Deriving the de re blocking effect

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This paper presents and attempts to account for novel empirical data from English in which the de re blocking effect–that an obligatory de se anaphor cannot be c-commanded by its de re counterpart–is attested. Although Anand (2006) is able to derive blocking within the same clause, it is shown, on the basis of experimental evidence, that there are cases in which blocking takes place across clause boundaries, both with the predicate *dream* and with PRO. Moreover, blocking takes place with PRO not due to locality, as has been claimed, but rather due to the novel observation that de re pronouns cannot self-ascribe a property. To account for blocking in all of these cases, I propose to redefine the de re blocking effect in terms of θ-roles, based on evidence from the blocking being inverted in passives. The account presented here also provides novel evidence for the existence of PRO and control complements being properties.

Keywords: de re, de se, de re blocking effect, dream, PRO, control, θ-roles

1 Introduction

I will begin with a reminder of what it means for an attitude to be de se. Take a context in which Caitlin looks into a mirror to dress up for an event and she thinks to herself "wow, I look beautiful." Paired with such a context, it is felicitous to use (1) below; after all, this is the usual way in which a sentence like (1) would be read. As such, the pronoun *she* in (1) is a de se pronoun; such pronouns are interpreted from the first-personal perspective of the attitude holder, which is *Caitlin* in (1). In other words, *Caitlin* self-attributes the property of being beautiful to herself.

(1) Caitlin believes that she looks beautiful.

A sentence like (1) seems prima facie to be acceptable, however, even if Caitlin is not self-attributing the property of being beautiful to herself. Take a context in which a photo of Caitlin had been taken before the date; decades have passed since the photo was taken, and Caitlin has gone senile. She sees the photo of herself and thinks "wow, the girl in that photo is beautiful!" rather than "I look beautiful." These two beliefs are different, even though the two pronouns end up referring to the same person. Under such a context, *she* in (1) would be a de re pronoun, as it would not be a de se one; it is not interpreted from the first-personal perspective of *Caitlin*.

With the de se vs. de re distinction in mind, we now have the theoretical tools needed for a full understanding of the intricacies that arise from the predicate *dream*. This predicate is interesting as it shows that we can have the first-personal perspective of someone else; in other words, we can experience the world from another's shoes. Imagine that you have a dream in which you are

Biden during the 2020 election, and Biden beats Trump in the dream. Under such a context, it is felicitous to use (2), even though you are clearly not Biden in the real world.

(2) I dreamed that I was Biden and I defeated Trump.

This shows that it is possible for you to have the perspective of Biden in dream-worlds. Biden, then, is your *dream-self*, a notion we will be coming back to throughout this paper. But as Lakoff (1972) has pointed out, even if your dream-self as Biden, it is possible for your bodily counterpart to appear in the dream, but in the third-person. Let us call this your *real-self*. Imagine that your real-self is running for President, and Biden, your dream-self, is running for Vice President; your real-self beats Trump in the dream. (2) can be felicitously paired with such a context.

The dream- and real-selves can therefore be different, leading to interesting semantic consequences. A dream-self need only be a mental counterpart to you, while your real-self need only be a bodily counterpart. Of course, in most dreams, mental and bodily counterparts overlap. We have seen that the first-person pronoun can refer to either the mental or the bodily counterpart. Furthermore, given that in the dream, the mental counterpart is just the one which you have the first-personal perspective of, this is also your de se counterpart. The bodily counterpart is your de re counterpart. In other words, the first-person pronoun which refers to the dream-self is a de se pronoun, while one which refers to the real-self is a de re pronoun.

As Percus and Sauerland (2003b) points out, there is an asymmetry that arises when we have two pronouns, one referring to the dream-self and the other to the real-self, in the same sentence, like in (3) in which one pronoun c-commands the other. We find that (3) is best paired with a context in which the dream-self (de se) is the one kissing the real-self (de re), rather than the other way around. Such contrasts have been verified experimentally by Pearson and Dery (2013).

(3) **Case 1:** I dreamed that I was Biden and I kissed me.
Possible reading: In the dream, Biden kissed me. (de se kissed de re)
Less plausible reading: In the dream, I kissed Biden. (de re kissed de se)

Let us call such instances "Case 1" (C1) for short. Works such as Percus and Sauerland (2003b) and Anand (2006) have attempted to come up with accounts for this–ranging from movement and agreement to an independently defined binding constraint–but I will argue that neither can account for the novel pieces of data presented in this paper, as they both account for the distribution of such pronouns only in the same clause. For example, this asymmetry seems to arise even if the two pronouns are not in the same clause, as long as they are semantically connected:[1]

(4) **Case 2:** I dreamed that I was Biden and I said that I was fired.
Possible reading: In the dream, Biden says that I was fired. (de se vs. de re)
Less plausible reading: In the dream, I said that Biden was fired. (de re vs. de se)

We will refer to such instances as "Case 2" (C2). We will get further into the details of each account in the next section, but the generalization, following Anand (2006), seems to be more general than just *dream*, as such contrasts arise in other languages as well. So Anand defines the *de re blocking effect* as follows: an obligatorily de se anaphor cannot be c-commanded by its de re

[1]One might object to the asymmetry in (4), and claim that it arises because of the verb *fire*: as we associate Biden with a position of power and the ability to fire people. I will discuss this point further in section 3, but experimental data indicates that this same asymmetry arises even with predicates like *kiss*, where it is equally natural to think of Biden kissing the real-life self.

counterpart. This definition predicts such asymmetries might arise outside of the same clause, but Anand's method appeals to locality, deriving this contrast in the same clause.

Interestingly, this definition predicts another novel observation made in this paper, that has nothing to do with *dream*: a de re pronoun cannot c-command PRO. This seems to be strongly attested in English, as illustrated with the context-sentence pair in (5). As Chierchia (1990) points out, PRO cannot be read de re and must be read de se. What makes this sentence interesting is that, although PRO is interpreted de se in this sentence, it is from the first-personal perspective of a de re pronoun. Yet this is judged as unacceptable in English:

(5) **Case 3:** Miranda was a professor of mathematics who lost all her memories, and had to start her life anew. She does not remember any of her past research. But she kept her interest in math, and found a paper written by a mathematician named Miranda–who she does not realize is herself. Miranda is impressed by her own attempts to prove Goldbach's conjecture, even though she does not realize it is herself.

Miranda believes that she decided to prove Goldbach's conjecture.

Let us refer to such instances of the blocking effect as "Case 3" (C3). This is similar to the asymmetry in (4), but with one crucial difference: in (4) the de se pronoun is de se with respect to the matrix subject, and the de re pronoun is de re with respect to the matrix subject. But in (5), although the de re pronoun is again de re with respect to the matrix subject, PRO is de se with respect to the de re pronoun, and *not* the matrix subject. So, locality is not a problem.

It is difficult to see how the de re blocking effect in each case–C1, C2 and C3–could be derived by reference to the same methods. But because they all have the relation of a de re pronoun c-commanding some (obligatorily) de se counterpart in common, it is likely they are all ruled out for the same reason. This leads to the central challenge that I will attempt to solve in this paper: how do we unify these three different instantiations of the de re blocking effect?

This is precisely the topic of this paper, which is structured as follows. In Section 2, I introduce the reader to the concepts needed to fully understand the paper. Section 3 provides experimental evidence that the de re blocking effect actually does take place in C1, C2 and C3, based on two experiments: one with 100 participants for C1 and C2, and another with 50 for C3.

