

De Re/De Dicto Ambiguity and Presupposition Projection

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Abstract

The purpose of this paper is to compare three existing theories of *de re/de dicto* ambiguity: (i) the scope theory, (ii) the intensional variable theory and (iii) the presupposition projection theory. We will conclude that the presupposition projection theory is the conceptually most desirable among these, although all three are expressive enough to describe the data. In particular, we will present novel data suggesting that the intensional variable theory is too expressive and hence lacks explanatory power.

1 Introduction

De re/de dicto ambiguity refers typically to the ambiguities in the interpretations of determiner phrases (DPs) in relation to modal operators. A representative example with a definite DP is given in (1).

- (1) John thinks that **the president of United States** is smart.

Consider the situation as of today, in which Barack Obama is the president of United States and suppose that John wrongly thinks that Al Gore is. In this context, the sentence has two interpretations. It can be read as reporting John's belief about Barack Obama or about Al Gore. The former is called the *de re* reading and the latter the *de dicto* reading.

Similarly, indefinites show the same kind of ambiguity as illustrated in (2).

- (2) Sue wants to marry **a plumber**.

In the *de re* reading, the sentence is about an actual plumber who Sue wants to marry, and crucially, she does not have to know that he is a plumber. The *de dicto* reading, on the other hand, means that Sue wants to marry someone she thinks is a plumber.

In this paper, we only deal with one side of this phenomenon. That is, we are concerned with how the *de re* and *de dicto* readings are disambiguated at the relevant grammatical representation, and not with how they —especially *de re* readings— are adequately represented in a formal metalanguage (for this topic, see Cresswell and von Stechow 1982; Kaplan 1969; Lewis 1979; Maier 2006; Quine 1956 among others). The objective of this paper is to compare three theories of *de re/de dicto* ambiguity found in the literature, namely (i) the scope theory, (ii) the intensional variable theory and (iii) the presupposition projection theory. We will conclude that the presupposition projection theory is conceptually the best among these. In the following three sections, we will examine them in detail in this order. Section 5 briefly discusses the consequences of our conclusion with regards to the theory of presupposition projection.

2 The Scope Theory

The classic way to capture *de re/de dicto* ambiguity is to analyze it as a scope phenomenon between DPs and modal operators (Cresswell and von Stechow 1982; Fodor 1970; Keshet 2008; Montague 1973; Partee 1974; Russell 1905 among others). Under this theory, the readings of (1) and (2) are paraphrased as follows.

- (3) John thinks that the president is smart.
 - a. The president x is such that John believes x is smart.
 - b. John believes that the president x is such that x is smart.
- (4) Mary wants to marry a plumber.
 - a. There is a plumber x and Mary wants to marry x .
 - b. Mary believes there is a plumber x and wants to marry x .¹

However, Bäuerle (1983), Fodor (1970, §4.3) and Percus (2000) point out that the naive scope theory is too weak and runs into the problem of scope puzzle.

To state the conclusion first, the scope puzzle suggests the need for differentiating the mechanisms of scope taking and the interpretation of the restrictor of the DP in question, which is impossible in a naive scope theory. Thus, more fine-grained terminologies than the simple dichotomy of *de re* and *de dicto* are needed, and we will henceforth use the following (cf. Bonomi, 1995; Quine, 1956).

- (5) a. **Wide/Narrow Scope:**
The quantifier scope with respect to the intensional operator
- b. **Transparent/Opaque:**
Whether the extension of a predicate is actual or not

¹The fact that the operator that the existential quantifier gets caught in is an epistemic operator rather than a bouletic one needs an explanation in any theory. See Heim (1992) and Geurts (1998) for discussions.

The *de re* readings of the previous examples as described above are wide scope transparent, while the *de dicto* readings are narrow scope opaque. The gist of the scope puzzle is that narrow scope transparent readings also exist.²

2.1 Scope Puzzle

Now let us look at concrete examples. Fodor (1970) uses the following example.

