PRO<sup>2</sup> cannot be a bound variable either: there is no lambda in the antecedent clause to copy in the elision site. PRO<sup>2</sup> is interpreted as coreferential with *Jean* because of the OC requirement.

Or, after Landau 2013, p. 233 example (454a) repeated here as (74):

- (74) John<sub>k</sub> thinks that [PRO<sub>k</sub><sup>1</sup> behaving himself] will please his mother, and she<sub>m</sub> does too ~~think that [PRO<sub>k</sub><sup>2</sup> behaving himself] will please her.~~  
So to please his mother, his brother Mike<sub>p</sub> tries to PRO<sub>p</sub><sup>3</sup> ~~behave himself.~~

PRO<sub>k</sub><sup>2</sup> is read strictly as Landau 2013, p. 233, reports. So neither it, nor PRO<sub>k</sub><sup>1</sup> is a variable bound by *John*. Yet PRO<sub>p</sub><sup>3</sup> must be read as coreferential with *Mike*. This can't be because it is a bound variable given that the antecedent of the elided constituent contains no such variable.

A similar point can be made on the basis of:

- (75) John wants to PRO<sup>1</sup> sleep in every morning. Mary thinks that not to PRO<sup>2</sup> ~~sleep every morning~~ would improve his health.

Were PRO<sup>1</sup> a variable bound by *John*, it is unclear how PRO<sup>2</sup> could be read strictly (i.e. interpreted as referring to *his*).

I conclude that OC PRO must be coreferential with its controller and may but need not be treated as a variable bound by its controller.

Note also that, contrary to what Landau 2013, p. 233 example (255), reports (citing Chierchia and Jacobson, 1986), pronominal anaphora does not generally require sloppiness. Thus, *Jean veut PRO partir et Mary le veut aussi/ John wants PRO to leave and Mary wants it too* is meaningwise fairly tolerant: it can mean that Mary wants John to want to leave, or that Mary wants to leave or, crucially, that Mary wants John to leave, a strict reading.

### 6.3 Control is of concepts

Take the following sentences in the usual scenario.

- (76) a. Oedipus expects *PRO* to punish himself.  
b. Antigone thinks that Oedipus expects *PRO* to punish himself.

In the first, the speaker (me) is the control attributing thinker T. In the second, Antigone is. What we want to achieve is that T takes Oedipus and PRO to be the same individual. Then whichever way T thinks about Oedipus, T will think about the denotation of PRO this way too. This will include contingent properties T attributes them as well as non context dependent descriptions such as the error free descriptions which hold necessarily, not contingently. Among these ways, we will find acquaintance relations that T entertains with Oedipus, whether they uniquely identify Oedipus or not, whether they are vivid or not, as provided by the context of utterance, that is what I or Antigone is supposed to know or believe about Oedipus in this context. Surely, one such acquaintance relation must be uniquely identifying in the right way or else it is not clear what the sentence would be talking about. This means there is an acquaintance-based concept-generator G as in Percus and Sauerland (2003) defined as follows, e.g. for belief attitudes:

Acquaintance Based Concept Generator (ABCG): G:  $D_e \rightarrow D_{\langle s, e \rangle}$  is an ABCG for x in w iff

- a.  $\text{domain}(G) = \{y \mid x \text{ is acquainted with } y \text{ in } w\}$
- b.  $\forall y \in \text{domain}(G)$ : there is a acquaintance relation A such that
  - (i) x holds A uniquely towards y in w and
  - (ii)  $\forall (x', w') \in \text{DOX}(x, w)$ : x' hold A uniquely towards G(y)(w') in w.

- c. Where:  $DOX(x, w) = x$ 's doxastic alternatives in  $w$ <sup>39</sup>

Basically, in simple cases, a concept generator provides me with a way (that's the acquaintance relation) to think about an individual - the *res* - that identifies him in all situations I could in principle be in (it picks out a unique individual in each of my doxastic alternatives: this individual is the counterpart in these alternatives of who I take this person to be in the actual world). Agreeing with Percus and Sauerland (2003) that concept generators are syntactically represented and notating  $G_\pi(\alpha)$  to be some uniquely identifying way in which  $\pi$  thinks of the *res*  $\alpha$ , this means that the sentences in (76) are better partially represented as:

- (77) a.  $G_{speaker}(Oedipus)$  expects *PRO* to punish himself.  
 b.  $G_{speaker}(Antigone)$  thinks that  $G_{Antigone}(Oedipus)$  expects *PRO* to punish himself.

The desired result is that  $PRO = G_T($ PRO's controller), where T is me in (77a) and Antigone in (77b).

To get this result, we need two properties:

- (i) *PRO* must involve an anaphoric concept generator and  
 (ii) it is anaphoric on  $G_T$ , T the control attributing thinker.

