

# ‘Nearly free’ control as an underspecified *de se* report

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## 1 Introduction

One of the long-standing questions in the syntax and semantics of English is how the CONTROLLER in control constructions is determined, and why it is determined in that manner. In literature, there are generally two lines of approaches to this issue: a syntactic approach based on Minimal Distance Principle (MDP; Rosebaum 1967), which states that the controller is the closest c-commanding NP with respect to PRO, and the lexicalist approach (e.g., Chierchia 1984, Dowty 1985) that seeks an account in terms of the specific lexical semantics of each control verb. However, although both of these theories basically assume a dichotomy between obligatory and nonobligatory control, there is actually a control pattern in which the restriction on the controller selection lies somewhere intermediate between obligatory and nonobligatory control: a control pattern which Jackendoff and Culicover (2003) call NEARLY FREE CONTROL, exemplified in (1).<sup>1</sup>

- (1) a. John<sub>i</sub> talked to Sarah<sub>j</sub> about PRO<sub>i|j|i+j|gen</sub> taking better care of himself<sub>i</sub>/herself<sub>j</sub>/themselves<sub>i+j</sub>/oneself<sub>gen</sub>.  
b. \*Amy<sub>k</sub> knows that John<sub>i</sub> talked to Bill<sub>j</sub> about PRO<sub>k</sub> taking care of herself<sub>k</sub>.  
c. \*Brandeis<sub>i</sub> is in a lot of trouble. John talked to Sarah about PRO<sub>i</sub> firing the football coach. (Jackendoff and Culicover 2003: (17))

In this type of control, any NP in the local<sup>2</sup> clause (indexed as *i* or *j*), their sum (*i* + *j*), as well as a generic individual (*gen*) can be the controller, while NPs long distance away from the complement (1b), or those in different sentences (1c) cannot. As will

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<sup>1</sup>Throughout this paper, I indicate the understood subject of a subjectless complement with the index attaching to PRO, following the standard notation in syntactic literature. However, I use PRO here just for expository purposes without making any theoretical commitments to its existence.

<sup>2</sup>In this paper, I use the terms LOCAL/LONG DISTANCE in control sentences in the following way. I refer to the co-arguments of the complement selected by a control verb as LOCAL NPs of the relevant complement or of PRO. On the other hand, NPs are LONG DISTANCE away from the complement or from PRO if they are outside the clause headed by the control verb.

be argued in Section 2.2, existing theories of control, whether MDP-based or lexical, cannot be easily extended so that it can account for this peculiar control pattern.

In this paper, I propose a novel view on controller selection that can account for nearly free control as well as other control patterns. In this view, controller selection is determined by two independent factors: one is the obligatoriness of *de se* interpretation (e.g., Lewis 1979, Chierchia 1989), and the other is the argument-oriented lexical semantics of each control verb. According to this proposal, control constructions are semantically classified into the following four types: those having (i) obligatory *de se* reading and argument-oriented lexical semantics, (ii) no obligatory *de se* reading and argument-oriented lexical semantics, (iii) obligatory *de se* reading and unspecified lexical semantics, and (iv) no obligatory *de se* reading and unspecified lexical semantics. In Section 3, I will argue that it is the interaction of these two semantic factors that determines the different control patterns. Specifically, it will be shown that the nearly free control pattern straightforwardly follows from the semantic features of the third type of control in this typology—those having obligatory *de se* reading but underspecified lexical semantics—while the first two types and the fourth type respectively induce the obligatory control and the nonobligatory control pattern.

The rest of the paper is structured in the following way. In Section 2, together with well known obligatory control (OC) and nonobligatory control (NOC), I introduce the phenomenon of nearly free control (NFC), and show why existing theories of control cannot account for NFC. Section 3 proposes a novel semantics of control, where NFC is analyzed as a *de se* attitude report which is underspecified as to the property ascription target. In Section 4, I formalize and provide an empirical basis for the proposal in Section 3 based on Farkas's (1992) analysis of obligatory control. Finally, Section 6 concludes.

## 2 Nearly free control

### 2.1 The data

It is widely known that control phenomena are divided into two general types, namely obligatory control (OC) and nonobligatory control (NOC). In OC, the NP which denotes the understood subject of the subjectless complement, namely the CONTROLLER, is *uniquely* determined as a particular argument of the control verb. Thus, in the case of (2), the understood subject of the complement *to take better care of X-self* can only be identified with the *subject* of the control verb *promise*, and no other choice of controller is possible, as seen from the unacceptable sentences in (2).

- (2) a. Sally<sub>i</sub> promised Ben<sub>j</sub> PRO<sub>i/\*j/\*i+j/\*gen</sub> to take better care of herself<sub>i/\*himself<sub>j</sub>/\*themselves<sub>i+j</sub>/\*oneself<sub>gen</sub></sub>.
- b. \*Amy<sub>k</sub> thinks that Ben<sub>i</sub> promised Fred<sub>j</sub> PRO<sub>k</sub> to take better care of herself<sub>k</sub>.  
(long distance control)
- c. \*Amy<sub>k</sub> is not in good shape now. Ben<sub>i</sub> promised Fred<sub>j</sub> PRO<sub>k</sub> to take better care of herself<sub>k</sub>.  
(discourse antecedent control)  
(Jackendoff and Culicover (2003): (19) modified)

In OC, the lexical property of the control verb uniquely determines which argument becomes the controller. For example, for a SUBJECT CONTROL verb like *promise*, the controller is the subject (as in (2)) while for an OBJECT CONTROL verb like *ask* or *persuade*, the controller is the object.<sup>3</sup>

NOC, on the other hand, is a type of control where there is arguably no grammatical restriction on the choice of a controller. As seen in (3), the understood subjects of the infinitives/gerunds can be any (pragmatically plausible) individual. Thus, in NOC, the controller can be either a discourse antecedent (as in (3a)) or an NP separated long-distance from the infinitive/gerunds (as in (3b)).

- (3) a. John's<sub>i</sub> strange behavior has been a concern to everybody. Apparently, [PRO<sub>i</sub> undressing himself<sub>i</sub> in public] has caused a serious scandal.  
(discourse antecedent control)
- b. John<sub>i</sub> is afraid that [[PRO<sub>i</sub> undressing himself<sub>i</sub> in public] has caused a serious scandal].  
(long distance control)  
(J&C: (12, 13) modified)

In the literature, these two types of control are often taken to exhaust the possible control patterns in English. However, in actuality, there is an intermediate case: Jackendoff and Culicover (2003, J&C) note the existence of a type of control, which they call NEARLY FREE CONTROL (NFC), where the restriction on the possible controller is stricter than NOC ('free control' in J&C's term), but freer than OC. J&C give (4-5) below as examples of sentences which exhibit the relevant control pattern. Example (4) is a case involving the three place predicate *talk to* and (5) is a case involving the two place predicate *think*.

- (4) a. John<sub>i</sub> talked to Sarah<sub>j</sub> about PRO<sub>i/j/i+j/gen</sub> taking better care of himself<sub>i</sub>/herself<sub>j</sub>/themselves<sub>i+j</sub>/oneself<sub>gen</sub>.
- b. \*Amy<sub>k</sub> knows that John<sub>i</sub> talked to Bill<sub>j</sub> about PRO<sub>k</sub> taking care of herself<sub>k</sub>.  
(long distance control)
- c. \*Brandeis<sub>i</sub> is in a lot of trouble. John talked to Sarah about PRO<sub>i</sub> firing the football coach.  
(discourse antecedent control)
- (5) a. John<sub>i</sub> thought about PRO<sub>i/gen</sub> taking better care of himself<sub>i</sub>/oneself<sub>gen</sub>.
- b. \*Amy<sub>k</sub> knows that John<sub>i</sub> is thinking about PRO<sub>k</sub> taking care of herself<sub>k</sub>.  
(long distance control)
- c. \*John always thinks about the future of his daughter<sub>i</sub>. Today, John thought about PRO<sub>i</sub> going to a college.  
(discourse antecedent control)

In (4a) and (5a), we see that the understood subject of the complement *taking care of X-self* can be (i) an individual denoted by any argument in the local clause, (ii) any group of individuals denoted by the arguments in the local clause (split controller), or (iii) a generic individual (generic controller). On the other hand, the unacceptable examples

<sup>3</sup>An apparent exception to this basic picture is the well known 'controller shift' examples (Hust and Brame 1976), as in (i). See Uegaki (2010) for how the proposal in this paper is extended to these cases.

- (i) a. John<sub>i</sub> was promised by Mary<sub>j</sub> PRO<sub>i</sub> to be allowed to perjure himself<sub>i</sub>.  
b. John<sub>i</sub> asked Mary<sub>j</sub> PRO<sub>i</sub> to be allowed to perjure himself<sub>i</sub>.

in (4b-d) and (5b-d) show that the controller cannot be (i) an NP in a nonlocal clause or (ii) an NP in the preceding discourse.<sup>4</sup>

As seen above, NFC exhibits a peculiar control pattern where the restriction on the controller choice lies somewhere between OC and NOC: unlike OC as in (2), where only a single argument in the local clause can be a controller, NFC allows *any* argument in the local clause to be a controller, as well as split and generic controllers. On the other hand, NFC allows neither nonlocal NPs nor the speaker or hearer to be a controller. This behavior contrasts with NOC, where there is arguably no restriction on the possible controller.