- (6) Charley wants to buy a coat like Bill's. (Fodor, 1970, 226)

The wide scope transparent and narrow scope opaque readings are not surprising and, in the scope theory, they can be informally paraphrased as follows.

- (7) a. There is a coat like Bill's x such that Charley wants to buy x .
 b. Charley believes that there is a coat like Bill's x and wants to buy x .

Fodor points out that there is yet another reading, which is true in the following kind of context: suppose that a store sells some coats that all look like Bill's, and that Charley does not know anything about Bill. Assume further that Charley wants one of those coats and any of them is an option. The sentence in (6) is true in this context, but neither of (7) represents this reading. In fact, there is no other scope possibility for the DP in question.

The scope puzzle is not confined to indefinites, and applies to strong quantifiers, as the following example illustrates (cf. Percus, 2000).

- (8) If every man was a woman, John would be happy.

The most salient reading of this sentence is that if every actual man was a woman, John would be happy. The logic of the problem is exactly the same as above. In a naive scope approach, if *every man* is read transparent, it has to take wide scope, and if it is read opaque, it has to take narrow scope, but neither of them is the desired reading. Rather, what we want here is to interpret the restriction as being outside of the antecedent of the conditional, while the scope as being inside.

2.2 Semantic Reconstruction as a Solution

Before leaving this section, we present one possible way of saving the scope theory from the scope puzzle (see Keshet, 2008 for a different proposal). Specifically, assuming quantifying-in as the mechanism of scope taking, higher order abstraction (or semantic reconstruction) can be used to solve the puzzle (von Stechow and Heim 2007; for semantic reconstruction in general, see Cresti 1995; Heim and Kratzer 1998; Sternefeld 2001). In this way, scope taking and transparency can be treated in some sense separately: quantifying-in dealing with the former and semantic reconstruction dealing with the latter. The problematic readings of the sentences above can be represented as follows, for example.

²Wide scope and opaque readings are logically possible, but whether they exist as semantically distinct readings in natural language is controversial (Fodor, 1970; Bonomi, 1995; Keshet, 2008). To simplify the discussion, we will put them aside in this paper.

- (9) a. [a coat like Bill's] $\lambda Q_{\langle et,t \rangle}$ Charley wants to buy Q
 b. [every man] $\lambda Q_{\langle et,t \rangle}$ if Q was a woman, John would be happy

Here, the DPs are interpreted above the intensional operators and thus they are transparent, but the scope is reconstructed below the operators. This solution requires a treatment for non-subject quantifiers, but such methods have been explored in the literature, for example, type-shifting (Sternefeld, 2001) and intermediate semantic reconstruction (Cresti, 1995).

However, there is a conceptual criticism that one can raise against this solution. It is known that quantificational DPs generally cannot take scope out of a tensed clause, but sentences like (8) require exactly this. It is of course possible to modify the locality constraint so that it is not a restriction on quantifying-in in general, but only on first-order quantifying-in. However, such an ad hoc formulation is conceptually undesirable.

3 The Intensional Variable Theory

The intensional variable theory separates the scope and the transparency mechanisms more directly by positing intensional variables in the object language so that transparency is treated by logical binding of intensional variables, while the scope is dealt with by an independent scope taking mechanism (von Stechow and Heim, 2007; Keshet, 2008; Musan, 1995; Percus, 2000). For example, the ambiguity in our initial example is described as follows, where s and s' are variables ranging over situations.

- (10) John thinks that the president is smart.
 a. John thinks [$\lambda s'$ the president- s is smart] *(transparent)*
 b. John thinks [$\lambda s'$ the president- s' is smart] *(opaque)*

By employing a completely distinct mechanism for dealing with transparency, this theory is free from the scope puzzle and does not involve any extra assumption about the locality of scope. In fact, the narrow scope transparent readings of the problematic sentences above are easily described as follows:

- (11) a. Charley wants [$\lambda s'$ to buy a coat-like-Bill's- s]
 b. If [$\lambda s'$ every man- s was a woman], John would be happy.