A detour through Hungarian will help specify how to get this result. Szabolcsi (2009) shows that in Hungarian, obligatory control allows the controllee to be overt:

- (78) Context: A group of friends boards a crowded bus that has only one vacant seat.  
 a. Senki nem akart csak ő 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

In such a case this controlled pronoun must, as Marta Abrusán noted, be read *de se* as well :

- (79) A(z amnéziás) hős nem akart csak ő 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*

This leads to Abrusán's *Observation About de se Pronouns*: The overt pronoun in the subject position of infinitival control complements is interpreted exclusively *de se*. So mandatory *de se*-ness can't be a property of controlled PRO: it is a property of obligatorily controlled pronouns (in appropriate contexts). In other words, the properties of controlled elements seems not to be an intrinsic property of these elements, rather it seems to be a property of **the control relation**.

We can get the desired results by defining a **control relation** as one requiring the controller and the controllee be the same individual for T, the control attributing thinker. In other words, a controllee is identical not to the *res* of its antecedent, but to how T sees this *res*.

Because in both *Oedipus* is the controller, e must be Oedipus and in (77a),  $G_\pi = G_{speaker}$  yielding  $PRO = G_{speaker}(Oedipus)$  and in (77b),  $G_\pi = G_{Antigone}(Oedipus)$  yielding  $PRO = G_{Antigone}(Oedipus)$ .

The Hungarian case also follows from the control relation, with the difference that the argument of the concept generator, the *res* is an overt pronoun.<sup>40</sup>

This is how the *de dicto omnibus* requirement arises: control by DP is identity not to DP but the concept generator T applies to DP.

The proposal we end up with is conceptually closest to that found in Hornstein and Pietroski 2010<sup>41</sup>, with which I will do a brief comparison. Hornstein and Pietroski 2010's proposal:

<sup>39</sup> Recall that I redefined this notion so that it would look different from what Percus and Sauerland (2003) assume.

<sup>40</sup> 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*). In effect these OC cases with *only* exemplify cases of Partial Control and provide a way to check whether partial control is only available with attitudinal OC verbs.

<sup>41</sup> Thanks for Paul Pietroski for directing me to this work

1. treats PRO as a trace/copy of its controller, and assumes therefore that they must instantiate the same individual concept (the value of concept generator) 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.

This treatment differs from the present one in a variety of ways.

First we agree that control is of concept but not that PRO itself is a concept. Rather we take PRO to be the argument of a concept generator because there are cases in which this argument is not a PRO but a realized pronoun as in Hungarian.

Second, the postulated concept cannot be generally first personal because of the non attitudinal or inanimate cases. A first personal concept is sometimes involved to yield *de se*-ness, and we spell out what individual concept the relevant one is and relate this behavior to the more general *de dicto omnibus* requirement.

Third, their postulated concept is not specified as to who holds it (while we take it to be held by the control attributing thinker).

Finally, because they take PRO and its antecedent to be in a movement relation, the concept identity follows: as movement is Rmerge, a trace and its antecedent are one and the same syntactic object thus must denote the same element. This strikes us as a further reason *not* to adopt a movement analysis. As we saw, the fact that *de dicto omnibus* holds for both OC and NOC cases and the existence of partial or split control both militate against a movement analysis. But in addition, assuming a movement analysis should mean that this concept is the same for **all** attitude holders, not just the control attributing thinker: this is too strong requirement. Indeed, if I report a thought by a control attributing thinker involving a control relation, \*I\* am not committed to PRO and its antecedent referring to the same object; I merely report that this is what the control attributing thinker believes.

## 7 Appendix: non *de se* in NOC?

Various authors report that, in properly set up cases, that is within attitude contexts, NOC PRO need not be read *de se*. Does this contradict what was concluded here? I think the answer is negative. I will discuss two cases, one from Hornstein (1999) and one from Landau (2013). (Hornstein, 1999, p.73) reports the following:

- (80) a. The unfortunate expects PRO to get a medal.  
 b. Only Churchill remembers PRO giving the blood, toil, tears and sweat speech.

In (80), a *de se* ascription is mandatory. Thus the first one is false if the unfortunate is an amnesiac not realizing ‘I will get a medal’. The second is true as as nobody but Churchill can remember ‘I gave the blood, toil, tears and sweat speech’.

But the next two sentences yield the opposite judgments, true for the first one, false for the second.

- (81) a. The unfortunate believes that PRO getting a medal would be boring.  
 b. Only Churchill remembers that PRO giving the blood, toil, tears and sweat speech was momentous.

Indeed, for example, the last sentence “is consistent with the notion that many people other than Churchill recall that the BST speech was momentous”, as Hornstein writes.