Another important characteristic of NFC is that the predicates whose complements show this type of control are restricted to those having a certain type of lexical semantics. According to J&C, the verbs whose complements exhibit NFC are generally ‘verbs of communication’ or ‘verbs of thought’ as in (6).

- (6) a. **three place predicates (‘verbs of communication’)**  
*talk to, speak to, mention, discuss, tell NP about V-ing, ask NP about V-ing, etc.*
- b. **two place predicates (‘verbs of thought’)**  
*think about, consider, ponder over, etc.*

Before leaving the presentation of the data, I have to note here that NFC cannot be characterized in purely syntactic terms. The subjectless complement in NFC does not have to be selected by *about*, since there exist NFC examples where the complement is directly selected by verbs like *mention* or *discuss*, as in the following example:

- (7)  $I_k$  believe John<sub>*i*</sub> mentioned PRO<sub>*ijj*</sub>\*<sub>*k*</sub> defending himself<sub>*i*</sub>/herself<sub>*j*</sub>/ \*myself<sub>*k*</sub> to Mary<sub>*j*</sub>.

Moreover, involving a gerundive complement is not a sufficient condition of NFC since there are also OC sentences with gerundive complements, as in (8). This fact makes it impossible to distinguish between OC and NFC solely by the syntactic form of the complement.

- (8) Mary<sub>*i*</sub> thinks that John<sub>*j*</sub> {forgot / enjoyed / stopped} PRO<sub>*j*</sub>\*<sub>*i*</sub>\*<sub>*gen*</sub> reading the book.

## 2.2 The problem

In this section, I show that a simple treatment of NFC is impossible in existing theories of controller selection, either in the SYNTACTIC ANALYSIS which argues that the controller is determined according to a purely structural principle called the Minimal Distance Principle (MDP) (cf. e.g., Chomsky 1981, Larson 1991), or in the LEXICALIST ANALYSIS which argues that the controller selection is determined by the lexical semantic nature of the control verb (cf. e.g., Chierchia 1984, Dowty 1985, Sag and Polard 1991).

<sup>4</sup>At least some speakers find long distance control ((4b) and (5b)) more acceptable than discourse antecedent control ((4c) and (5c)). However, in this paper, I exclude this relative acceptability difference from consideration, and leave its investigation to future works.

### 2.2.1 Problems with a syntactic analysis

Since Rosenbaum (1967), a syntactically-based analysis of the controller selection in the GB/Minimalist framework (e.g., Chomsky 1981, Larson 1991, Hornstein 1999) has employed the syntactic principle MDP in accounting for control patterns.<sup>5</sup> The MDP can be stated as follows:

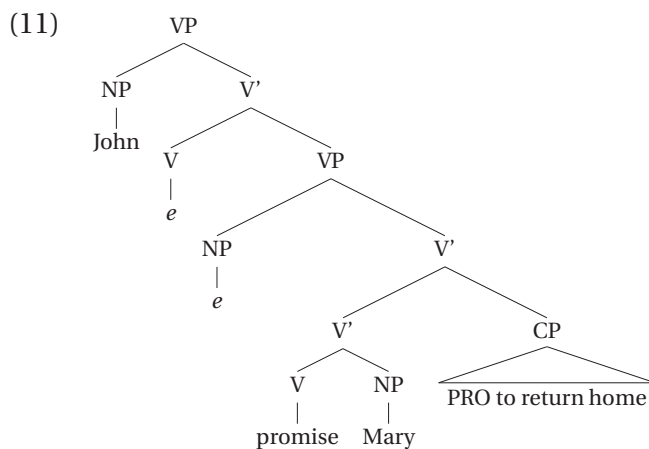
(9) **Minimal Distance Principle (MDP)**

The structurally closest c-commanding NP with respect to PRO is the controller.

According to the MDP, the controller of three place control verbs should always be the object, since it is the NP closest to PRO. Therefore, it should be clear that NFC sentences are (at least apparent) counterexamples to the MDP, along with *promise*-type subject control. The most notable analysis of *promise*-type subject control in an MDP-based theory is that of Larson's (1991), in which it is argued that subject control actually obeys the MDP given the special kind of syntactic structure for the relevant sentences. Here I consider a possible analysis of NFC in terms of MDP along the lines of Larson (1991).

Larson (1991) argues that the verb *promise* is a double object verb, and that sentence (10) therefore has the underlying structure in (11), assuming Larson's (1988) analysis of double object constructions.

(10) John<sub>i</sub> promised Mary PRO<sub>i</sub> to return home.



According to Larson, the MDP should apply to underlying structures. In (11), the object NP *Mary* does not c-command PRO, so the closest NP c-commanding PRO is *John*. Therefore, it is correctly predicted that the subject, and not the object, is the controller in (10). On the other hand, verbs like *ask* are treated as non-double-object verbs, and hence predicted by the MDP to exhibit the object control pattern, as usual.

Under this view, one possibility of analyzing NFC is to argue that NFC sentences are structurally ambiguous between a double object structure like (11) and a non-double-object structure. In this analysis, the subject control pattern is predicted to arise in the double object structure, and the object control pattern in the non-double object structure.

However, an obvious empirical problem with this analysis is that it cannot account for the split and generic control cases of NFC, such as in the following examples.

<sup>5</sup>In the movement-based theory of control in Hornstein (1999), the MDP is reduced to the Minimal Link Condition, a more general principle governing movement.

- (12) John<sub>i</sub> talked to Mary<sub>j</sub> about PRO<sub>i+j/gen</sub> taking good care of themselves<sub>i+j/oneself<sub>gen</sub></sub>.

Given that both subject and object control are derived as an obligatory consequence of the different underlying structures, it is unclear how ‘subject + object’ control, namely split control, and generic control are derived in structural terms in this analysis.

Another problem with an analysis of NFC along these lines is that it is not clear how NFC sentences are syntactically distinguished from other control sentences, nor why they are ambiguous between two structures. There is no independent motivation for assigning NFC predicates, such as *talk to ... about ...*, double-object/non-double-object ambiguous thematic structures.

### 2.2.2 Problems with a lexicalist analysis

An important fact that poses a significant challenge to a syntactic analyses is that NFC predicates are restricted to those having a certain lexical semantics. Thus, let us next consider possible analyses in the other tradition of the theory of control, namely lexicalist analyses, which take into account the lexical semantics of control verbs in analyzing control patterns. In lexicalist accounts of OC, it is argued that a control relation is specified in the lexical entry of, or in a meaning postulate associated with, the relevant control verb. For example, the lexical entry of *promise* is associated with a specification that its subject is identified with the understood subject of the complement. One way of implementing this specification is to posit a meaning postulate along the lines of (13).

- (13)  $\forall w \forall x \forall y \forall P \in D_{\langle s, et \rangle} [\mathbf{promise}(x, y, P, w) \leftrightarrow \forall w' \in W^{\text{PROM}(\langle x, y, w \rangle)} [P(w')(x)]]$   
 $(W^{\text{PROM}(\langle x, y, w \rangle)}$  is the set of worlds compatible with what  $x$  promises  $y$  in  $w$ .)

What (13) says is the following:  $x$  promises  $y$  to do  $P$  in  $w$  if and only if the subject  $x$  does  $P$  in all worlds where all  $x$ 's promises to  $y$  in  $w$  are fulfilled. Thus, (13) captures the fact that the matrix subject is the understood (embedded) subject in a sentence with *promise*.

A simple lexicalist account of NFC would stipulate that the NFC pattern itself is associated with the relevant verbs of communication and thought. However, this is obviously not an analysis, but a mere description of the fact. A stipulation that the control relation in question is associated with the relevant communication/thought verbs does not answer the question of *why* only the verbs in this particular semantic class show the peculiar control pattern and *why* this pattern must be as it is.

In fact, this kind of account of NFC lacks the conceptual advantage in the lexicalist account of OC, and is somewhat against the spirit of this approach. In the case of OC verbs like *try*, it is plausible to say that the understood subject of the complement must be the subject of the embedding verb since it is inherent in the situation of ‘trying’, and thus in the lexical semantics of *try*, that the trier can only try his/her own action but no one else's, as originally argued by Jackendoff (1972). On the other hand, in the situation of communication or thought as described by *talk to* or *think*, the communicator or thinker in fact *can* talk about or think about some other person's action or experience. Therefore, it is counterintuitive to say that, for example, the lexical semantics of *think* determines that the thinker must be the understood subject of the complement (or a generic individual). In other words, there seems to be no lexical semantic connection

between any argument of an NFC verb like *talk to* or *think* and the understood subject of its complement. This lack of conceptual appeal makes an attempt to assimilate NFC to OC in a naive lexicalist account still less plausible.

Given that there is no lexical semantic connection between the understood subject of a complement and the other arguments of NFC predicates, a lexicalist who relies on the lexical semantics of a control verb would have to argue that NFC predicates are *totally* underspecified for the controller selection. This is exactly the analysis of J&C, who first noticed this phenomenon. Although this idea is incorporated into my analysis to be presented in Section 3, this assumption alone would fail to distinguish NFC from NOC, and overgenerate allowable patterns. This is because, control by expressions other than local arguments is empirically impossible in NFC, as shown in (4b-4c, 5b-5c), contrary to the prediction of this analysis.

Summarizing Section 2.2, simple analyses of NFC in existing theories of OC are not promising. The only existing analysis of this particular control pattern, namely that by J&C, is not an exception: it wrongly predicts that NFC should pattern like NOC.