However, as Percus (2000) and Keshet (2008) point out, this theory is too strong in its expressive power and generates impossible readings. They propose four constraints to prohibit such impossible readings, which we now review. We also show the need for an additional, novel constraint.

3.1 Overgeneration and the Four Constraints

3.1.1 Main Predicate and Adverb Constraints

As Percus (2000) points out, main predicates and adverbs cannot have transparent readings. Thus, the following (a) examples do not have the readings paraphrased by the (b) sentences.³

- (12) a. Mary thinks that my brother is Canadian.
 b. The set of Canadian X is such that Mary thinks that whoever she thinks is my brother is a member of X .
- (13) a. Mary thinks that my brother always won the game.
 b. All the relevant rounds R of the game is such that Mary thinks that whoever she thinks is my brother is the winner in R .

These readings are readily generated in the intensional variable theory by indexing the intensional variable on the main predicate and the adverb with the respective evaluation index. Percus (2000) proposes the following constraints to block them.⁴

- (14) a. *Main Predicate Constraint*
 Main predicates cannot be interpreted transparent.
 b. *Adverb Constraint*
 Adverbs cannot be interpreted transparent.

3.1.2 Intersective Predicate Constraint

Keshet (2008) further points out that intersective modifiers of a DP restrictor have to agree in transparency with the head NP. For example, the following example does not have a corehent reading, which would be possible if *married* and *bachelor* could have different intensional variables on them.

- (15) #Mary thinks that the married bachelor is confused. (Keshet, 2008, 53)

This is not blocked by the Main Predicate or Adverb Constraints, and Keshet posits a third constraint:

- (16) *Intersective Predicate Constraint*
 All intersective modifiers of a DP must agree in transparency with the NP.

3.1.3 Presuppositional DP Constraint

Thirdly, Keshet (2008) observes that non-presuppositional/cardinal DPs cannot be interpreted transparent (also Musan, 1995). The following example illustrates this.

³Percus' original paraphrases for the (b) examples are not the readings we are after, and they are changed appropriately here.

⁴Percus calls them Generalizations X and Y, but we will use more transparent labels here. Similarly for the Intersective Predicate Constraint immediately below, which Keshet (2008) calls Generalization Z.

- (17) [Context: There are two horses, but Charley thinks that they are donkeys.]
#Charley thinks that there are two horses.

This is not subsumed by the above constraints, and a new constraint is needed:

- (18) *Presuppositional DP Constraint*
Only presuppositional DPs can receive transparent readings.

3.2 Nested DP Constraint

Lastly, we add one more constraint on the distribution of intensional variables, in order to account for the range of interpretations in a configuration where one DP is nested inside another DP.

- (19) *Nested DP Constraint* (to be revised)
When a DP is embedded inside a DP, the embedding DP must be opaque if the embedded DP is opaque.

In such a nested context, there are four logically possible combinations of transparent/opaque, but one is systematically excluded. Specifically, if the embedded DP is opaque, the entire DP cannot be transparent.

Here is a concrete example. Putting aside the two uncontroversial interpretations where the two DPs agree in transparency, let us first consider the actually available mixed interpretation of (20-a) represented as (20-b).

- (20) a. Mary thinks the wife of the president is nice.
b. Mary thinks [$\lambda s'$ the wife- s' of the president- s is nice]

This is true in the following context: Mary is watching television and sees Barack Obama, the actual president, and his sister besides him. Also, she doesn't know who he is and she thinks that the woman besides him must be his wife. That (20-a) is true in this scenario means that (20-b) is a legitimate representation. The following is a more perspicuous example, where only the opaque-transparent reading is pragmatically felicitous.