Section 4 attempts to unify the blocking effect in C1, C2 and C3, by reference to θ-roles. The idea is that a de re pronoun cannot have a non-Theme θ-link to a coindexed (obligatorily) de se counterpart. And I argue, based on experimental evidence, this is because of a semantic preference to associate de se pronouns with θ-roles higher in the thematic hierarchy. I also present five further predictions of this analysis which seem to be borne out, and some theoretical consequences of this analysis and data. For example, the de re blocking effect with PRO is novel evidence for the existence of PRO. Section 5 concludes.

2 Background

The goal for this section is to give the necessary background to understand the data and analysis in sections 3 and 4 respectively. I first introduce the reader to the primary semantics for de se pronouns that will be used in this paper in 2.1. I provide a brief introduction to concept generators in 2.2, and discuss an alternate treatment of de se in terms of concept generators in 2.3. I

then go into detail on two of the papers mentioned in the introduction prior: Percus and Sauerland (2003b) in 2.4, and Anand (2006) in 2.5.

2.1 The semantics of de se

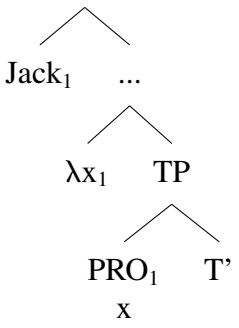
I noted in the section prior that the pronoun *she* in (1) may either be a de se or a de re pronoun. However, this is not the case for PRO, as Chierchia (1990) notes in his account of de se, following Lewis (1979). It cannot be read de re, indicating that PRO is an obligatorily de se anaphor:

(6) Jack is a high school student who has lost all of his memories. He watches a video of a high school student solving a very difficult math problem in front of all of his classmates, and the teacher congratulates that student. Jack thinks to himself "that student is very clever!" But that student is actually Jack himself, though Jack doesn't know it.

Jack claimed to be clever.

To account for the necessity of this reading, Chierchia proposed that a sentence such as *Jack claimed to be clever* reports Jack's self-ascription of the property of being clever. This was implemented with a lambda abstractor base-generated into the left-periphery of the embedded clause.

(7)



Abstraction operators bind coindexed variables at LF just in case they are of the same type. The matrix subject itself does not bind PRO; PRO is bound by an individual abstractor. An example of the lexical entry for *claim* is given in (8), where (8b) is the embedded clause built-up from the bottom up and (8c) is the matrix clause:

(8) a. $[\![\text{claim}]\!]^{c,g} = \lambda P_{<e,<st>>} \lambda x_e \lambda w_s . \forall <w', y> \in \textbf{claim}_{x,w}$: P(y)(w') where $\textbf{claim}_{x,w}$ = {<w',y>: what x claims in w is true w' and x identifies herself as y in w'}

b. $[\![CP_2]\!]^{c,g} = \lambda x.\ \lambda w.$ x is clever in w

c. $[\![CP_1]\!]^{c,g} = \lambda w.\ \forall <w', y> \in \textbf{claim}_{Jack,w}$: y is clever in w' (Pearson, 2015, p. 82)

This semantics is based on Hintikka (1969)'s semantics for attitude reports where the content of an attitude is not a set of worlds. Chierchia and Pearson's semantics makes it possible for one to bear an attitude de se towards a property just in case that property is self-ascribed. This is because the attitude predicate quantifies over *centered* worlds rather than worlds. For *claim*, these are the sets of *claim*-alternatives <w',y> such that it is compatible with the attitude holder saying she is y in w'. For a predicate like *believe*, we might instead be dealing with doxastic alternatives, which is defined in terms of centered worlds, as in below:

(9) $\mathbf{Dox}_{x,w}$ = {<w', y>: according to x in w's beliefs, they could be y in w'}

The definition given in (8) entails that the attitude holder would be willing to refer to the person in the *claim*-alternative worlds as him or herself, and this is not possible in a de re scenario.

2.2 Concept generators for de re LFs

There is a great deal of literature on the semantics of de re attitudes. For our purposes it suffices to discuss the notion of a *concept generator*, which allows for the res to remain in situ–the res being the individual the de re attitude is about. As Anand (2006) among others have pointed out, it is problematic to assume that the res moves covertly. I will then assume, following Percus and Sauerland (2003a), that de re attitude ascription involves concept generators.

A concept generator is a function which takes a res as an argument, and outputs a centered concept, which is a function from a centered world to an entity.[2] It is therefore a function of type <s, <e, e>>. For example, if (1) is paired with the de re context provided, then *Caitlin* may be associated with the following centered concept:

(10) [λw. λx. the girl x saw in the photo in w]

This centered concept outputs the res when the ordered pair of the actual world and the attitude holder is applied to it. The res itself is embedded covertly in a resP, which contains a variable over concept generators that is abstracted over. The de re LF of (1) is given below:

(11) Caitlin believes that [λG [[$_{resP}$ G she] is beautiful]].

I define concept generators as follows, following Charlow and Sharvit (2014):[3]

(12) G is an acquaintance-based concept generator for x in w iff:
  a. G is a function from entities to centered concepts of type <e, <s, <e, e>>>
  b. For all y, G(y) is an acquaintance-based y-concept for x in w

With this definition in mind, we can now give a semantics for *dream*, following Anand (2006). With this treatment of concept generators in mind, an attitude predicate like *believe* or *dream* is a function which takes functions from concept generators to properties as inputs:

(13) $[\![\text{dream}]\!]^{w,g}$ = λP$_{<esee,\ est>}$. λx. λw. ∃G is an acquaintance-based *selfless* concept generator for x in w & ∀<w', y> ∈ $\mathbf{dream}_{x,w}$: P(G(x))(y)(w') = 1

The notion of a *selfless* concept generator will be elaborated upon in section 4.3, but the basic idea in *dream*-complements, a de se pronoun cannot be a special case of de re. A predicate like *believe* does not require a selfless concept generator. This is the approach we will now discuss.

[2]Here I am not following Percus and Sauerland (2003a) in assuming that de re readings are based on concepts of type <s, e>. As such, concept generators are of type <e, <s, e>. I instead follow Charlow and Sharvit (2014), Pearson (2015) among others with my treatment of concept generators with centered concepts here.

[3]The notion of what it means for a concept generator to be acquaintance-based is not too relevant for us. This notion is based on Lewis (1979); an acquaintance-based relation is one which stands in to one's experience. For example, the individual that "the girl x saw the photo of in w" is the unique one Caitlin has the acquaintance relation "saw the photo of" in w. In the de re context, this individual ends up being Caitlin.

2.3 De se as special case of de re

Chierchia's account is one of the two major LFs given for de se binding in the literature. But the other is worth discussing briefly, too. As Lewis (1979), Schlenker (2005) and Anand (2006) among others suggest, de se ascription could just be a kind of de re ascription with a special self-identity acquaintance relation, rendering the approach seen in 2.1 potentially superfluous:

(14) Caitlin$_i$ wants of herself$_i$, under self-identity, [$_{CP}$ she$_i$ is beautiful.]

As such, this account differs from Chierchia's in that Chierchia has a dedicated LF for de se binding, while this account does not. The de se readings are reduced to the same LF as de re. This might be derived as a presupposition on the concept generator, following Percus and Sauerland (2003a)–concept generators are used to obtain a de re reading on the pronoun. Under this treatment, de se readings involve a concept generator as well so it is a special kind of de re. Furthermore, this indicates that complements of attitude predicates are propositions rather than properties, contra the account seen in 2.1, where a property is de se if it is self-ascribed.