### 3 Analyzing nearly free control

In this section, I propose a novel analysis of NFC making use of the notion of *de se* attitude reports (Lewis 1979) and controller underspecification. The basic idea of the proposal is the following: What makes NFC more restricted than NOC is the obligatoriness of a *de se* attitude interpretation, while what makes NFC less restricted than OC is the fact that NFC predicates lack the controller specification inherent in the lexical semantics of OC predicates. Below, I start by briefly introducing the notion of *de se* attitudes and *de se* attitude reports.

#### 3.1 A semantics for *de se* attitude reports

##### 3.1.1 *De se* attitude reports

Since the notion of *de se* is hard to grasp using only theoretical terms, let me begin the illustration with an example: In the described situation in (14), sentence (14a) can be judged as true, but sentence (14b) is not (e.g., Morgan 1970, Chierchia 1989).

- (14) Situation: John is an amnesiac who does not remember what he has done yesterday. He reads a newspaper article about someone saving a baby yesterday and expects that the man who did so will be rewarded, without realizing that he himself is that man.
- a. John<sub>i</sub> expects that he<sub>i</sub> will be rewarded.
  - b. #John<sub>i</sub> expects PRO<sub>i</sub> to be rewarded.

What this contrast suggests is the following: in order for sentence (14b) to be true, it has to be the case that John expects *of himself* that he will be rewarded. In other words, the understood subject of the infinitival complement of *expect* must be identified as himself *by the expecter*. In contrast to this, there is no such restriction on the interpretation of (14a): for (14a) to be true, John does not have to recognize that the person whom John expects to be rewarded is he himself.

In other words, (14b) has to be interpreted as reporting John's attitude involving a first person perspective, as represented in the sentence in (15a), whereas (14a) does not have to be: (14a) can be interpreted as reporting either of the two attitudes in (15).

- (15) a. 'I will be rewarded.' (*de se*)  
 b. 'This guy will be rewarded.' (non-*de-se*)

Attitude *de se* (Lewis 1979) refers to the kind of attitude that involves the first person perspective, as represented by (15a).<sup>6</sup> What the example in (14) suggests is that a control sentence, such as (14b), must be interpreted as reporting an attitude *de se* of the subject, namely John in the case of (14b).

### 3.1.2 Analysis of attitudes *de se* based on Lewis (1979)

In the standard analysis of attitudes *de se*, as originally proposed by Lewis (1979), the content of an attitude is not a proposition but a property, and the holder of the attitude *de se* self-ascribes the relevant property. Here, the notion of SELF (embedded in the notion of self-ascription) is introduced as a primitive component in the analysis of attitudes, around which people's attitudes are 'centered'. For example, in (15a), the content of the attitude is the property of being rewarded as shown in (16), and the attitude holder self-ascribes this property.<sup>7</sup>

- (16)  $\lambda w \lambda x. \mathbf{rewarded}(w)(x)$

Thus, in this case, the one who is to be rewarded, as believed by the attitude holder, cannot fail to be the attitude holder himself.

On the other hand, in the non-*de-se* attitude in (15b), the content of the attitude is not the property in (16). In such a non-*de-se* attitude content, the 'subject' argument of **rewarded** is saturated explicitly with the individual John. In Lewis's (1979) view of attitudes where all attitude contents are properties, the relevant non-*de-se* attitude content here is the property in (17) ('the property of inhabiting a world where John is rewarded').

- (17)  $\lambda w \lambda x. \mathbf{inhabit}(w)(x) \wedge \mathbf{rewarded}(w)(j)$

The important point here is that the self of the attitude holder has no direct connection with the 'subject' argument of **rewarded** in (17), i.e. the one who is to be rewarded. This is so, because the subject of **rewarded** is explicitly specified independently as John. Thus, in this analysis of a non-*de-se* attitude, it is correctly captured that the attitude holder need not expect that the one who is to be rewarded is he/she him/herself.

The crucial reason why propositions will not do as the contents of attitudes *de se* is that propositions fail to distinguish between *de se* and non-*de-se* attitudes. For instance, if contents of attitudes were propositions, the contents of both attitudes represented in (15) would end up as the single proposition, as in (18).

<sup>6</sup>This notion of attitude *de se* will be generalized to that incorporating second-person oriented attitudes, as will be discussed shortly.

<sup>7</sup>I ignore tense throughout this paper.



(18)  $\lambda w.\mathbf{rewarded}(w)(\mathbf{j})$

Note, on the other hand, that the difference between *de se* and non-*de-se* attitudes is rightly captured in the analysis presented above. The contents of attitudes are different between the two kinds of attitudes, as in (16) vs. (17).

### 3.1.3 Chierchia (1989): control and *de se* reports

The notion of *de se* attitude reports has been introduced to the semantic analysis of control at least since Chierchia (1989). Chierchia's first assumption is that infinitives/gerunds denote properties, as shown below.

(19)  $[[\text{PRO to be rewarded/being rewarded}]] = \lambda w \lambda x.\mathbf{rewarded}(w)(x)$

In order to ensure that infinitives/gerunds denote properties as in (19), PRO in the syntax must either be viewed as syntactically nonexistent,<sup>8</sup> interpreted as an identity function i.e.  $\lambda P.P$ , or it must be viewed as a special variable always lambda-abstracted in the semantics, as Chierchia (1989) argues.

Assuming that infinitive/gerundive complements denote properties, Chierchia analyzes the non-*de-se* interpretation of (14a) and the *de se* interpretation of (14b), both repeated below, as having the logical translations in (20a) and (20b), respectively.

- (14) a. John<sub>*i*</sub> expects that he<sub>*i*</sub> will be rewarded.  
 b. John<sub>*i*</sub> expects PRO<sub>*i*</sub> to be rewarded.

- (20) a.  $\mathbf{expect}^*(\lambda w.\mathbf{rewarded}(w)(\mathbf{j}))(\mathbf{j})$  (non-*de-se*)  
 b.  $\mathbf{expect}(\lambda w \lambda x.\mathbf{rewarded}(w)(x))(\mathbf{j})$  (*de se*)

What is crucial here is that the non-*de-se* interpretation arises when an individual stands in a relation with a *proposition* while the *de se* interpretation arises when an individual stands in a relation with a *property*. Building on the insight of Lewis's analysis of attitudes *de se*, Chierchia argues that a *de se* interpretation arises, i.e. an individual is interpreted as self-ascribing an intensional property, whenever the individual stands in a relation with a property. This principle can be stated as follows.

(21) **Principle of *de se* interpretation (two place predicates) (prelim.)**

Whenever an individual  $x$  stands in a relation  $R$  of type  $\langle\langle s, et \rangle, et \rangle$  with an intensional property  $P$ ,  $x$  is interpreted as holding an attitude *de se* to  $P$ , i.e. as ascribing  $P$  to  $x$  him/herself as the first person of the attitude context.<sup>9</sup>

In the case of (20b),  $R$ ,  $x$  and  $P$  correspond to **expect**, **j** and **rewarded**, respectively. Thus, given this principle, (20b) must be interpreted as involving a *de se* attitude. On the other hand, (20a) does not have to be interpreted as involving a *de se* attitude since

<sup>8</sup>Of course, if we are to defend the thesis that PRO does not exist in the syntax, we have to assume a nonstandard mechanism for checking the agreement features of anaphoric items in infinitival/gerundive complements, about which I have nothing to say in this paper.

<sup>9</sup>The terms 'first person' and 'second person' here and below do not refer to the grammatical person (as in agreement). Rather, they refer to the agent and the addressee of the relevant communication or attitude being reported.

it involves a relation holding between an individual and a proposition, instead of a property.

It should be noted in this connection that a *de se* interpretation is not available in sentences with *extensional* OC verbs, such as *succeed in*. In example (22) from Chierchia (1989), John does not have to be aware that the winner is himself. As such, (22a) and (22b) have equivalent entailments.

- (22) a. John succeeded in PRO winning a lottery.  
 b. John succeeded in bringing about a situation where he wins a lottery.

This is as expected by the principle in (21) since, in the case of extensional OC sentences, intensionality is not involved, and hence no kind of attitude is being reported. Other extensional OC verbs as listed in (23) show the same pattern.

- (23) *force, make, begin, finish* etc. (Chierchia 1989: (25) modified)

Thus, the principle in (21) is central to the semantic account of *de se* interpretation of control sentences. However, it turns out that the principle in (21) is not enough to account for all cases of *de se* readings in control sentences, since a *de se* reading is also obligatory in the case of *three place* attitude relations such as *promise*, as the following examples in (24) suggest, while the principle in (21) only targets the cases of *two place* attitude relations. In (24b), unlike (24a), John must be understood as ascribing the property of leaving to himself.

- (24) Situation: John, an amnesiac who does not remember his own name, is a manager of a company. He heard a rumor among the employees that 'John' should leave the company since he is responsible for a devastating deficit. Hearing the rumor, John promises to the employees that John will leave the company, without realizing that John is no one other than himself.  
 a. John promised the employees that he would leave.  
 b. #John promised the employees to leave.

Furthermore, importantly, if we turn to an object control sentence involving a control verb such as *tell*, we see a slightly different pattern. Object control must be interpreted as involving a *second-person-oriented* attitude. For example, in the situation in (25), where John does not know that the person he is talking to is Mary, the situation cannot be reported using the object control version of the verb *tell*, as in (25b).