- (21) a. Mary wants to find every solution to the unsolvable problem.
b. Mary wants [$\lambda s'$ to find [every solution- s'] to [the unsolvable prob- s]]

On the other hand, as our generalization states, the reading in which *the president* is opaque and *the wife* is transparent is not available for (20-a). This should be true in the following context. Mary sees Bono Vox on TV with his wife Alison Hewson. Mary wrongly believes that he is the president, and furthermore, that the nice woman next to him is his sister. Thus, the wife-relation is actually true, but the characterization of Bono Vox as the president is not. Under the intensional variable theory, this reading can be represented as follows.

- (22) Mary thinks [$\lambda s'$ the wife- s of the president- s' is nice]

However, the sentence is not judged true in this context. Thus, our constraint is independently necessary to prohibit the representation in (22).

Incidentally, the constraint is general enough to capture cases involving relative clauses such as the following example, where only the transparent-opaque reading is pragmatically felicitous on the assumption that unicorns do not exist in reality. The infelicity of the example suggests this reading is again unavailable.

- (23) a. #Mary thinks that [the man who likes the unicorn] is a woman.
 b. Mary thinks [$\lambda s'$ the man-*s* who likes the unicorn-*s'* is a woman-*s'*]

We have so far seen cases with two definites. The situation is the same for strong quantifiers, and we will not provide examples here for the sake of space. However, indefinites are a bit more complicated, because they can take exceptional wide scope and each indefinite is therefore three-way ambiguous: wide scope transparent, narrow scope opaque and narrow scope transparent.⁵

Thus if the whole DP is definite and there is an indefinite inside, the number of possible readings is six, rather than four. Of these, two are not attested. This is summarized below.

(24)	Embedding DP	Embedded DP
	a. Transparent	Wide/Transparent
	b. *Transparent	Narrow/Opaque
	c. *Transparent	Narrow/Transparent
	d. Opaque	Wide/Transparent
	e. Opaque	Narrow/Opaque
	f. Opaque	Narrow/Transparent

For the sake of exposition, we do not go into the details of the uncontentious cases where the two DPs agree in transparency. Let us begin with the actually available cases of disagreeing transparency. Firstly, if the embedding DP is opaque, both mixed readings are possible. To see this, consider the following example.

- (25) Mary thinks that the unicorn that a famous linguist hides from her is beautiful.

Suppose that unicorns do not exist, but Mary believes that they do and in addition that her father John hides a beautiful one from her. Assume further that he is a famous linguist, unbeknownst to Mary. In this context, the sentence is judged true and the reading is such that the indefinite phrase is read wide scope transparent.

Also, the narrow scope transparent reading of the embedded indefinite is available for the same sentence. Here is a context: assume that there are group of people in front of Mary and she is convinced that one of them hides a beautiful unicorn from her, but has no idea which. Those people are famous linguists, but Mary does not know this fact. The sentence is again true in this context.

On the other hand, if the embedded DP is read opaque, the mixed readings are both impossible. Consider the following example.

⁵We again ignore the wide scope opaque reading.

- (26) Mary thinks that the semantics paper about a tone language is a phonology paper.

Suppose that there is a semantics paper about French, which Mary thinks is a phonology paper about some tone language that she does not know. In this context, the sentence is judged false, but it would not if the indefinite *a tone language* could be read narrow scope opaque with the whole DP being read transparent.

Similarly, the indefinite cannot be read narrow scope transparent. Suppose now that there is a semantics paper about Vietnamese. Mary knows that it is about either Vietnamese, Cantonese or Thai, but she is unaware of the fact that these languages are tone languages, and she thinks that the paper is a phonology paper. In this context, the sentence is again judged false, but it would not if the indefinite could be read opaque narrow transparent.

Notice that although the former case is subsumed by the Nested DP Constraint in (19), the latter reading is not. Thus we add an additional conjunct to it:

- (27) *Nested DP Constraint*
- a. When a DP is embedded inside a DP, the embedding DP must be opaque if the embedded DP is opaque;
 - b. When an indefinites is embedded inside a DP, the indefinite must be wide scope transparent, if the embedding DP is transparent.