Unsurprisingly, some accounts of control that think de se is a special kind of de re, such as Landau (2015), have given up the idea that control complements are properties. I will save further discussion of this for section 5, but I will follow Anand in section 4.3, to use the de re blocking effect to argue that it is possible for both forms of de se binding to be attested in the grammar. Namely, the de re blocking effect diagnoses whether a de se complement is a property or not.

Although this seems to reduce de se to de re and may seem like a desirable consequence, several have noted that this approach makes incorrect predictions, and is not enough on its own. This has led some authors, such as Anand (2006), to argue that the property and the concept generator approach to de se LFs are needed to account for the presence of the de re blocking effect with *dream*. Similarly, Pearson (2018) has argued that de se as de re cannot account for counterfactual reports involving counter-identity, and dedicated de se binding is needed for these instances. In section 4.3, I provide an argument in support of Anand's claim.

2.4 The Oneiric Reference Constraint

As mentioned in the introduction, the use of dream reports allows us to shed further light on the de se and de re distinction. This is because a pronoun referring to the dream-self, despite clearly being a different person from the dreamer, is interpreted de se. This entails that a pronoun referring to the real-self in a dream, if distinct from the dream-self, will be de re. I repeat (3) in (15) below, in which we see that the real-self cannot c-command the dream-self in the same clause.

(15) I dreamed that I was Biden and I kissed me.
Possible reading: In the dream, Biden kissed me. (de se kissed de re)
Less plausible reading: In the dream, I kissed Biden. (de re kissed de se)

Percus and Sauerland (2003b) note that a sentence like (15) can in fact express two more possibilities than the one noted above. We have seen that the dream-self may kiss the real-self. Another alternate reading for (15) is that the dream-self kisses himself, or for the real-self to kiss him or herself. These possibilities for (15) are represented below (the real-self in the first person):

(16) a. In my dream, the dream-self kisses me. (de se + de re)
b. In my dream, the dream-self kisses himself. (de se + de se)

c. In my dream, I kiss myself. (de re + de re)

d. # In my dream, I kiss my dream-self. (de re + de se)

The only combination of the de re vs. de se forms that is ruled out is the one in which the de re form c-commands the de se form. Their Oneiric Reference Constraint is defined as follows:

(17) *Oneiric Reference Constraint* (ORC) (Percus and Sauerland, 2003b, p. 5)
A sentence of the form *X dreamed that . . . pronoun . . .* allows a reading in which the pronoun has the dream-self as its correlate only when the following condition is met: some pronoun whose correlate is the dream-self on the reading in question must not be asymmetrically c-commanded by any pronoun whose correlate is X.

Of course, this alone isn't enough to account for the distribution given in (16); we would prefer to explain why the ORC is present. To do so, they make two crucial assumptions. Following Chierchia (1990), they assume that *dream* has a denotation which selects for properties rather than propositions. Their definition is given below:

(18) $[\![\text{dream}]\!]^g = \lambda P.\ \lambda x.\ \lambda w.\ \forall \langle y,w' \rangle \text{ in } \mathbf{dream}_{x,\,w'}\ P(y)(w') = 1.$

They further assume that de se pronouns bear a special diacritic, represented by *. This moves the pronoun to the left-periphery of the embedded clause complement of the attitude verb. A lambda abstractor is that binds the trace is inserted by movement, deriving Chierchia (1990)'s semantics of the de se pronoun. The crucial difference is that under this account, the de se semantics is generated via movement, but base-generated on Chierchia's account.

The blocking effect seen in (16d) is analyzed as an instance of Superiority. The lower de se pronoun, c-commanded by the de re pronoun, cannot move, because the de re pronoun is a closer potential Goal for the probe P:

(19) * I λf dreamed [$_{CP}$ me* λx H I_f kissed t_x]

The movement constraint explicitly refers to morphological features, noting that there are restrictions on what morphological features a pronoun can have. This can be seen in the contrast in (20): the form of the bound pronoun must match up with the argument of *only*.

(20) Context: I did my homework, but no one else did his homework.

a. Only I did my homework.

b. * Only I did his (or her) homework.

This is despite the seeming fact that the morphological features of bound pronouns are not interpreted (ex. the person feature of *my*). It seems that bound variable pronouns must share features with the complement of *only*; they extend this reasoning to de se pronouns in *dream*-complements, as well. As such, the ORC is derived by reference to movement and agreement.

2.5 The de re blocking effect

Anand (2006) notes that the ORC bears a striking resemblance to an interaction between logophoric and non-logophoric pronouns in Yoruba, first pointed out by Adesola (2006). Ordinary pronouns, the *o*-forms, cannot c-command the logophoric pronoun *òun* under coreference–

logophoric pronouns are usually obligatory de se logophors.[4] This is despite the fact that ordinary pronouns and logophoric pronouns may both co-occur in the same logophoric environment (subject of an attitudinal embedded clause).

(21) Olu$_i$ so pé o$_{*i/j}$ ri bàbá òun$_i$.
Olu say that 3SG see father LOG
'Olu$_i$ said that he$_{*i/j}$ had seen his$_i$ father.'

As Anand points out, if we trade the logophoric pronoun for the dream-self (de se) and the ordinary pronoun for the real-self (de re), these two puzzles seem to be the same. As such, he defines the *de re blocking effect* below, which is the most crucial notion for this paper:

(22) *De re blocking effect*
No obligatorily de se anaphor can be c-commanded by a de re counterpart.

Based on this, one prediction that we would make is that obligatorily de se logophors in other languages would also undergo the de re blocking effect. This prediction is borne out with *ziji* in Chinese and ordinary pronouns–Huang and Liu (2001), among others points out that it is an obligatory de se anaphor, as seen in (23):

(23) Zhangsan$_i$ renwei Lisi$_j$ gei ta$_i$ ziji$_{*i,\,j}$-de shu.
Zhangsan think Lisi give 3SG self-POSS book
'Zhangsan$_i$ thinks that Lisi$_j$ gave him$_i$ his$_{*i,\,j}$ book.' Anand (2006)

The notion of a "de re counterpart" is supposed to be inclusive enough to include bodily counterparts with *dream* and ordinary pronouns. We will return to this notion in more detail in section 4. Anand offers another method to derive the de re blocking effect. But he first notes that it seems unclear how Percus & Sauerland's derivation of the ORC via movement and agreement could apply to the cases we have just seen in Yoruba and Chinese without major modifications to their syntactic assumptions.[5]

Anand's basic idea is that there is competition between two forms: de se c-commanding de re and de re c-commanding de se. Under Anand's semantics, *dream* selects for a CP headed by the logophoric operator OP_{LOG}, an individual abstractor, which may bind either the subject of the embedded clause or the object, as in below:

(24) I dreamed (I was Biden and) OP_{LOG} I fired me.

Binding of the subject is preferred over the object, because binding of the object would not be local. To derive this contrast, Anand appeals to a modification of Fox (2000)'s Rule H:

(25) *Rule H (mod de se, simplified)*
A variable, x, cannot be bound by antecedent, A, in cases where a more local antecedent, B, could bind x and yield the same semantic interpretation.