- (25) Situation: At a party, John is told that 'Mary' is being particularly obnoxious. He tells the person he is having a conversation with that 'Mary should leave'. But that person is no one other than Mary herself.  
 a. John told Mary that she should leave.  
 b. #John told Mary to leave. (Schlenker 2003:61)

In other words, (25b) must be interpreted as reporting John's saying to Mary 'You should leave', 'Leave!' or its equivalent. Thus, here we have a second-person-oriented version of an attitude *de se*. In what follows, to incorporate this kind of attitude also as a sub-case of attitudes *de se*, I generalize the notion of *de se* to attitudes that are sensitive to,

or refer back to, any component of the context of the attitude itself, whether or not it is the first person. Thus, an attitude *de se* must be divided into at least two subtypes, one an attitude toward the attitude holder him/herself, and the other an attitude toward the second person, i.e. the addressee of the attitude holder.<sup>10</sup> I refer to the former as an ATTITUDE *de me*, and the latter as an ATTITUDE *de te*.

Whether a *de me* or a *de te* reading arises correlates with the verb’s lexical subject/object control specification. Subject control verbs induce *de me* readings while object control verbs induce *de te* readings.<sup>11</sup> Examples (24) and (25) above have shown this point. If a sentence involves a subject control verb like *promise*, the subject (i.e. the attitude holder) must be interpreted as having an attitude *de me*. On the other hand, if a sentence involves an object control verb like *ask* or *tell*, the subject must be interpreted as having an attitude *de te*.

If we adopt a Chierchia-style analysis, another principle of *de se* interpretation along the lines of (21) that takes care of the three place attitude relations must be stated as follows:

(26) **Principle of *de se* interpretation (three place predicates) (prelim.)**

Whenever individuals  $x$  and  $y$  stand in a relation  $R$  of type  $\langle\langle s, et \rangle, \langle e, et \rangle\rangle$  with an intensional property  $P$ , the attitude holder  $x$  is interpreted as holding an attitude *de se* to  $P$ , i.e. as ascribing  $P$  to either  $x$  him/herself as the first person (*de me*), or to  $y$  as the second person of the attitude context (*de te*).

In the case of (24) (*John promised the employees to leave*),  $R$ ,  $x$ ,  $y$  and  $P$  correspond to the promising relation, John, the employees, and the property of leaving, respec-

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<sup>10</sup>This terminology is different from standard terminology, where an attitude *de se* only refers to a first person-sensitive attitude. It should also be noted that the current notion of an attitude *de se* can be generalized also to time/space-sensitive attitudes such as the following (where a time-sensitive attitude is sometimes referred to as attitude *de nunc* in the literature).

(i) It is raining *now/here*.

<sup>11</sup>Caution is in order here. Although verbs such as *persuade* and *convince* are classified as object control verbs, they are ‘psychological causatives’, in which the attitude holder is the object rather than the subject, as pointed out by Chierchia (1989). This is shown by the unacceptability of sentences such as (i), and the acceptability of sentences such as (ii), in which the subject is inanimate (see also Anand 2006:16).

(i) ?? John persuaded/convincing Mary to leave, but Mary couldn’t hear.

(ii) The constant noise from the upstairs apartment finally convinced John to leave.

These psychological causatives entail that the object has a relevant *de me* attitude, instead of subject’s having a relevant *de te* attitude. This can be seen by the intuitive falsity of the following example from Anand (2006:16), in the situation where John has watched a video of his winning a diver competition, and thought that he should be a professional diver, without knowing that the winner is he himself.

(iii) John’s<sub>i</sub> winning the best diver competition convinced him<sub>i</sub> PRO<sub>i</sub> to become a professional diver.

Nevertheless, verbs such as *ask* and *tell* in fact entail that the subject, rather than the object, has a relevant *de te* attitude, as can be seen from the acceptability of (iv).

(iv) John told/asked Mary<sub>i</sub> PRO<sub>i</sub> to leave, but Mary couldn’t hear.

The fact that (iv) can be true regardless of Mary’s attitude shows John has the relevant *de te* attitude toward Mary.

In the remainder of this paper, I ignore psychological causatives such as *persuade* or *convince* in the main text for the sake of simplicity.

tively. Furthermore, let us simply assume at this point that *promise* is lexically specified as a subject control verb. Given this lexical specification, the promising relation chooses the *de me* option, rather than the *de te* option. Thus, the obligatoriness of a *de me* reading in (24) is correctly captured by the principle in (26). (I spell out how the lexical semantics of each predicate correlates with the *de me/de te* interpretation in Section 4.)

### 3.1.4 A formalization

Although the principles of *de se* interpretation in (21) and (26) presented in the previous section are empirically adequate, several problems remain unsolved. One such problem is that they are just descriptive generalizations about the semantic environments in which a *de se* interpretation arises, and that they take the notion of ascription towards the first/second person as a primitive.<sup>12</sup> Another problem is about the correlation between a verb's lexical subject/object control specification and the *de me/de te* reading. In the previous section, it is just stipulated that subject control goes with a *de me* reading while object control goes with a *de te* reading without any explanation. The formulation in the previous section again needs explanation regarding this point. In this section, I provide a formal implementation of the semantics of *de se* reports that overcome the first problem. The second problem will be taken up in Section 4.

Regarding the formal analysis of *de se* reports, for two-place predicates, Schlenker (1999, 2003) provides a Kaplanian two-dimensional formulation of *de se* reports based on his theory of (Kaplanian) context shifting. In Schlenker's formulation, infinitives generally denote intensional properties, while each verb is specified to be associated with a *de se* interpretation as in the following denotation.

$$(27) \quad [[\text{expect}^{de\ se}]^{w,c} = \lambda P \in D_{\langle s,et \rangle} \lambda x. \forall c' \in C^{\text{EXP}(\langle x,w \rangle)} [P(w_{c'})(I_{c'})]]$$

$(C^{\text{EXP}(\langle x,w \rangle)}$  is the set of Kaplanian contexts compatible with  $x$ 's expectation in  $w$ ;  $I_c$  and  $w_c$  are the first person and the world of the context  $c$ .)<sup>13</sup>

According to (27), *expect* takes as arguments an intensional property  $P$  and an individual  $x$ , and returns true iff  $P$  is ascribed to the first person of the context (in Kaplan's 1989 sense) of the expectation, i.e. the expecter, in each context compatible with  $x$ 's expectation. Thus, in (27), it is properly formulated that the expecter ascribes the intensional property to the first person of the expectation context, who cannot fail to be the expecter him/herself as believed by the expecter. Note that this condition is (correctly) not satisfied in the situation in (14), since in that situation the amnesiac expecter is not ascribing the relevant property to him/herself.

In this paper, I adopt this analysis of *de se* attitude reports along the lines of Schlenker with a small modification: I analyze infinitives/gerunds to denote a set of contexts instead of a simple property. The modification is made in order to make a conceptual

<sup>12</sup>Chierchia (1989) actually suggests several ways to analyze self-ascription, among which is one in terms of speaker-centered worlds isomorphic to the context sets employed in the proposal of the current paper (Chierchia 1989: 7-9). However, in his conclusion, Chierchia stays neutral as to the actual analysis of self-ascription, focusing more on the *de se*-related empirical consequences of his property theory of control.

<sup>13</sup>A context COMPATIBLE with  $x$ 's expectation is a member of the set of contexts that represent  $x$ 's expectation, which consists of the individual who  $x$  expects him/herself to be, and the world which  $x$  expects him/herself to inhabit.

connection between the set of contexts compatible with an attitude on the one hand, and the property denoted by the complement on the other.

First, I introduce two different semantic types for contexts as in (28):

- (28) a. SINGLE-CENTER CONTEXT:  $\langle I_c, w_c \rangle \in D_c$  b. DOUBLE-CENTER CONTEXT:  $\langle I_c, 2_c, w_c \rangle \in D_c$

Single-center contexts (which are of type  $c$ ) are contexts that involve only the first person, while double-center contexts (type  $c$ ) are those that involve both the first and the second person. In the context-shifting theory that I am proposing, the former appears in denotations of two place attitude verbs, while the latter appears in denotations of three place attitude verbs. Note further that any context is a tuple consisting of an individual (or individuals) and a world, and hence contexts here are sub-sorts of individual(s)-world tuples. Based on this modified type definition, I assume that subjectless infinitives and gerunds denote (characteristic functions of) sets of single-center contexts (of type  $\langle c, t \rangle$ ), and that control verbs take as an argument a set of contexts, as shown in (29) and (30).<sup>14</sup> Note again that any set of single-center contexts (of type  $\langle c, t \rangle$ ) is formally equivalent to an intensional property (of type  $\langle s, et \rangle$ ). Given these components, The truth conditions of the sentence *John expects to leave* are computed as in (31).