Hornstein paraphrase is exactly right: the speech was momentous, regardless of who gave it. This reading is available because this is NOC: PRO in (81) need not be controlled by the subject of the main clause, it may be read as ‘arbitrary PRO’ or PRO<sub>arb</sub>. Closer paraphrases of the sentences in (81) are:

- (82) a. The unfortunate believes that for anyone to get a medal would be boring.  
 b. Only Churchill remembers that anyone giving the blood, toil, tears and sweat speech was momentous.



In order to decide whether such examples contradict our finding regarding the *de dicto* requirement on NOC PRO, we need to guarantee that we are dealing with a case of control by the subject of the main clause, the easiest case being a case of exhaustive control of PRO by this subject.

(Landau, 2013, p. 32 and 234) reports a very similar case:

- (83) Hacked Computer scenario: John's computer has been hacked, and some secret files have been copied from it by a business competitor. John's company holds an urgent meeting to decide on the necessary measures. John has no idea that his own computer was the one that was hacked, but he is determined to punish any careless workers who failed to protect their computers against malicious attacks.

In this scenario, Landau (2013) reports the following judgements: (a) is false but (b) may be true.

- (84) a. John<sub>k</sub> insists on [PRO<sub>k</sub> being punished] only *de se*: False  
 b. John<sub>k</sub> insists that [PRO<sub>k</sub> being punished] will prevent similar hacks *de se*: False; *de re* True

We see the same confound: PRO in the second sentence can be understood as PRO<sub>arb</sub>.

We need to control away from this possibility, e.g. by guaranteeing exhaustive control of PRO by *John*. As sentences with PRO<sub>arb</sub> always have generic flavor (see Moltmann, 2006), one strategy is to try to make the infinitive receive an episodic interpretation. So suppose we modify the scenario as follows:

- (85) Hacked Computer scenario: John's computer has been hacked, and some secret files have been copied from it by a business competitor. John does not realize that his own computer was hacked. He is determined to punish any careless workers who failed to protect his computer against malicious attacks; he decides to impose a financial penalty on the culprit and instruct accounting to fine him - himself, he does not realize. The next day he holds a meeting at which (where we independently know that the reflexive can be read non *de se*, cf. Heim, 1994) he insists that the fact that he pushed the culprit will act as a deterrent.

John<sub>k</sub> insists that [PRO<sub>k</sub> having punished himself<sub>k</sub> yesterday] will prevent similar hacks

Now, native speakers (I consulted) report that this sentence is false: PRO must be read *de se*.

We can further corroborate these judgments by modifying the scenario as follows.

- (iv) Corrupt chief scenario: Don, the police chief, is lecturing his officers because newspapers have reported that an unnamed officer was involved with shady characters. He insists that the culprit should keep his nose clean from now on to prevent further bad publicity and refers to a similar previous incident in which he insisted on the same strategy and it worked. The unnamed officer was Don himself, although he never realized it, unlike Mel, one of the officers, who did.
- (v) Mel reports:
- a. Don<sub>k</sub> had insisted on [PRO<sub>k</sub> keeping his<sub>k</sub> nose clean ] only *de se*: False  
 b. Don<sub>k</sub> (now) insists that [PRO<sub>k</sub> having kept his<sub>k</sub> nose clean] prevented further bad publicity only *de se*: False

In (b), the use of the idiom *keep one's nose clean* together with the episodic interpretation of the infinitive forces PRO to refer back to Don only. And the result is an incorrect report of Don's attitude. The same is true of French in comparable cases using the idiom *garder ses distances*:

- (86) French
- a. Don<sub>k</sub> affirme [PRO<sub>k</sub> avoir gardé ses<sub>k</sub> distances] only *de se*: False  
 b. Don<sub>k</sub> affirme que d' [PRO<sub>k</sub> avoir gardé ses<sub>k</sub> distances] avait limité les ennuis only *de se*: False

In conclusion, when the proper control relation is enforced, PRO must be read *de dicto omnibus* or *de se*, depending on the configuration.

Several questions remain. Exhaustive control is not the only option both in OC cases, with embedding attitude verbs, and it is legitimate to ask what happens when control is not exhaustive. I will not discuss this here but the findings reported here remains relative to each control relation: a partial controller of a PRO must be in a *de dicto omnibus* relation with whatever part of PRO it controls.

We may finally now wonder whether, even in the  $PRO_{arb}$  case, PRO has to be read *de dicto omnibus* in some sense. [Moltmann \(2006\)](#) shows that with arbitrary PRO (as well as generic *one*), an agent ascribes a property to each one in the domain as if to himself, that is, while projecting himself onto everyone in the domain. For example, a speaker describes a particular experience (or a particular frequency of experiences) which he recognizes as generalizable to others, abstracting from particularities of his own situation. I think that the denotation of PRO must be understood as necessarily including the agent himself *de se* for him although this needs further discussion - cf. [Moltmann, 2006](#))

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