[4] As Pearson (2015) points out, it is at least the case in Yoruba, but the logophoric pronoun in Ewe is not an obligatorily de se. Satik (2019) provides independent evidence from Yoruba showing that the logophoric pronoun cannot be paired with a de re context.

[5] Anand (2006) provides further arguments against this account, but it would be outside the scope of our paper to present it here. He also notes that it would be difficult to extend their account to cases in which the blocking effect is obviated by focus sensitive operators. For example, in a sentence like *John dreamt that only he knew that he$_{de\ re}$ had guessed his favorite color, there is no blocking because of the presence of* only.

One may notice that it is unclear whether this method would work past clause boundaries: can OP_{LOG} bind across clauses? I now present novel contexts in which the de re blocking effect takes place across clauses, based on experimental evidence.

3 Data

In this section, I present the two experiments that provide the foundation for this paper. The introduction to this section will go into detail on what the two experiments have in common. In section 3.1, I present the experiment to establish that there is a blocking effect in the case originally reported in the literature, C1, and the novel case involving the blocking effect past clause boundaries, C2. Both involve the predicate *dream*. In 3.2 I present the second experiment to establish the blocking effect with C3, in which a de re pronoun self-ascribes a property with PRO, making it different from the other two cases. In both experiments, the predictions were borne out.

It is often difficult for linguists to ask native speakers of a given language, who themselves are not linguists, judgments on de re contexts for sentences. It is a challenge to come up with an experimental design that is both as simple as possible for anonymous participants of all sorts of backgrounds to understand, and keep the survey short enough so that they do not lose interest and give low-quality answers. It is also important to discard clearly low-quality answers.

As such, both experiments were surveys with context-sentence pairs–a context together with a sentence–and participants were asked to judge the naturalness of a sentence paired with its context, on a Likert scale from 1 (very unnatural) to 6 (very natural). To keep the survey as simple as possible, each survey had no more than 10 questions. Furthermore, each survey began with two practice examples explaining the notion of naturalness, for example:

(26) John and Mary are school kids. John complains that Mary kicked him.

a. Natural: John said that Mary kicked him.

b. Unnatural: John said that Mary kicked himself.

Both surveys were on Qualtrics and participants were recruited from Prolific; a custom prescreening for native English speakers was applied to ensure that no one else could take the survey.

To ensure that each survey had the highest quality answers possible, some answers were discarded; the criteria for both experiments was the same. The first criteria was, if the participant gave every context-sentence pair the same score, their answer was automatically discarded. The second criteria was based on the participant's judgment of a control sentence. If a participant gave a naturalness judgment of 2 or 1 on a control sentence that is clearly acceptable to native speakers, then the entire set of their answers was automatically discarded. Each of the surveys had control questions. For example, experiment 2 had the following control question (among a few others), which is clearly acceptable when paired with its context:

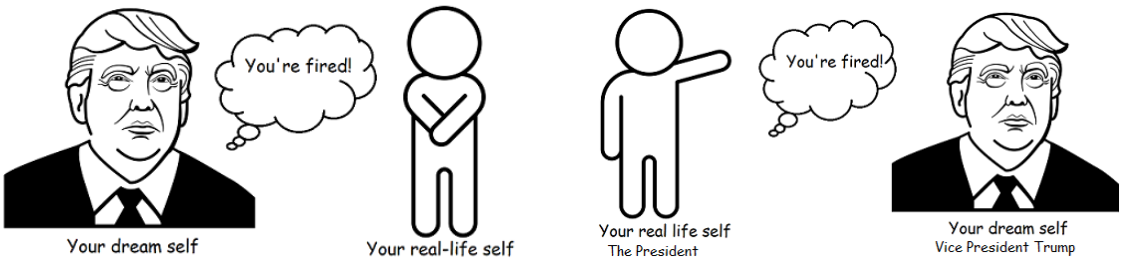
(27) Caitlin is trying to cook. She decides that she wants to make tomato sauce with pasta. She finds a can of tomatoes in the cupboard and tries to open a can.

Caitlin tried to open a can.

Finally, $p<0.0001$ was determined to be significant. P-values were calculated using the Wilcoxon rank sum test, in which two sets of data are paired, because the responses are on a scale and do not follow a normal distribution. As we will see, this is in fact convenient for our purposes.

3.1 Experiment 1: De re blocking effect with *dream* (C1 and C2)

In this experiment, I investigated the distribution of the de re blocking effect with the predicate *dream*: the main goal was to verify that a de re blocking effect was present, both with the original case of C1 and the novel case of C2, involving blocking past a clause boundary. In addition to context-sentence pairs, pictures such as those in Figure 1 following were paired together with all of the contexts apart from two, to make the experiment more understandable for the participant.



(a) De se vs. de re context

(b) De re vs. de se context

Figure 1: The images used for all of the non-control examples (apart from *kiss*).

The image of Donald Trump was used, and the participant was asked to imagine themselves as Donald Trump in the dream, given that he is a very well-known individual. This experiment had a single control context-sentence pair: "I dreamed I was Donald Trump and I ate a Big Mac." This was also paired with an image. Anyone who gave this pair a 2 or 1 was automatically rejected.

Two questions to test C1 were asked: "I dreamed that I was Trump and I fired me" was paired with reading in which the dream-self (de se) c-commanded the real-self (de re), as seen in (a) of Figure 1, and vice versa, as seen in (b) of Figure 1. Two questions to test C2, "I said I was fired" were asked, and paired similarly with the images above.

One potential problem with this experiment is using the verb *fire* together with the character of Trump, as Donald Trump is an individual who is associated with firing people. The asymmetry may arise simply because it is difficult for the participant to imagine Trump being fired, rather than doing the firing. To eliminate this possibility, I included 2 questions for a context-sentence pair with the predicate *kiss* rather than *fire*, expecting the results to not differ significantly.

Finally, two more context-sentence pairs that I have not yet discussed were included, which had "I was fired by me." This was to determine whether the surface structure of the sentence was relevant for the blocking effect, or the deep structure. For example, in "I (dream-self) was fired by me (real-self)," the de se c-commands the de re in the surface structure, but the real-self is the Agent of the firing. My hypothesis was that the deep structure would be relevant, rather than the surface structure. This could indicate that blocking is purely semantic rather than syntactic.

Here is a summary of the expected results:

(28) Total: 9 questions (the term "control" refers to scientific control)

a. Control with *dream*: expected to be natural

b. "I fired me" (2 questions): the de se vs. de re context-sentence pair is expected to have a higher average than the de re vs. de se context-sentence pair

c. "I kissed me" (2 questions): the de se vs. de re context-sentence pair is expected to have a higher average than the de re vs. de se context-sentence pair

d. "I said that I was fired" (2 questions): the de se vs. de re context-sentence pair is expected to have a higher average than the de re vs. de se context-sentence pair

e. "I was fired by me" (2 questions): the de se vs. de re context-sentence pair is expected to have a higher average than the de re vs. de se context-sentence pair

All of these predictions were borne out. This experiment was conducted with 100 participants:

Table 2: A summary of Experiment 2 based on 86 answers. 14 discarded.

Kind of sentence	De se vs. de re average	De re vs. de se average
"I fired me"	3.56/6	2.34/6
"I kissed me"	3.29/6	2.29/6
"I said that I was fired"	3.62/6	2.87/6
"I was fired by me"	3.59/6	2.97/6

For each kind of sentence, the "de se vs. de re average" and "de re vs. de se average" were paired and the p-value of the difference was calculated via the Wilcoxon rank sum test. In each instance, the difference between the two scores was significant at $p<0.0001$, in support of my hypothesis. However, there is one complication. The astute reader may notice that the difference between the two scores in "I was fired by me" was lower than the difference between the other kinds of sentences, even though the difference was significant at $p<0.0001$.