(29)  $[[\text{PRO to leave/leaving}]] = \lambda \langle x, w \rangle \in D_c. \mathbf{leave}(w)(x)$

(30)  $[[\text{expect}]]^{w,c} = \lambda P \in D_{\langle c,t \rangle} \lambda x. \forall c' \in C^{\text{EXP}(\langle x,w \rangle)} [P(c')]$

(31)  $[[\text{expect}]]^{w,c} ([[ \text{PRO to leave} ]]) ([[ \text{John} ]]) = 1$   
 iff  $\forall \langle I_{c'}, w_{c'} \rangle \in C^{\text{EXP}(\langle j,w \rangle)} [\mathbf{leave}(w_{c'})(I_{c'})]$   
 iff for all contexts compatible with John's expectation in  $w$ , the first person of the context leaves at the world of the context

Under this formulation, the principle can be viewed as a general requirement for the denotation of verbs that denote relations between individuals and context sets. I formalize this general requirement in the case of two place attitude relations as in the following meaning postulate.<sup>15</sup>

<sup>14</sup>Therefore, Kaplan contexts appear in three places in the current formulation. They (i) appear as the context of utterance itself, (ii) are quantified over by the denotation of attitude verbs, and (iii) appear as a member of the denotation of infinitival/gerundive complements. An intuitive way to capture these three levels at which contexts are at play in the current analysis is to paraphrase attitude reports with direct quotations and regard the contexts at each level (i-iii) above as the (traditional) Kaplan context-of-utterance of (i) the matrix utterance, (ii) the first quoted utterance, and (iii) the embedded quoted utterance. For example, the three levels of contexts that are at play in the meaning of (iv) below are the contexts-of-utterance of the matrix, quoted and doubly-quoted utterances in (v), which is a paraphrase of (iv) using a (doubly-embedded) direct quotation.

(iv) John promised Mary to leave.

(v) John promised to Mary the following: 'I promise you the following: "I will leave"'

<sup>15</sup>The meaning postulate applies in the following way. Control verbs such as *expect* have the lexical entry as in (i). The logical constant of type  $\langle ct, et \rangle$  involved in (i) (i.e. **expect**) will be in turn subject to an instantiation (given in (ii)) of the meaning postulate in (32).

(i)  $[[\text{expect}]] = \lambda P \in D_{\langle c,t \rangle} \lambda x. \mathbf{expect}(P)(x)$

(ii)  $\forall w \forall P \forall x [\wedge \mathbf{expect}(w)(P)(x) \rightarrow \forall c' \in C^{\text{EXP}(\langle x,w \rangle)} [P(c')]]$

Hence, eventually the verb *expect* is assigned the denotation given in (30).

(32) **Principle of *de se* interpretation (two place predicates) (final)**

$$\forall w \forall R \in D_{\langle ct, et \rangle} \forall P \forall x [\wedge R(w)(P)(x) \rightarrow \forall c' \in C^{R^*(\langle x, w \rangle)} [P(c')]]$$

where  $C^{R^*(\langle x, w \rangle)}$  is the set of contexts compatible with  $x$ 's attitude  $R$  at  $w$ .

This meaning postulate roughly says that whenever an individual ( $x$ ) stands in an attitude relation ( $R$  of type  $\langle ct, et \rangle$ ) with a context set ( $P$ ), the context set contains all the contexts compatible with the relevant attitude. It follows from this meaning postulate that the first person of the attitude context is always identified as the subject of the action denoted by the subjectless complement.<sup>16</sup> What (32) states is equivalent to the following: whenever an individual stands in an attitude relation with a content of some centered attitude, the content is interpreted as having the attitude holder him/herself as the center. It is conceptually plausible to assume that this is the interpretation to which any relation holding between individuals and a context set is 'dedicated' i.e. lend itself to no other interpretation.

Let us turn to the case of three place control verbs. In the case of verbs like *promise* or *ask*, I propose the denotations shown in (33) and (34).<sup>17</sup> The truth conditions of the sentence *John asked Mary to leave* are computed as in (35).

$$(33) \quad [[\text{promise}]]^{w,c} = \lambda P \in D_{\langle c, t \rangle} \lambda y \lambda x. \forall c' \in C^{\text{PROM}(\langle x, y, w \rangle)} [P(\langle 1_{c'}, w_{c'} \rangle)]$$

$$(34) \quad [[\text{ask}]]^{w,c} = \lambda P \in D_{\langle c, t \rangle} \lambda y \lambda x. \forall c' \in C^{\text{ASK}(\langle x, y, w \rangle)} [P(\langle 2_{c'}, w_{c'} \rangle)]$$

$$(35) \quad [[\text{ask}]]^{w,c} ([[ \text{PRO to leave} ]]) ([[ \text{Mary} ]]) ([[ \text{John} ]]) = 1$$

iff  $\forall c' \in C^{\text{ASK}(\langle j, m, w \rangle)} [\text{leave}(w_{c'})(2_{c'})]$

iff for all contexts compatible with what John asks Mary to do, the second person of the context leaves at the world of the context.

Importantly, in contrast to the case of two place predicates, the context that is quantified over in the denotations of three place attitude predicates is a *double-center* context, which involves both the first and the second persons, while complements invariably denote sets of *single-center* contexts. Thus, in the denotation of three place control predicates, a double-center context is related to a single-center context. For example, in the denotation of *promise* in (33), a double-center context is related to a single-center context consisting of the first person and the world of the original double-center context. On the other hand, in the denotation of *ask*, a double-center context is related to a single-center context consisting of the second person and the world of the original context. If we represent the ways of 'squeezing' a double-center context into a single-center context using functions, we can conceive of the following three functions:

$$(36) \quad \text{a. } \lambda \langle 1_c, 2_c, w_c \rangle. \langle 1_c, w_c \rangle \quad \text{b. } \lambda \langle 1_c, 2_c, w_c \rangle. \langle 2_c, w_c \rangle \quad \text{c. } \lambda \langle 1_c, 2_c, w_c \rangle. \langle 1_c \oplus 2_c, w_c \rangle$$

<sup>16</sup>A necessary assumption here is that any subjectless complement of the form  $\lceil \text{PRO VP} \rceil$  denotes  $\lambda \langle x, w \rangle \in D_c. [[\text{VP}]](w)(x)$  for any infinitival/gerundive VP, and not  $\lambda \langle x, w \rangle \in D_c. \text{inhabit}(w)(x) \wedge [[\text{VP}]](w)(y)$  for some  $y$ , nor does it involve vacuous  $\lambda$ -abstraction of  $\langle x, w \rangle$ .

<sup>17</sup>The denotation of the psychological causative verb *persuade* looks like (i) below.

$$(i) \quad [[\text{persuade}]]^{w,c} = \lambda P \in D_{\langle c, t \rangle} \lambda y \lambda x. \forall c' \in C^{\text{PERS}(\langle x, y, w \rangle)} [P(\langle 1_{c'}, w_{c'} \rangle)]$$

where  $C^{\text{PERS}(\langle x, y, w \rangle)}$  is the set of contexts that are compatible with what  $y$  is *persuaded* by  $x$  in  $w$ , where  $y$  corresponds to the first person.

Note that the peculiarity of psychological causatives is captured here in the definition of  $C^{\text{PERS}(\langle x, y, w \rangle)}$ , in which the object of the original persuasion corresponds to the first person.

In other words, the first person in the resulting contexts in (36) becomes the target of the property ascription in the relevant *de se* attitude ascription. Specifically, in (36), it is the first person, the second person and the sum of the first and the second persons, respectively, of the original attitude context that correspond to the target of property ascription. This PROPERTY-ASCRPTION TARGET becomes the semantic subject of the complement.

As I will defend in detail in Section 4, I assume that the lexical semantics of OC verbs determines the specific way (among the choices in (36)) in which the verb's denotation relates a double-center context to a single-center context, i.e. to which participant they specify that the relevant property be ascribed. In the case of a subject control verb such as *promise*, we construct a new single-center context by picking up the first person and the world from the original double-center context, as in (36a), and input it as the argument of the infinitive/gerund. In other words, the property is ascribed to the first person of the attitude context. On the other hand, in the case of an object control verb such as *tell* or *ask*, we construct a new single-center context by picking up the second person and the world, as in (36b).

Thus, in this formulation, the principle of *de se* interpretation that the denotation of any intensional three place OC verb is subject to (i.e. (26) in the previous section) can be restated as in (37) below, where  $\mathcal{F}$  resolves the type mismatch between the relevant double-center context associated with  $R$  and the single-center context that  $P$  requires.

- (37) **Principle of *de se* interpretation (three place predicates) (final)**  
 $\forall w \forall R \in D_{\langle ct, \langle e, et \rangle \rangle} \forall P \forall x \forall y [\wedge R(w)(P)(y)(x) \rightarrow \exists \mathcal{F} \forall c' \in C^{R^*(\langle x, y, w \rangle)} [P(\mathcal{F}(c'))]]$   
 where  $\mathcal{F}$  is one of the functions in (36)

It follows from (37) that, in the case of intensional three place control predicate, either the first person of the relevant attitude context, the second person of the context, or the sum of those two becomes the understood subject of the complement. Again, note that this principle is conceptually plausible in that it essentially says that whenever an attitude holder stands in an attitude relation with a second person and a centered attitude content, that content is interpreted as having as the center some individual(s) among the participants of the attitude relation.

Lastly, regarding extensional OC predicates such as *succeed in* and *force*, the principles above do not apply to them since these verbs are assumed to denote relations between extensional properties and individuals (of type  $\langle et, et \rangle$  or  $\langle et, \langle e, et \rangle \rangle$ ), as in (38), whereas the principles above apply only to intensional OC verbs (which, in the current formulation, are of type  $\langle ct, et \rangle$  or  $\langle ct, \langle e, et \rangle \rangle$ ).