3.3 Interim Summary

That the intensional variable theory needs the five constraints introduced above suggests that this theory is too expressive, and lacks explanatory power. Although the data can be correctly described with these constraints, they seem rather ad hoc and thus the theory lacks an insight into the nature of the present phenomenon.

Before closing this section, let us examine the scope theory with semantic reconstruction with respect to the same constraints. The scope theory is better than the intensional variable theory in that it does not require the Main Predicate, Adverb and Intersective Predicate Constraints, since they can be attributed to syntactic locality constraints on quantifying-in. That is, it is not inadequate to posit a constraint that forbids quantifying-in of predicates in general. Furthermore, such a locality constraint makes the nested DP constraint unnecessary as well. In the scope theory, the whole DP cannot be transparent with the embedded DP opaque, since such a configuration necessarily involves an unbound trace/variable.

Nonetheless, however, the Presuppositional DP Constraint is independently necessary, as nothing prohibits quantifying-in of a non-presuppositional/cardinal DP. Also, recall that this theory suffers from the conceptual complexity regarding the scope islands. The presupposition projection theory presented in the next section is free from all these conceptual problems.

4 The Presupposition Projection Theory

The presupposition projection theory uses presupposition projection to derive the two readings (Geurts, 1998; Maier, 2006). While Geurts uses the Discourse Representation Theory (DRT) augmented with the Binding Theory of Presupposition, we try to be neutral with respect to the detailed mechanism of presupposition projection in this section. Importantly, however, the flexibility of presupposition resolution is crucial as we will discuss in Section 5.

Specifically, this theory differentiates the two readings by resolving the presupposition of the relevant DP in two different places. Transparent readings obtain when the presupposition is resolved globally, while opaque readings obtain when it is resolved locally. For instance, our initial example is analyzed as follows. The presuppositional parts of the paraphrases are underscored.

- (28) John thinks that the president is smart.
- a. $\exists!x$: president(x) and John thinks that ιx [president(x)] is smart
 - b. John thinks that $\exists!x$: president(x) and ιx [president(x)] is smart

Definite descriptions are typical presuppositional DPs, and their transparency ambiguities are innocuously captured as above. Similarly, strong quantifiers have presuppositions, and exhibit transparency ambiguity. Here we make an assume that they presuppose the unique existence of their domains and are semantically partitives (Geurts and van der Sandt, 1999; Geurts, 2007).⁶ This enables us to describe the transparency ambiguities with strong quantifiers in the following way.

- (29) John thinks every Canadian is smart.
- a. $\exists!X$: Canadian(X) and John thinks that all of X are smart.
 - b. John thinks that $\exists!X$: Canadian(X) and all of X are smart.

Note that just as in the intensional variable theory, the quantificational scope is reckoned independently from the transparency, and hence the scope puzzle does not arise in this theory. For example, the conditional case repeated below is treated as (30-b).

- (30) a. If every man was a woman, John would be happy.
 b. $\exists!X$: men(X) and if all of X were women, John would be happy.

4.1 No Need for the Constraints

A good thing about this theory is that it requires none of the independent constraints introduced in Section 3.

The Main Predicate and Adverb Constraints follow from the fact that the nature of presuppositions associated with presuppositional predicates and adverbs is different from the nature of presuppositions of presuppositional DPs (Zeevat, 2002). Simply put,

⁶As Gennaro Chierchia (p.c.) pointed out to us, there might be some differences between true partitives such as *most of the linguists* and mere strong quantifiers such as *most linguists*. However, we believe the differences, if any, are differences in the nature of presuppositions and not fatal for our assumption here.

while presuppositional DPs mention the same individuals or sets thereof in the presupposition and the assertion, the presuppositions of main predicates and adverbs are always about different sets of individuals, properties, events, situations etc. This lack of direct anaphoric dependency between the presupposition and the assertion straightforwardly explains why transparency ambiguity does not arise with main predicates and adverbs.