This was in fact because of multiple participants (n=11) who rated the latter less preferable over the former, contrary to my hypothesis. And this was also the intuition of several of the people that I discussed this informally with. It might be reasonable to conclude that there are two "dialects" for blocking: this dialect uses the surface structure of the sentence for the purposes of blocking, rather than the deep structure. But the more common dialect may use the deep structure of the sentence for blocking. I will include a discussion of this, prior to concluding, in section 5.

3.2 Experiment 2: De re blocking effect with PRO (C3)

We now move on to the experiment involving a novel kind of blocking effect. In experiment 1, we dealt with de se and de re pronouns which were relative to the matrix subject. This time, we are dealing with examples which are completely local, so Rule H does not apply. In particular, with de re pronouns that c-command PRO–in other words, self-ascribe a property to themselves.

I have already given an example of the de re blocking effect with PRO, C3, in (5), which itself is going to be included in the experiment. Here is another one:

(29) **Case 3:** Jack is a criminal who lost his memories years ago; he once stole a pound of shrimp from a grocery store and was recorded by a surveillance camera while being chased by the police, and in the end he was caught after trying to flee. He now works as a police officer, and he is looking at past security camera recordings as part of his job. He is watching an old security camera recording of himself stealing shrimp and does not realize it was him trying to run from the police. Jack tells his co-worker "so that was the guy who ran from the police for shrimp."

Jack said that he tried to run from the police.

Along with (5), (29) will be the most important context-sentence pair that will be surveyed in this experiment. In order to calculate p-values, they will be paired together with what I call "basic de re" sentences. For instance, this is like the sentence *Caitlin thinks that she is beautiful* paired with a de re context in which she unknowingly attributes being beautiful to herself.

Although Chierchia (1990), among many other linguists, report basic de re sentences as acceptable, my personal judgment along with the non-linguist speakers that I have consulted is that they are in fact not quite acceptable, but marginal. C3 itself involves de re pronouns, and this will likely lead to its average score being lower, as well. But this isn't a problem for our investigation of C3. What matters is this: is C3 significantly worse than basic de re? If so, then this is likely because of a novel instance of local de re blocking. The answers for the basic de re and C3 will be paired up and its p-value will be calculated with the Wilcoxon test, to determine whether the difference between them is significant at $p<0.0001$.

In addition, the survey will include 6 scientific control sentences. For example, (27) will be included; such sentences are what I will refer to as "de se PRO." I will also include instances of what I call "embedded de se PRO," such as the one below, which is clearly natural:

(30) Winter is a man who lives alone with a sleepwalking problem. He tried to eat pasta while asleep the night before. He wakes up and sees a mess in the kitchen, with opened boxes of pasta. He thinks "I must have been craving pasta yesterday."

Winter believes that he wanted to eat pasta.

Finally, I will include instances of "de re PRO," previously discussed in (6). This is not to be confused with C3: C3 is not an instance of de re PRO, given that PRO itself is not read de re.

Here is the layout and the predicted results for this experiment:

(31) Total: 10 questions (the term "control" refers to scientific control)

a. De se PRO (control, 2 questions): expected to be natural
b. Embedded de se PRO (control, 2 questions): expected to be natural
c. De re PRO (control, 2 questions): expected to be unnatural
d. Basic de re (2 questions): expected to be marginal
e. De re blocking effect PRO (C3 (2 questions)): expected to be unnatural

All of these predictions were borne out. This experiment was conducted with 50 participants:

Table 2: A summary of Experiment 2 based on 46 answers. 4 discarded.

Kind of sentence	Average
De se PRO	5.31/6
Embedded de se PRO	5.15/6
De re PRO	2.10/6
Basic de re	2.86/6
De re blocking effect PRO (C3)	1.88/6

I calculated that the difference between the basic de re and C3 is significant at $p<0.0001$, as expected. This indicates that a de re pronoun cannot self-attribute a property to itself. I will now attempt to provide an explanation of this in the next section.

4 Analysis

The goal of this section is to present an account of the data discussed in section 3 and discuss the predictions and consequences of the analysis. I present the account in 4.1, discussing four of its predictions which seem to be borne out in 4.2 and the fifth in section 4.3. In 4.4, I argue that this has consequences on existing theories on control, because the de re blocking effect with PRO implies that PRO exists, and it also implies that de se binding of PRO involves an individual abstractor, as Chierchia (1990) has claimed.

4.1 The de re blocking effect in terms of θ-roles

In the section prior, we have seen experimental evidence of the de re blocking effect arising both past clause boundaries: to be more specific, with C2 and C3. I will now provide a summary of C1-C3 together with their simpler and more complex LFs:

(32) # **C1:** Miranda$_i$ dreamed that [she$_i$ fired her$_i$].[6]
Simple LF: In Miranda's dream worlds, her real-self fires her dream-self.
A de re pronoun c-commands a de se pronoun, both of which are relative to Miranda.
LF: λw. ∃G. G is a *selfless* concept generator for Miranda in w & ∀<w',y> ∈ **dream**$_{\text{Miranda, w}}$: G(Miranda)(y)(w') kissed y in w'

(33) # **C2:** Miranda$_i$ dreamed that [she$_i$ said that [she$_i$ was fired.]]
Simple LF: In Miranda's dream-worlds, her real-self says that her dream-self is fired.
A de re pronoun c-commands a de se pronoun, both of which are relative to Miranda.
LF: λw. ∃G. G is a *selfless* concept generator for Miranda in w & ∀<w', y> ∈ **dream**$_{\text{Miranda, w}}$: ∀<w", z> ∈ **say**$_{\text{G(Miranda)(w')(y), w'}}$: y was fired in w'

(34) # **C3:** Miranda$_i$ believes that [she$_i$ decided [PRO$_i$ to prove Goldbach's conjecture]].
Simple LF: In Miranda's belief-worlds, the individual who she does not realize is herself self-attributes the property of proving Goldbach's conjecture.
The de re pronoun (relative to Miranda) self-ascribes a property to herself.
LF: λw. ∃G. G is a concept generator for Miranda in w & ∀<w', y> ∈ **Dox**$_{\text{Miranda, w}}$: ∀<w", z> ∈ **decide**$_{\text{G(Miranda)(w')(y), w'}}$: z proves Goldbach's conjecture in w"

I will first argue that both a new definition and derivation of the de re blocking effect is needed based on this novel data–neither Percus and Sauerland (2003b) nor Anand (2006) are able to account for the presence of blocking in C3, given that it is fundamentally different from prior instances of de re blocking.[7] I will then present my own definition and derivation, arguing that we should define it in terms of θ-roles.

[6] I am aware that this sentence might be ruled out by Principle B. However, something curious happens with *dream*-pronouns; we seem to not regard binding principles as much. Recall that in (3) we had *I kissed me*; most speakers accept constructions like this. The reader can choose to replace this example with third-person pronouns like *she* and *her* with first-person ones if they wish; the same point can be made.