- (38)  $[[\text{succeed in}]] = \lambda Q \in D_{et} \lambda x. \text{succceed-in}(Q)(x)$

I assume that infinitives/gerunds are extensionalized by Montague's (1973) down operator ( $\vee$ ) to combine with extensional OC verbs.

Abstracting away from the specific adicity of attitude relations, we can generalize the principles of *de se* interpretation as a polymorphic meaning postulate in (39).

(39) **Principle of *de se* interpretation (general)**

$$\forall w \forall R \forall P \forall x_1 \dots \forall x_n [\wedge R(w)(P)(x_n) \dots (x_1) \rightarrow \exists \mathcal{F} \forall c' \in C^{R^*((x_1, \dots, x_n, w))} [P(\mathcal{F}(c'))]]$$

where  $\mathcal{F}$  is a function from a context to another context such that any component of an output context is a subpart of the sum of all components of the input context;

$R$  is of type  $\langle ct, et \rangle, \langle ct, \langle e, et \rangle \rangle, \langle ct, \langle e, \langle e, et \rangle \rangle \rangle \dots$

This meaning postulate says that whenever  $n$  individuals stand in an ( $n$ -ary) attitude relation with a set of contexts, the set contains all the contexts which are  $\mathcal{F}$ -mapped from the relevant (shifted) attitude contexts. The  $\mathcal{F}$ -mapping is defined in such a way that it can construct an output context only with the resources contained in the input. Furthermore, it is assumed independently of (39) that the specific lexical semantics of an OC verb determines what kind of  $\mathcal{F}$  is chosen in its denotation (cf. Section 4). Thus, it is the interaction of the general principle of *de se* interpretation and the particular lexical semantics of each verb that determines the ultimate denotation of OC verbs.

### 3.2 NFC as an underspecified *de se* report

In this section, based on the semantics for *de se* attitude reports proposed in the previous section, I argue that a *de se* interpretation is invariably obligatory in NFC sentences. I further argue that the ascription target of the property is underspecified in NFC. From these two points, the peculiar control pattern of NFC follows immediately.

#### 3.2.1 Obligatoriness of a *de se* interpretation

First of all, a *de se* interpretation is empirically obligatory in NFC. To see this, suppose, for example, that John was completely drunk at the party last night. He does not remember (or know) that he himself undressed, but has heard from his friend Mary that somebody undressed himself last night. In this situation, sentence (40a) can be true in the reading where *his* is read non-*de-se* (i.e. *his* refers to John regardless of whether John himself identifies this person as himself) while (40b) is false.<sup>18</sup>

(40) Situation: as described above

- a. John<sub>*i*</sub> talked to Mary about his<sub>*i*</sub> undressing himself.
- b. #John<sub>*i*</sub> talked to Mary about PRO<sub>*i*</sub> undressing himself.

This contrast parallels the pattern we observed in (14), showing that the *de me* interpretation is obligatory in the NFC sentence in (40b). A parallel thing can be said about a *de te* interpretation. This is illustrated by the following object control example. In

<sup>18</sup>Some native speakers prefer the reading of (40b) where John talked to Mary about his *future* undressing to the reading where he talked her about his *past* undressing. However, even for these speakers, a contrast parallel to (40) arises in the following sentences in which the complements explicitly refer to the past event, and thus my point here still holds.

- (i) Situation: the same as (40)
  - a. John<sub>*i*</sub> talked to Mary about his<sub>*i*</sub> having undressed himself.
  - b. #John<sub>*i*</sub> talked to Mary about PRO<sub>*i*</sub> having undressed himself.



the given situation, (41a) can be true, but (41b) cannot. This suggests that the object control NFC sentence in (41b) requires a *de te* reading.<sup>19</sup>

- (41) Situation: John was completely drunk at the party last night. He does not remember that Mary undressed herself yesterday, but has heard from his friend that somebody undressed him or herself last night. Now, John has told this story to Mary, without knowing it is Mary who undressed herself.
- a. John talked to Mary<sub>j</sub> about her<sub>j</sub> undressing herself.
  - b. #John talked to Mary<sub>j</sub> about PRO<sub>j</sub> undressing herself.

Furthermore, a parallel pattern obtains in the split control cases. As a way of describing the situation in (42), (42a) can be true, but (42b) cannot. Here, the kind of attitude that is required for the interpretation of (42b) is an attitude toward 'ourselves' (John and Mary in the case of (42)), i.e. the joint group of the first and the second person. I call this type of attitude an ATTITUDE *de nos*.

- (42) Situation: John was completely drunk at the party last night. He does not remember that he and Mary danced with each other last night, but has heard from his friends that some two people were dancing together. Now, John has told this story to Mary, without knowing it is John and Mary themselves who were dancing with each other.
- a. John<sub>i</sub> talked to Mary<sub>j</sub> about their<sub>i+j</sub> dancing with each other.
  - b. #John<sub>i</sub> talked to Mary<sub>j</sub> about PRO<sub>i+j</sub> dancing with each other.

Now, note that the obligatoriness of a *de se* interpretation in NFC discussed above is already predicted by the semantics for *de se* reports proposed in the previous section. This is because, the revised principles of *de se* interpretation in (32) and (37) hold also in the case where the relevant attitude relation is one denoted by a predicate appearing in NFC, a verb of communication or thought, which invariably involves an attitude relation between an individual and a context set (of type  $\langle c, t \rangle$ ) denoted by its complement. For example, the NFC sentence *John talked to Mary about dancing* involves the talking-to relation holding between the individuals John, Mary, and the context set of dancing. Thus, in the proposed semantics, an NFC predicate such as *talk to* is predicted by the principle in (37) to have the following denotation:

$$(43) \quad [[\text{talk to}]]^{w,c} = \lambda P \in D_{\langle c,t \rangle} \lambda y \lambda x. \exists \mathcal{F} \forall c' \in C^{\text{TALK-TO}(\langle x,y,w \rangle)} [P(\mathcal{F}(c'))]$$

That the predicates appearing in NFC are intensional, and that they thus take as an argument a context set rather than an extensional property, can be shown by the failure of substitution *salva veritate* of coextensive referring expressions in their complement:

- (44) John talked to Mary about beating Superman.  $\not\equiv$  John talked to Mary about beating Clark Kent.

<sup>19</sup>NFC object control is not psychological causatives. This can be shown by the acceptability of the following sentence.

(i) John<sub>i</sub> talked to Mary<sub>j</sub> about PRO<sub>j</sub> undressing herself<sub>j</sub>, but Mary<sub>j</sub> couldn't hear.

On the other hand, in the case of sentences with gerundive complements that have explicit subject arguments, such as (40a) repeated below, it is correctly predicted that they do not have to be read *de se*.

(40a) John<sub>i</sub> talked to Mary about his<sub>i</sub> undressing himself.

This is so because gerundive complements with explicit subjects denote (untensed) propositions under normal circumstances, and thus the meaning postulates are not applicable. Furthermore, I assume that the grammar is equipped with a general mechanism of abstracting over a variable corresponding to a pronoun (à la Jacobson 1999). Thus, when *his* in (40a) is abstracted over, the complement ends up denoting a property rather than a proposition, and thus the *de se* reading is predicted to arise by the principle. Therefore, the optional *de se* reading of (40a) is also accounted for.

However, there is one question that is yet to be considered here. The question is this: what is the value of  $\mathcal{F}$  in the denotation of NFC predicates such as (43)? In other words, to whom do verbs of communication/thought such as *talk to* specify that the intensional property be ascribed? I consider this question in the next section.

### 3.2.2 Underspecification of the property-ascription target

The answer to the question posed in the previous section lies in the lexical semantic difference between OC and NFC verbs. I argue that the verbs of communication or thought appearing in NFC are *underspecified* regarding whom the property is to be ascribed to. That is, in the case of NFC, a double-center context can be related to a single-center context in any way, and hence either the first person or the second person, as well as their sum, can be the target of property ascription. As such, I will argue, predicates such as *talk to* can be either interpreted *de me* like the subject control verb *promise*, or as *de te* like the object control verb *ask*, or both simultaneously, depending on the pragmatic context. In the semantics that I proposed in the preceding section, this means that the value of  $\mathcal{F}$  can be identified as any of the three possible functions according to the pragmatic context. Hence, I propose the following denotation for the predicate *talk to*:

$$(45) \quad [[\text{talk to}]]^{c,w} = \lambda P \lambda y \lambda x. \exists \mathcal{F} \forall c' \in C^{\text{TALK-TO}(\langle x,y,w \rangle)} [P(\mathcal{F}(c'))]$$

where  $\mathcal{F}$  is one of the functions in the following set:

$$\{\lambda \langle 1_c, 2_c, w_c \rangle. \langle 1_c, w_c \rangle, \lambda \langle 1_c, 2_c, w_c \rangle. \langle 2_c, w_c \rangle, \lambda \langle 1_c, 2_c, w_c \rangle. \langle 1_c \oplus 2_c, w_c \rangle\}$$

My claim here that NFC predicates are invariably underspecified as to their property-ascription target can be supported conceptually in the following way (a formal implementation of as well as empirical support for this claim will be given in Section 4): in the case of OC predicates such as *promise* or *ask* (NP to V), it is inherent in the lexical semantics of the predicate that a particular participant of the described event must be the semantic agent of the complement. I assume, following Jackendoff (1972), Farkas (1988) and Sag and Pollard (1991), that these argument-oriented entailments associated with the lexical semantics of OC predicates determine the controller specification, i.e. the value of  $\mathcal{F}$  in our formulation. However, in a communication or thought event described by verbs like *talk to* or *think*, there is no inherent connection between a participant of the described communication/thought and the understood subject of the

*content* of that communication/thought, as was already discussed in Section 2.2. That is, we can potentially talk/think about anyone else’s action or experience. This fact—the lack of an inherent connection between a communication/thought participant and the agent of the communication/thought content—is, I claim, the reason why the kind of predicate appearing in NFC is underspecified as to the property-ascription target, the specific value of the function  $\mathcal{F}$  in the case of three place predicates.