The Intersective Predicate Constraint does not have to be stated independently either. Specifically, the presupposition of a DP is triggered by D, and the NP meaning becomes part of the presupposition as a whole. Consequently, its constituents just cannot be separated. Similarly, the Presuppositional DP Constraint is just what this theory predicts.

Furthermore, the nested DP constraint straightforwardly follows from interpretability (cf. *trapping* of van der Sandt, 1992). Let us look at the non-indefinite case first. The assumption here is that presuppositions cannot contain free variables. For instance, in the following example, the only felicitous reading necessarily contains a free variable y .

- (31) #Mary thinks that the man who likes the unicorn is a woman.
- a. * $\exists!x : \text{man}(x) \text{ and } \text{like}(x, y)$ and Mary thinks that [$\exists!y : \text{unicorn}(y)$] and x is a woman. (T-O)
 - b. # $\exists!y : \text{unicorn}(y)$ and Mary thinks that $\exists!x : \text{man}(x) \text{ and } \text{like}(x, y)$ and x is a woman. (O-T)
 - c. # $\exists!x, y : \text{unicorn}(y) \text{ and } \text{man}(x) \text{ and } \text{like}(x, y)$ and Mary thinks that x is a woman. (T-T)
 - d. #Mary thinks that $\exists!x, y : \text{unicorn}(y) \text{ and } \text{man}(x) \text{ and } \text{like}(x, y)$ and x is a woman. (O-O)

4.2 Wide Scope Indefinites and Presuppositions

As we have already seen, indefinites can be interpreted transparent as well, but a problem here is that indefinites are generally considered non-presuppositional. It has been well known, however, that indefinites are different from other quantifiers in that they can take exceptional wide scope, and we maintain that whatever is responsible for the exceptional wide scope is also responsible for the wide scope transparent reading. For example, the wide scope transparent reading of the following example is captured as in (32-b).

- (32) a. Mary thinks that a plumber is cool.
 b. $\exists x : \text{plumber}(x)$ and Mary thinks that x is cool.

Nothing so far subsumes the narrow scope transparent reading of indefinites, but this also can be given a natural explanation. Namely, we assume that indefinites can be interpreted as partitives too. It is widely acknowledged that weak/non-presuppositional quantificational determiners can also be interpreted as strong/presuppositional, which we assume to be a partitive reading (Geurts and van der Sandt, 1999; Milsark, 1977), and there seems to be no reason to exclude indefinites from this generalization. Thus, Fodor's example of the scope puzzle with an indefinite is captured as follows.

- (33) a. Charley wants to buy a coat like Bill's.
 b. $\exists!X : \text{coats-like-Bill's}(X)$ and Charley wants to buy one of X .

Furthermore, this account nicely predicts the interaction of wide scope indefinites and transparency stated in the second conjunct of the Nested DP Constraint. That is, when an indefinite is embedded inside a DP, the indefinite must be wide scope transparent if the embedding DP is transparent. This pattern straightforwardly follows from the interpretability. The relevant cases of the example in (26) would look as follows where y is free in the impossible readings.

- (34) Mary thinks that the semantics paper about a tone language is a phonology paper.
- a. $*\exists!Y, x : \text{tone-langs}(Y)$ and $\text{sem-paper}(x)$ and $\text{about}(x, y)$ and
 Mary thinks $\exists y \in Y$ and x is a phonology paper. *(T-N/T)
- b. $*\exists!x : \text{sem-paper}(x)$ and $\text{about}(x, y)$ and
 Mary thinks $\exists y : \text{tone-lang}(y)$ and x is a phonology paper. *(T-N/O)
- c. $\exists y : \text{tone-lang}(y)$ and $\exists!x : \text{sem-paper}(x)$ and $\text{about}(x, y)$ and
 Mary thinks John is reading x . (T-W/T)

Thus, if the embedding DP is read transparent, the only choice for the embedded indefinite is also wide scope transparent, which is exactly what we want. Although we do not show them here, the other readings are also correctly accounted for.