[7] Here I will focus on C3, as the arguments are more convincing. It may be possible Anand's approach to derive blocking in C2: for example, if Anand's logophoric operator could bind across clauses. But I do not believe that Superiority approaches like Percus & Sauerland's could derive blocking in C2, given the additional presence of a phase, which blocks movement and agreement, across a finite clause boundary, following Chomsky (2001). It is not clear how blocking could be derived via syntactic operations if they are not even possible to begin with.

Recall that the blocking effect arises due to Superiority, according to Percus and Sauerland. The de se pronoun cannot move because of the presence of a more local de re pronoun:

(35) a. * I λf dreamed [$_{CP}$ me* λx H I_f kissed t_x]

This account derives blocking only when the matrix subject binds both pronouns in the embedded clause; not when the more local de re pronoun binds a de se one. As we have seen, the latter is the case in C3. Recall that in (5), blocking arises when a de re pronoun self-ascribes a property; in other words, de se binds PRO. This sentence is repeated in (36):

(36) # Miranda believes that she decided to prove Goldbach's conjecture.

Blocking in C3 is therefore underivable via Superiority, given that locality is not a problem. Anand (2006) attempts to derive blocking via reference to locality, as well. His Rule H is repeated below, which derives blocking by ruling out the possibility of a base-generated logophoric operator trying to bind a de se pronoun past a more local de re pronoun,

(37) *Rule H (mod de se, simplified)*
A variable, x, cannot be bound by antecedent, A, in cases where a more local antecedent, B, could bind x and yield the same semantic interpretation.

PRO is bound by the more local de re pronoun, and not by the matrix subject, so C3 remains underivable for this approach as well. Rule H just does not apply. Both approaches are missing something more fundamental here: namely that a de re pronoun cannot self-ascribe a property.

We need a new definition and derivation of the blocking effect. Let us sharpen our definition as much as possible, so that we do not rule out structures which are actually good. First, I want to point out that the de re blocking effect arises only with three nominals that are coindexed, rather than two. Trivially, the matrix subject pronoun in (38) is de re, and it can be the controller:

(38) He_i tried PRO_i to run.

It is also clear that the de re blocking effect arises only when all three nominals are coindexed. We do not want to rule out clearly acceptable structures like in (39), in which Caitlin may not be aware that the person trying to catch some fish is a fisherman, so *a fisherman* would be de re:

(39) $Caitlin_i$ believes that [a fisherman]$_j$ tried PRO_j to catch some fish.

(40) is a general summary of the problem we are dealing with, including all the good and the bad forms. The ellipsis "..." is meant to represent a c-command relation in the tree structure, without regard to clause boundaries:

(40) a. Good: de re_i ... de se_i
b. Good: de re_i ... de se_i ... de se_i
c. Good: de re_i ... de se_i ... de re_i
d. Good: de re_i ... de re_i ... de re_i
e. Bad: de re_i ... de re_i ... de se_i

Finally, I want to sharpen our notion of a *counterpart*.[8] The rule of thumb is that two arguments, x and y, are counterparts if they are coindexed. Recall that the de re blocking effect is defined as

[8]This is not to be confused with Lewis (1986)'s counterpart theory across possible worlds. Under this, individuals exist in only one world, unlike the Kripkean approach. For example, under a Kripkean approach, when I say "I might have been a phonologist" I say that there is another possible world in which I am a phonologist, but under Lewis's I say that there is a counterpart to me–but is crucially not me–who is a phonologist.

follows: *an obligatorily de se anaphor cannot be c-commanded by a de re counterpart*. In the cases of C1 and C2, it's easy to see how the dreamer has a mental and a bodily counterpart, and I assume that this entails that these counterparts are also counterparts of each other.

C3 is slightly more tricky, but take a control sentence like *Caitlin tried to open a can*, in which Caitlin identifies an individual as herself in her *try*-worlds. This individual is the de se counterpart of Caitlin. Therefore, C3 is ruled out because a de re counterpart cannot itself c-command an (obligatorily) de se counterpart. With our current notion of a counterpart, Anand's original definition of the blocking effect is able to get the generalization from C1-C3.

But we have seen evidence in section 3.2 that this definition is not able to account for the surface distribution of *dream*-pronouns that is seen in passives. Recall that the experiment indicated that participants, on average, preferred the form in which the *de se*, on the surface structure, c-commanded the *de re*. As such, this is a counterexample to Anand's definition:

(41) I dreamed that I was Biden and I was kissed by me.
Possible reading: In the dream, I was kissed by Biden. (de se kissed de re)
Worse reading: In the dream, Biden was kissed by me. (de re kissed de se)

But what does remain in common is the deep structure; in other words, the θ-roles that the de re and de se argument receive. I therefore propose to redefine blocking as follows:

(42) De re blocking effect (mod θ)
A de re counterpart cannot have a non-Theme θ-link to an obligatorily de se counterpart.

I will attempt to derive this shortly, but it is first important to discuss how this applies to C1-C3. C1 is the trivial case, given that in the surface structure, the de re form is the Agent and the de se form is the Theme, so there is blocking. In the case of C2–*I said I was fired*–the de re form is once again the Agent of the firing, due to the lexical semantics of *fire*–you can fire someone by saying so–and the de se form is the Theme that is undergoing the firing.

Let us now consider how blocking arises with C3. Recall that to self-ascribe a property is to pick out a de se counterpart. Control predicates such as *try* assign a θ-role such as Experiencer, never Theme. Here, I must assume that to self-ascribe a property is to establish a θ-link with a de se counterpart. In C3, this θ-role is assigned to a de re counterpart which has a θ-link to a de se counterpart, which gets us the predicted blocking, given that it is a non-Theme link.

The obvious question is how to derive this definition: why should this exist at all? Here is my attempt at doing so. Rather than attempting to derive such contrasts via locality as Percus, Sauerland and Anand do, I would like to propose that such contrasts arise due to the thematic hierarchy. It is common for authors, such as Belletti and Rizzi (1991), to assume a thematic hierarchy: Agent $>$ Experiencer $>$ Theme. One could imagine that there is a semantic constraint which causes a preference for de se forms to be associated with θ-roles higher in the hierarchy–because de se forms are logophoric.

I would like to conclude by pointing out that there is still an open question that I have not addressed–why is generic de re so marginal to begin with, based on the results seen in section 3.1? (42) does not provide an explanation of this. Could generic de re be less marginal if it is associated with a Theme θ-role rather than Agent? I will leave this question mostly open and discuss it further in section 5.

4.2 Empirical predictions

Let us now consider the five predictions that my account makes. Although this was not empirically tested, the definition in (42) immediately makes a strong empirical prediction that is borne out concerning C2. Blocking arises because of the lexical semantics of *fire*. If we had two pronouns which did *not* have a link, but where the de re c-commands de se, contra Anand's definition, we would expect there to be no blocking. This prediction is borne out; these are much more acceptable compared to C2 given that there is no link.

(43) a. I dreamed that I (real-self, Source) said that I (dream-self, Agent) ate a rabbit.

b. I dreamed that I (real-self, Source) said that a rabbit ate me (dream-self, Theme).

Recall that obligatorily de se anaphors like *ziji* in Chinese and *òun* in Yoruba require de se ascription via an individual abstractor, which entail that there is a θ-link between the de re counterpart and the obligatorily de se counterpart. In section 2.5, independent evidence for Anand's de re blocking effect was provided by Adesola (2006). Ordinary pronouns cannot c-command logophoric pronouns, which are obligatorily de se anaphors. (21) is repeated in (44) below:

(44) Olu_i so pé $\text{o}_{*i/j}$ ri bàbá òun_i.
Olu say that 3SG see father LOG
'Olu_i said that $\text{he}_{*i/j}$ had seen his_i father.'