This point, together with the obligatoriness of a *de se* reading, accounts for the possibility of any semantic argument of an NFC verb being the controller: since an NFC verb is underspecified as to the property-ascription target, any participant of the relevant communication context, as well as their sum, can be the target of property ascription, i.e. the controller. On the other hand, the obligatoriness of a *de se* interpretation in NFC accounts for the impossibility of NPs other than the local arguments being a controller. This is because, if any NP other than the local arguments were taken as the controller, no participant of the communication would be ascribed the property denoted by the complement, hence violating the requirement for a *de se* interpretation. Thus, the peculiar control pattern of NFC (except for generic control) comes out as a natural consequence of the obligatoriness of a *de se* reading, together with the underspecification of the property-ascription target coming from the lexical semantics of the verbs of communication/thought.

### 3.3 Generic control

In the analysis proposed in the preceding sections, the possibility of generic control in NFC was left unaccounted for. Regarding generic control, I propose a separate analysis in this section: the generic control interpretation of an NFC sentence as in (46) is a case where the gerundive complement is interpreted as a type *e* INDIVIDUAL CORRELATE of the relevant property (along the lines of Chierchia 1984).

- (46) a. John talked to Mary about  $\text{PRO}_{gen}$  undressing oneself.  
 b. John thought about  $\text{PRO}_{gen}$  undressing oneself.

That is, I argue that predicates like *talk to* or *think* also have the lexical entries in (47), which take a type *e* argument corresponding to the content of the relevant communication, and that a generic control interpretation arises when this content argument is filled by an individual correlate of the property denoted by the gerundive complement.

- (47) a.  $[[\text{talk to}_{indiv}]] = \lambda x \in D_e \lambda y \lambda z. z \text{ talks to } y \text{ about } x$   
 b.  $[[\text{think}_{indiv}]] = \lambda x \in D_e \lambda y. y \text{ thinks about } x$

In this analysis, the gerundive complement *undressing oneself* in (46) denotes an abstract (type *e*) individual, namely of the self-undressing activity, which is obtained by applying Chierchia’s (1984) nominalization (‘down’) operator to the property (of type  $\langle s, et \rangle$ ), which is equivalent to the context set of type  $\langle c, t \rangle$  originally denoted by the complement. Since such a property understood *qua* individual is a ‘pure’ individual abstracting away from any specific person’s having the corresponding property, the relevant NFC sentence is interpreted as involving communicating/thinking about ‘having the relevant property in general’. In other words, a generic interpretation arises when

an individual correlate of a property fills the content argument because it is impossible to ascribe the individual correlate to any specific person.<sup>20</sup>

It should be emphasized here that the need for the lexical entries in (47) is supported by the existence of cases where the content argument is filled by an ordinary NP, such as *Bill* or *the desk* in the following examples.

- (48) a. John talked to Mary about {Bill/the desk}.  
 b. John thought about {Bill/the desk}.

Summarizing Section 3, I have analyzed NFC based on a semantics for *de se* attitude reports proposed in Section 3.1. NFC is analyzed as involving *de se* attitude reports underspecified as to the target of property ascription, and it is shown that the NFC control pattern, with the exception of generic control, comes out automatically from this analysis. However, in the analysis presented in this section, I have only characterized the underspecified nature of the NFC predicates on conceptual grounds. Providing independent empirical support and a formal implementation of this characterization will be my task in the next section.

## 4 Lexical semantics of OC/NFC predicates

In this section, examining the lexical semantics of OC and NFC verbs, I provide a formal as well as an empirical foundation for the lexical semantic difference between OC and NFC verbs that I have argued for in the previous section.

### 4.1 OC: The existence of a RESP relation

The purpose of this section is to show how the lexical semantics of three place OC verbs determines the target of property ascription, which is to become the semantic subject of the complement, drawing on an observation and proposal by Farkas (1988).

Farkas (1988) analyzes the lexical semantics of OC verbs as necessarily involving an assignment to the controller argument of ‘responsibility’ of bringing about the situation associated with the complement, using a version of situation semantics. According to Farkas, what it means to have responsibility of bringing about a situation is to be an INTENTIONAL INITIATOR (‘initiator’ for short) of the situation.

Incorporating Farkas’s analysis, I argue that the lexical semantics of OC verbs such as *promise* and *ask* involves a RESP relation as in (49) and (50), where I redefine Farkas’s original RESP relation as in (51).

$$(49) \quad \forall w \forall P \forall x \forall y [\wedge \text{promise}(w)(P)(y)(x) \rightarrow \text{RESP}(x, P)]$$

$$(50) \quad \forall w \forall P \forall x \forall y [\wedge \text{ask}(w)(P)(y)(x) \rightarrow \text{RESP}(y, P)]$$

<sup>20</sup>One might argue that the specific controller can be fixed *before* the down operator applies, and thus the generic interpretation does not necessarily arise as a consequence of nominalizing the property. However, in the view on controller selection put forth here, control only surfaces as an epiphenomenon of the semantic composition of the verb and the intensional complement, and does not involve assigning an individual as the index of PRO. Thus, there is no possibility of determining a specific controller before the semantic relationship between the verb and the complement is settled.

$$(51) \text{ RESP}_{R^*(c)}(x, P) \stackrel{\text{def}}{=} \forall \langle x', w' \rangle \in f^{R^*(c)}_{\langle x, w \rangle} [\exists e [P_E(e)(w') \wedge \mathbf{Initiate}(x', e, w')]]$$

where

- $P_E$  is the event predicate corresponding to  $P$  such that  $\forall e \forall w [P_E(e)(w) \rightarrow [\exists x [P(\langle x, w \rangle)] \leftrightarrow e \text{ occurs at } w]]$
- $f^{R^*(c)}_{\langle x, w \rangle}$  is the set of individual-world pairs such that if  $\langle x, w \rangle$  is the pair of  $n$ th and  $m$ th participant/world of the context  $c$ , then  $\langle x', w' \rangle \in f^{R^*(c)}_{\langle x, w \rangle}$  is the pair of  $n$ th and  $m$ th participant/world of each member of  $C^{R^*(c)}$  (i.e. the set of contexts compatible with  $R$  w.r.t.  $c$ )

The definition of the RESP relation in (51) states roughly that a participant of the original attitude context is RESPonsible for  $P$  if and only if the corresponding participant in each of the shifted contexts compatible with the original attitude is the initiator of some event described by  $P_E$  (at the world of that shifted context). Thus, for example, if the person RESPonsible for  $P$  is the first person of the original attitude context, as entailed by the lexical semantics of *promise* in (49), the first person in each context compatible with the original attitude context becomes the initiator of some event described by  $P_E$  (at the world of the shifted context).

Farkas's empirical motivation for involving the RESP relation in the lexical semantics of OC verbs comes from the fact that complements of OC verbs must always be intentional (note the letter 't'). As observed by Lasnik and Fiengo (1974) and many others including Farkas as well as Jackendoff and Culicover (2003), OC verbs are incompatible with complements that describe nonintentional situations, such as being tall or getting hungry, which one cannot intentionally carry out, as the unacceptability of (52) shows.<sup>21</sup>

$$(52) \text{ ?? John \{promised/asked\} Mary PRO to \{be tall/resemble Sue/get hungry\}.}$$

Following Farkas, I argue that this behavior of OC verbs can be accounted for as a consequence of the RESP relation involved in their lexical semantics. Since the RESP relation in these verbs requires a particular participant to be the intentional initiator of the event associated with the complement, the complement must be intentional. Here, intentionality of a predicate can be independently tested with respect to phenomena such as the acceptability patterns of imperatives and the distribution of adverbs such as *intentionally*: only intentional predicates are compatible with imperatives and the adverb *intentionally*. In (53) and (54) below, we see that predicates such as *be tall*, *resemble* or *get hungry* are incompatible with imperatives or the adverb *intentionally*.

$$(53) \text{ Run! / Kill him! / ??Be tall! / ??Resemble Sue! / ??Get hungry!}$$

$$(54) \text{ John intentionally \{ran/killed him/??resembled Sue/??got hungry\}.}$$

<sup>21</sup>A *prima facie* exception to this generalization is the controller shift examples such as the following.

- (i) a. John<sub>i</sub> was promised by Mary<sub>j</sub> PRO<sub>i</sub> to be allowed to perjure himself<sub>i</sub>.
- b. The pupils<sub>i</sub> asked/persuaded the teacher<sub>j</sub> PRO<sub>i</sub> to leave early.

However, in Uegaki (2010), I argue that the complements in (i) too are intentional since they can be intentionally carried out by the 'permission giver'. The only difference between the ordinary cases and these cases is that the initiator role does not correspond to the syntactic subject position of the complement.