From the above discussions, we conclude that the presupposition projection theory is conceptually better than the previous two theories and that transparency ambiguity should be treated as a presuppositional phenomenon.

5 Theories of Presupposition Projection

The idea of treating transparency ambiguity as a presuppositional phenomenon is basically independent of the theory of presupposition projection. However, one thing it demands is that presupposition resolution be flexible enough so that there is a choice as to where the presupposition can be resolved. In other words, a theory that treats presupposition projection as a kind of scoping mechanism is necessary. The Binding Theory of Presupposition due to van der Sandt (1992) has this crucial feature, and the theories due to Geurts (1998) and Maier (2006) are couched in this framework. We simply refer the reader to those studies for the details of this account, and in this final section, we examine other representative theories of presupposition projection with regards to the flexibility of presupposition resolution.

The Satisfaction Theory (Heim, 1992; Karttunen, 1973) is one of the most espoused theories of presupposition projection. It attributes the projection behavior of a presupposition to the lexical nature of the operator that embeds the presupposition. In this framework such operators are divided in three different classes: *holes*, *plugs* and *filters*. Holes always let the presuppositions embedded in them project up, plugs always block them, and filters sometimes let them and sometimes do not. For what concerns us

here, attitude predicates are assumed to be plugs. Thus, while (35-a) presupposes (35-b), (35-c) does not.⁷

- (35) a. The king of Buganda is bald.
 b. Buganda is a monarchy
 c. Fred thinks that the king of Buganda is bald.

However, if transparency ambiguity is to be treated as a presuppositional phenomenon, as suggested above, this theory will only yield the opaque reading of the definite DP in (35-c)⁸.

Besides the Satisfaction Theory and the Binding Theory, a series of new theories have been recently proposed. Among these, we discuss the Transparency Theory (Schlenker, 2008) here. This theory treats the phenomenon of presupposition projection with the combination of a static semantics plus two violable pragmatic principles, *Be Articulate* and *Be Brief*. The former requires that a sentence \underline{pp}' , where p is the presupposition of p' , be expressed as p and \underline{pp}' , whereas the latter requires that p be not pronounced whenever it is pragmatically useless. For example (36-a) would be in accordance with *Be Articulate*, but not with *Be Brief*. As the latter is more highly ranked than the former by assumption, the less expressive form in (36-b) is the one usually chosen.

- (36) a. Buganda is a monarchy and the king of Buganda is bald.
 b. The king of Buganda is bald

In the case of attitude predicates the same reasoning can be applied and normally (37-b) would be chosen over (37-a) and this would give the opaque reading of the DP.

- (37) a. John thinks that Buganda is a monarchy and the king of Buganda is bald.
 b. John thinks that the king of Buganda is bald.

However, *Be Articulate* as defined in Schlenker (2008) cannot derive the transparent reading as it requires the conjunction p and to appear immediately before the sentence \underline{pp}' , i.e. as p and \underline{pp}' . In order to derive the transparent reading, one has to modify the definition of *Be Articulate* so that it also demands (37-a) to be expressed as (38).

- (38) Buganda is a monarchy and John thinks that the king of Buganda is bald.

To sum up, what is needed for a presupposition theory is some level at which the transparent and opaque readings can be represented as different ways of solving the presupposition. In the case of the Binding Theory, this is encoded at the level of discourse representation, but as we have seen in this section, other options are possible in other theories, for example, in the lexical semantics and in pragmatic principles. A further examination of these alternatives, however, is deferred to future work.

⁷For Heim (1992) and Karttunen (1973), a sentence of the form x believes $p_{\{q\}}$, where q is the presupposition of p , presupposes that x believes q .

⁸One solution would be to assume that attitudes are filters, specifying the conditions under which the presupposition would not project.

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