If as I have claimed for English, the de re blocking effect takes place with no regard to clause boundaries, then we would expect cases similar to C2 to be ruled out in Yoruba, as well, as the only difference is the clause boundary. This prediction seems to be borne out based on the intuitions of the single native speaker I have consulted: it is impossible for the pronoun to c-command *òun* if they corefer, but possible if they do not corefer:

(45) Olu_i so fun Taiwo_j pé $\text{o}_{*i,m}$ so pé Bóla_k féron òun_i.
Olu said to Taiwo that 3SG said that Bola like LOG
'Olu_i told Taiwo_j that $\text{he}_{*i,m}$ said that Bola_k likes himself_i.'

Similar to what we see in Yoruba, recall in section 2.5 that Anand (2006) makes the correct prediction, given in (23), repeated in (46) below, that *ziji*, an obligatorily de se anaphor, cannot be c-commanded by its de re counterpart–or by an ordinary pronoun.

(46) Zhangsan_i renwei Lisi_j gei ta_i $\text{ziji}_{*i,j}$-de shu.
Zhangsan think Lisi give 3SG self-POSS book
'Zhangsan_i thinks that Lisi_j gave him_i $\text{his}_{*i,j}$ book.' Anand (2006)

Based on the data we've just seen in English, we would expect de re *ta* to be unable to c-command its obligatorily de se counterpart *ziji* past a clause boundary. First, let us establish that *ziji* truly is an obligatory de se anaphor. When paired with a de re context, Huang and Liu (2001) reports that the sentence below is unacceptable:

(47) Zhangsan says: "that thief stole my purse!" without knowing that it is his purse.

a. # Zhangsan_i shuo pashou tou-le ziji_i-de pibao.
Zhangsan say pickpocket steal-PERF REFL-DE purse
'Zhangsan_i said that the pickpocket stole his_i purse.' Huang and Liu (2001)

The empirical prediction now is that (48a) should be preferable over (48b). In other words, we first need to check the acceptability of the ordinary pronoun when paired with a de re context, as in (48a).[9] Second, we need to compare this to a structure which has a similar shape to C2 that is judged as infelicitous–when the de re pronoun has a de se belief. If the speakers think that (48b) is less felicitous than (48a), then this indicates the presence of a de re blocking effect. Based on the three native Mandarin speakers that I have consulted, this prediction seems to be borne out.

(48) Zhangsan has amnesia. Zhangsan and Lisi are watching a video of a man winning a swimming competition a few years ago. After the man wins the competition, he starts yelling that he won to everyone in the audience. Zhangsan tells Lisi that the guy in the video said he won. Zhangsan doesn't realize that the man in the video is himself.

a. ? Zhangsan$_i$ shuo ta$_i$ ying-le.
Zhangsan said 3SG win-PERF
'Zhangsan$_i$ said that he$_i$ won.'

b. # Zhangsan$_i$ gaosu Lisi$_k$ ta$_i$ shuo ziji$_i$ ying-le.
Zhangsan tell Lisi 3SG say REFL win-PERF
'Zhangsan told Lisi that he said that he won.'

The fourth prediction that we might make based on this data is that the de re blocking effect would not take place in C3 if the matrix subject had a de se attitude towards someone who was not himself, but with other predicates, not just *dream*. Under a normal context, in a sentence such as *John$_i$ believes that he$_k$ tried to run from the police* in which the pronoun and matrix subject do not corefer, the pronoun is de re.

But if the matrix subject is very senile or mentally ill, it is possible for the matrix subject to incorrectly attribute de se belief to someone who is not himself. This is like cases involving *dream* and the dream-self. This prediction seems to be borne out, as (48a) seems to be a significant improvement over the usual C3 examples, though this was not experimentally verified:

> John is very senile. He sees a video of Trump after he loses the election, running away to Russia to avoid being prosecuted for evading taxes. John identifies the person in the video as himself.

a. ? John believes that he is Trump and that he tried to run away from the police.

To recap, the analysis proposed in section 4.1 seems to make at least four interesting predictions that are attested. The next section presents a fifth prediction.

4.3 Two paths to de se?

In section 2.5, we saw Anand's evidence for the de re blocking effect: the ORC is just a subset of it based on further evidence from obligatorily de se anaphors in Yoruba and Chinese, which do not involve the predicate *dream*. But Anand notes that this blocking is in fact not present with predicates such as *believe*, *hope*, *pretend* or *claim*: *dream* is the odd one out, as shown:

[9] The judgments for (48a) are rather controversial among the native speakers I have consulted. Like what we have seen in English, the de re form of the ordinary pronoun seems to be marginal. Some speakers seem to accept (48a) fully, while others do not accept it at all, and others believe that it is marginal. But the point is whether the native Mandarin speakers I consulted preferred (48a) over (48b), which they did.

(49) John comes late one night, drunk and without his keys. Undeterred, he smashes through a window and goes up to bed. By morning, he has forgotten the incident, and is shocked to see the back window in pieces. Fearing that he is being robbed, he runs upstairs to check his safe.

a. John$_i$ hoped that he$_i$ [*qua* robber] hadn't yet found his$_i$ [*qua* mental counterpart] safe. Anand (2006)

Why is this the case? Why should blocking be present with *dream* on one hand, but not with *hope* on the other? Anand suggests this can be handled if we assume that both LFs for de se binding– the property and the concept generator approach–are attested. Here is how it works. Recall the semantics of *dream*, repeated below:

(50) $[\![\text{dream}]\!]^{w,g} = \lambda P_{<esee,\ est>}.\ \lambda x.\ \lambda w.\ \exists G$ is an acquaintance-based *selfless* concept generator for x in w & $\forall$<w', y> $\in$ **dream**$_{x,w}$: P(G(x))(y)(w') = 1]

This is similar to *believe*, with one difference, not counting the worlds involved in the definition: the concept generator need not be *selfless*. The semantics of *believe* is given below.

(51) $[\![\text{believe}]\!]^{w,g} = \lambda P_{<esee,\ est>}.\ \lambda x.\ \lambda w.\ \exists G$ is an acquaintance-based concept generator for x in w & $\forall$<w', y> $\in$ **Dox**$_{x,w}$: P(G(x))(y)(w') = 1]

What does it mean for a concept generator to be selfless? It means that de se ascription cannot be a special kind of de re. The de re blocking effect can take place only as a result of Chierchia's dedicated LFs for de se binding, and if *dream* cannot have de se as de re LFs, then de re blocking effects will be obtained. This is not so for all other predicates like *hope*. Two LFs will be possible: one where de se is de re, and one with dedicated de se binding. We have no way of knowing that the latter would be ruled out, since the former seems to be acceptable.

I agree with Anand that there are two paths to de se, and I believe that C3 in this paper provides novel evidence for this. Recall that in a sentence such as (5)–*Miranda believes that she decided to prove Goldbach's conjecture*–the presence of PRO, an obligatorily de se anaphor, causes blocking. Interestingly, when we change the nonfinite clause to finite, this seems to lead to a significant improvement to the sentence–although this was not experimentally verified. The native speakers that I consulted believed that this sentence was marginal when paired with its context:

(52) Miranda was a professor of mathematics who lost all her memories due to hitting her head, and had to start her life anew. She does not remember any of her past research. But she kept her interest in math, and found a paper written by a mathematician named Miranda–who she does not realize is herself. In it, she claimed to have proven Goldbach's conjecture.