Thus, OC verbs are incompatible with nonintentional complements, and this suggests that OC verbs lexically entail the controller's responsibility of bringing about the event described by the complement. My proposal is that this RESP relation determines whether the first person or the second person of the relevant attitude context becomes the understood subject of the complement (i.e. which function is chosen as  $\mathcal{F}$  in (37)) in the denotation of three place OC verbs.

An important assumption behind my proposal is that an intentional initiator of some event in  $P_E$  must be the first person of some context contained in the context set  $P$ , as stated below.

(55) **Initiator–first person principle**

$$\forall \langle x, w \rangle [\exists e [P_E(e)(w) \wedge \mathbf{Initiate}(x, e, w)] \rightarrow P(\langle x, w \rangle)]$$

Intuitively, this means that if an individual intentionally initiates a certain event, he/she must be the ‘center’ of the context set describing that event. For example, in the sentence *John asked Mary to leave*, Mary (as the person whom John identifies as the second person in the relevant asking) is the initiator of the relevant leaving event, and thus Mary must be understood as the center of the context set of leaving, which corresponds to the attitude content of what John asked to Mary.

Given (55) and the RESP relation involved in the lexical semantics of each OC verb, we can predict whether the first person or the second person becomes the understood subject of the complement with three place OC verbs. Let me illustrate this taking *ask* as an example.<sup>22</sup> First, from the definition of RESP in (51) and (55), we can derive the following general requirement, which roughly says that if a participant is responsible for  $P$ , he or she must correspond to the first person of the contexts contained in  $P$ .

$$(56) \quad \forall R \forall P \forall x \forall c [\text{RESP}_{R^*(c)}(x, P) \rightarrow \forall \langle x', w' \rangle \in f^{R^*(c)}_{\langle x, w \rangle} [P(\langle x', w' \rangle)]] \quad (\text{By (51) \& (55)})$$

Now, the lexical semantics of the control verb *ask* (50) entails that the object is responsible for the bringing about of  $P$ . Then, by (50), together with (56), we can conclude (57), which says that the second person ( $y'$ ) in each context compatible with the original asking context is the first person of  $P$  at  $w'$ .

$$(57) \quad \forall w \forall P \forall x \forall y [\wedge \mathbf{ask}(w)(P)(y)(x) \rightarrow \forall \langle y', w' \rangle \in f^{\text{ASK}(\langle x, y, w \rangle)}_{\langle y, w \rangle} [P(\langle y', w' \rangle)]]$$

Given the definition of  $f$  and  $C^{\text{ASK}}$ , the consequent of the conditional statement in (57) is equivalent to the denotation of *ask* I gave in the previous section ((34) repeated below) as shown in (58).

$$(58) \quad \forall w \forall P \forall x \forall y [\forall \langle y', w' \rangle \in f^{\text{ASK}(\langle x, y, w \rangle)}_{\langle y, w \rangle} [P(\langle y', w' \rangle)] \leftrightarrow \forall c' \in C^{\text{ASK}(\langle x, y, w \rangle)} [P(\langle 2_{c'}, w_{c'} \rangle)]]$$

$$(34) \quad [[\mathbf{ask}]]^{w, c} = \lambda P \in D_{\langle c, t \rangle} \lambda y \lambda x. \forall c' \in C^{\text{ASK}(\langle x, y, w \rangle)} [P(\langle 2_{c'}, w_{c'} \rangle)]$$

As such, it follows from the RESP relation involved in the lexical semantics of *ask* that the second person in each of the attitude contexts compatible with the original asking becomes the ascription target of the relevant property, i.e. the understood subject of the complement. In general, the RESP-related lexical semantics of an OC verb

<sup>22</sup>The denotation of the psychological causative verb *persuade* in footnote 17 of Section 3 can be derived in the same manner, given the following lexical semantics of *persuade*.

(i)  $\forall w \forall P \forall x \forall y [\wedge \mathbf{persuade}(w)(P)(y)(x) \rightarrow \text{RESP}_{\text{PERS}(\langle x, y, w \rangle)}(y, P)]$

determines the way in which its denotation relates a double-center context to a single-center context (i.e. the choice of the function  $\mathcal{F}$ ): from the double-center context, the individual corresponding to the 'responsible participant' is chosen as the first person of the single-center context. Thus, the 'inherent lexical semantic connection between a participant and the semantic subject of the complement' that I argued to exist in OC verbs in the previous section is here implemented with the RESP relation involved in each OC verb.

## 4.2 NFC: The lack of a RESP relation

Next, let us turn to the case of NFC predicates. In the case of NFC predicates, non-intentional complements like *being tall* or *resembling Sue* are perfectly acceptable, as shown in the following examples (cf. Jackendoff and Culicover 2003:527 for the same observation).

- (59) a. John talked to Mary about PRO {being tall/resembling Sue/getting hungry}.  
 b. John thought about PRO {being tall/resembling Sue/getting hungry}.

This suggests that the responsibility meaning in the sense of Farkas (1988) is lacking in the lexical semantics of NFC predicates like *talk to* or *think about*. If a RESP relation were involved in the lexical semantics of NFC verbs, nonintentional complements as in (59) would have been impossible.

Accordingly, in the lexical semantics of NFC verbs, since no one is responsible for the event described by the complement, no specific individual is required (by the assumption in (56)) to be the first person, i.e. the understood subject of the complement. Thus, the underspecified nature of NFC predicates, which I have argued for in the previous section, is implemented as a lack of the RESP relation in their lexical semantics, which can be empirically tested by the compatibility with nonintentional complements.

It follows from the above that the denotations of NFC verbs such as *talk to* are restricted only by the general meaning postulate of *de se* interpretation in (37), which states that the relevant attitude context must be 'used' as an argument of (the characteristic function of) the context set denoted by the complement (without specifying *how*). Thus, although the RESP-related lexical semantics of OC verbs determines how the relevant attitude context is to be used (e.g., the lexical semantics of *promise* entails that it chooses  $\lambda\langle I_c, 2_c, w_c \rangle. \langle I_c, w_c \rangle$  as a value of  $\mathcal{F}$ ), the lexical semantics of NFC verbs does not specify how the relevant attitude context is to be used. Therefore, any of the three possible functions can be chosen as  $\mathcal{F}$  in the denotation of an NFC verb.

## 5 Conclusions and remaining issues

This paper has proposed an analysis of English nearly free control (NFC) (Jackendoff and Culicover 2003) as an underspecified *de se* report. The proposed analysis of NFC enables a new view on control where control constructions are classified into four types depending on two parameters: (i) whether the relevant control verb has an

argument-oriented lexical entailment, and (ii) whether a *de se* interpretation of the described attitude relation is obligatory. The proposed typology of control constructions is represented in the following table.

control pattern	argument-oriented entailment	<i>de se</i> obligatory	example predicates
OC (int.)	specified	YES	<i>try, promise, ask</i> (NP to) V
OC (ext.)	specified	NO	<i>make, force, succeed in</i>
NFC	unspecified	YES	<i>talk to, speak to, think</i>
NOC	unspecified	NO	<i>intrigue, be, entail</i>

Within the two parameters, an argument-oriented lexical semantic entailment of a control verb derives the controller selection in OC. In Section 4, the argument-oriented entailment of intensional OC verbs is analyzed as deriving from the RESP relation (Farkas 1988) that connects the semantic initiator of the event described by the complement with a particular participant of the attitude relation denoted by the verb. Although the idea of relating controller selection to lexical semantics is far from new (cf. Jackendoff 1972), the originality of the current proposal consists in distinguishing it from the requirement for a *de se* interpretation that intensional control verbs in general are subject to.

The general principle of *de se* interpretation requires that a *de se* interpretation is obligatory in the interpretation of any relation holding between individuals and intensional properties, the latter of which is recast as a set of contexts in the current formulation. The relevant principle can be stated as in (39) in Section 3.1.4. Because of this principle, the controller of any intensional control verb must be a participant of the attitude context associated with the verb. It is the interaction of this principle and the particular argument-oriented entailment associated with the control verb that determines the actual interpretation of intensional control verbs.

Independent of intensional OC and NFC, extensional OC is analyzed as a case where only the lexical semantic entailment of the control verb determines the control relation, further investigation of whose nature must await future study. NOC is analyzed as a case where neither of the two parameters apply, and thus no grammatical restriction on the controller selection is at work. That a *de se* reading is nonobligatory in NOC might need an explanation. This point is accounted for by the fact that NOC does not involve an attitude relation holding between individuals and an intensional property. That is, I argue that the principle of *de se* interpretation is not applicable in the case of NOC because of the semantic type of the relation denoted by the control verb. For example, in NOC as in (3), the denotation of the infinitive does not stand in an attitude relation with any NP.

Thus, the current view enables an adequate analysis not only of NFC, but also of other kinds of control constructions. Furthermore, in Uegaki (2010), it is shown that the current approach to control can be extended to the controller-shift examples such as *John asked Mary to be allowed to leave*, by assuming the complements of these examples to be a set of double-center contexts, rather than of single-center contexts (cf. (28)).

Nevertheless, the current analysis by no means provides an answer to the whole



range of issues concerning control. The remaining issues include the problem of feature-agreement of anaphoric pronouns in the controlled complement, the distinction between partial and non-partial control (Landau 2000), and a cross-linguistic investigation of the validity of the proposed classification of control sentences. These issues have to be left to future investigation.

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