? Miranda believes that she claimed that she proved Goldbach's conjecture.

Like Anand, I believe that this can only be explained if there are two paths to de se: PRO requires de se binding by a base-generated individual abstractor, as Chierchia argues. But both forms of de se binding are possible with finite clauses, allowing for this sentence to be acceptable. As we will see in 4.4, this has significant consequences on Landau (2015)'s two-tier theory of control. But I want to point out something that is problematic for my account that arises when I attempt to account for (52).

The rule that I have provided here is purely semantic: de re counterparts cannot self-ascribe properties to themselves, as doing so would entail having a θ-link to a de se counterpart. But Chierchia's approach seems to be semantically equivalent to de se as de re, given that in the latter, the centered concept is simply the self-identity relation. Is this semantically different from self-ascribing a property? It seems that I am forced to stipulate that only the self-ascription of a property is relevant for θ-linking, but de se as de re is not. I leave it open for future research as to whether this move is correct or not.

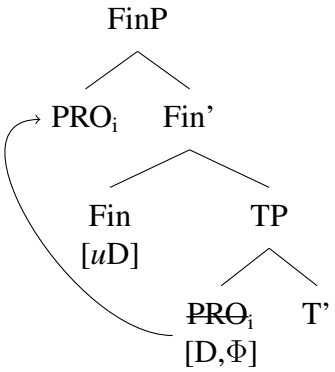
4.4 Consequences for theories of control

As mentioned prior, although Chierchia's approach to control assumed dedicated de se binding, not all theories of control do so. Landau (2015)'s two-tier theory of control argues that the de se reading of PRO is a special kind of de re: as we have seen, doing so makes certain predictions that can be empirically tested, and this is the goal for this subsection. First, let us discuss Landau's theory of control.

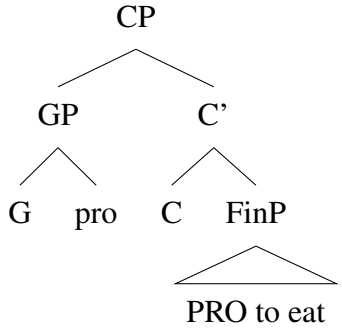
Landau builds a theory of control that places equal importance to both syntax and semantics. The approach intends to solve two problems: why PRO must be read de se in attitude contexts and why there is syntactic agreement between PRO and the controller. The "two-tier" theory of control is named as such because control complements, according to Landau, divide into two types: in non-attitudinal contexts OC is a kind of prediction which is made possible via movement of PRO, where PRO abstracts over the complement. The predicative head is designated as *Fin*, and an example derivation is given in (53).

The second tier of control, for attitudinal complements, is established by logophoric anchoring, which builds on the predicative tier. The attitude complement is a function from concept generators to propositions. A de re variable, pro, is embedded inside a concept generator, and the de se reading is obtained via a presupposition. I give a simplified derivation of a sentence with logophoric control in (54); although it is simplified, I have kept the essence of the approach.

(53) *Predicative control*
John forced the car$_i$ PRO$_i$ to stop.



(54) *Logophoric control*
John$_i$ tried PRO$_i$ to eat.



Based on the discussion we just had in 4.3, the astute reader will notice that this account predicts that no de re blocking effect can be present with PRO. As we have seen, C3 shows that this is false; Chierchia's approach to control makes the correct prediction here.[10]

[10]Also see Pearson (2018) for a similar argument against the two-tier theory of control. But these arguments need

But perhaps the most interesting consequence of C3 in this paper is that it is in fact novel data for the existence of PRO. After all, the de re blocking effect–that obligatorily de se anaphors cannot have a θ-link to their de re counterparts–requires that such a de se anaphor is present, which PRO is. It would be mysterious as to how there could be blocking without a de se element.

The original evidence for the existence of PRO was based on the θ-Criterion. For example, we want to avoid *Mary sent John* meaning the same thing as *Mary sent John to himself*, so (half of) the θ-Criterion is defined as follows: *each argument may bear one and only one θ-role*. This requires the stipulation of PRO, given that *try* in a sentence like *Mary tried to take out the trash* assigns a θ-role to the matrix subject, and we do not want *Mary* to violate the θ-Criterion after movement by receiving a θ-role each from *try* and *take out*.

Hornstein (1999) argues that the advent of Minimalism allows us to eliminate PRO from our grammar. But it is not completely clear to me whether this is an argument against Hornstein (1999)'s account in which control is derived by movement. Hornstein suggests that movement can account for the required de se interpretation of OC PRO because movement leaves behind a variable binder. But Chierchia (1990) points out that variable binding alone does not allow us to distinguish de se interpretations from de re ones. I leave it an open question as to whether the movement theory of control can account for the de re blocking effect with PRO.

5 Conclusion

In this paper, I have presented novel contexts in which Anand's de re blocking effect arises, and these both involve blocking past clause boundaries. Furthermore, C3 involved a novel kind of local blocking in which a de re pronoun self-ascribed a property to itself, and we found strong evidence that this was unacceptable. I have presented an account for this by redefining the blocking effect in terms of θ-roles, which seems to make at least five correct predictions.

Two open problems remain. The first is more relevant to this paper, as the account presented here is not completely correct for a subset of the participants of Experiment 1, and people I have informally discussed this with. As noted in section 3.1, in the passive construction with *dream*, many of the participants in fact preferred the reading in which the de re pronoun c-commanded the de se one on the surface. This data is repeated below:

(55) I dreamed that I was Biden and I was kissed by me.
Preferred by a significant portion: I kissed Biden. (de re kissed de se)
Dispreferred by this portion: Biden kissed me. (de se kissed de re)

This indicates that there is a significant portion of people who prefer linear order–in line with Anand's definition in terms of c-command–rather than θ-marking as I have proposed. Perhaps these people really do use some kind of Rule H past clause boundaries. But then, that leaves the problem of accounting for C3 (blocking with PRO) open, which is completely local. Perhaps these people, then, prefer linear order for the purposes of blocking for C1 and C2, but use θ-marking for blocking in C3; as it seems that the vast majority of speakers greatly dislike C3. Although this may seem *ad hoc*, it seems to be the only reasonable way to account for all of their intuitions at this point, which we ought not to dismiss.

not mean that we should reject the entire two-tier theory of control; see Satik (2019) for an account which is similar to Landau's in spirit, with one of the crucial differences being that control complements are properties.

The final problem, which goes out of the scope of this paper, concerns why the basic de re reading–ex. *Caitlin believes that she is beautiful* paired with a de re context–is so marginal. It has been reported since at least Chierchia (1990) that such sentences are acceptable, but many speakers reject it outright, and most do not find it very felicitous. Could this be related to θ-roles? This seems unlikely. (56) below, in which the de re pronoun is a Theme rather than an Experiencer (the θ-role that *Caitlin* gets from *beautiful*), seems to be equally as marginal:

(56) Caitlin and John are best friends. John is in love with Caitlin, although he does not want to tell her this. John tells Caitlin that he is trying to confess to the love of his life but unsure how to do it. He asks her for advice. Caitlin doesn't realize that John is going to try and confess to herself.

? Caitlin thinks that John is trying to confess to her.

As always, many open problems remain. But at the very least, this paper opens a great deal of interesting paths open for future research.

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