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Attitudes, Presuppositions, and the Binding Theory

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Abstract

In order to handle presuppositions in the scope of attitude verbs, the binding theory allows presuppositions triggered in a subject's beliefs to be bound at the matrix level; and it allows presuppositions triggered in non-doxastic attitudes to be bound in the subject's beliefs (Geurts, 1999; Maier, 2015). However, we argue that this leads to serious overgeneration, for example it predicts that the unacceptable 'Sue will come to the party, but Bill is sure that she won't and that only Sue will come to the party' should be equivalent to the acceptable 'Sue will come to the party, but Bill is sure that nobody will come to the party'. This is because the presupposition triggered by 'only Sue will come to the party' should be able to be bound at the matrix level. We discuss some responses to this problem, but argue that they all have shortcomings.

1. INTRODUCTION

An important feature of presuppositions is that they project: even when presupposition-carrying sentences are embedded, the conditions they impose can escape these embedded environments.[1] For example, (1b)–(1d), just as much as (1a), presuppose that Bill smoked in the past (Chierchia & McConnell-Ginet, 2000):[2]

(1) a. Bill stopped smoking.
     b. Bill did not stop smoking.
     c. Did Bill stop smoking?
     d. If Bill stopped smoking, then I bet Mary did too.

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1 This is not to say that *only* presuppositions project; a variety of constructions gives rise to projection behavior (Tonhauser et al., 2013). Still, capturing the particular way in which presuppositions project forms a central research program in semantics and pragmatics.

2 For simplicity, we take (1a) to presuppose that Bill smoked in the past. However, it does not seem to be sufficient that Bill smoked only once, years ago; rather the condition is closer to Bill being a recent, habitual smoker.

The literature on presupposition projection is enormous, but it is fair to say that the so-called dynamic approach is predominant. This approach is essentially comprised of two accounts: the satisfaction theory and the binding theory. On the satisfaction theory, presuppositions place constraints on recursively derived bodies of information, so-called "local contexts" (Kartunnen, 1974; Stalnaker, 1974; Heim, 1983; Schlenker, 2009). To illustrate, the local context of the negated sentence in (1b) is just the conversational context. Thus, the satisfaction theory predicts that (1b) will be felicitous only if it is taken for granted by the conversational participants that Bill smoked in the past. More generally, the theory predicts that presuppositions should project out of negation.

According to the binding theory, presuppositions are taken to be a type of anaphoric element. More precisely, presuppositions are parts of the logical form of a sentence that can be anaphoric on other parts (van Der Sandt, 1992; Geurts, 1999; Maier, 2009; Maier, 2015). When no antecedent for the presupposition exists, the presupposition "moves up" as high as possible, preferably to the matrix level. Thus, according to the binding theory, the presupposition triggered by the embedded sentence in (1b) percolates up to outscope negation, with the overall effect represented in (2):

(2)   Bill smoked in the past and he continues to smoke now.

More generally, the binding theory also predicts that presuppositions should project out of negation.

Although the satisfaction theory and the binding theory appear to handle some cases equally well, e.g. (1b), proponents of the binding theory have maintained that there are other examples that favor their account. Some of these cases involve presupposition triggers embedded inside the scope of attitude verbs. On the satisfaction theory, the local contexts of attitude reports are generally taken to be the subject's beliefs (Kartunnen, 1974; Heim, 1992; Schlenker, 2009; Sudo, 2014). In particular, the satisfaction theory predicts that presuppositions triggered in the scope of belief reports project into the ascribee's beliefs. But this has been argued to be problematic for two reasons. First, additive particles, such as 'too' and 'also' trigger presuppositions linked to aspects of the conversational context. But these presuppositions need not constrain a subject's beliefs (Geurts, 1999). For instance, consider Mary's response in (3b):

(3)   *Context*: John and Mary are talking to each other over the phone.
      a.   John: I am already in bed.
      b.   Mary: My parents think I am also in bed (Heim, 1992).

It is standardly assumed that the presupposition triggered by 'Mary is also in bed' is that there is a conversationally salient proposition to the effect that someone distinct from Mary is in bed (Kripke, 2009; Tonhauser et al., 2013). Thus, the satisfaction theory predicts that (3b) should only be acceptable if Mary's parents believe that this proposition is salient in the minds of the interlocutors. But this clearly is not the case: Mary's reply is perfectly felicitous even if her parents do not believe that she is speaking to John. By contrast, the binding theory allows presuppositions triggered in a subject's beliefs to be bound at the matrix level. Thus, the presupposition triggered by 'also' in (3b) can 'float free' and need not be locally satisfied.

Second, it has been argued that the satisfaction theory cannot capture de re construals of certain presupposition triggers, e.g. definite descriptions (Geurts, 1999; Maier, 2009). For instance, suppose that Sue is deluded about her boyfriend's intelligence. Then (4) is acceptable:

(4) Sue thinks her idiot boyfriend is a genius.

The presupposition triggered by the definite, namely that Sue has an idiot boyfriend, cannot be locally satisfied (on pain of incoherence). On the other hand, the binding theory allows the presupposition triggered by the definite in (4) to escape the scope of the belief report and be resolved in the global context.

 The issues for the satisfaction theory brought by examples, such as (3b) and (4), are fairly well known. The purpose of this note is to consider a challenge for the binding theory that has received less attention. As mentioned, in order to handle projection out of attitudes, the binding theory allows presuppositions triggered in a subject's attitudes to be bound at the matrix level. It also allows presuppositions triggered in a subject's non-doxastic attitudes to be bound in their beliefs. The problem is that these conditions lead to serious overgeneration. To give the reader an immediate sense of the issue, the binding theory predicts that the (a) sentences below should be equivalent to the (b) sentences:

(5) Sue will come to the party, but Bill is sure that she will not.
   a.   # He is sure that only Sue will come to the party.
   b.   ≉ He is sure that nobody else will come to the party either.

(6) Sue used to smoke regularly, but Bill is sure that she has never smoked up to now.
   a.   # He hopes that Sue stopped smoking.
   b.   ≉ He hopes that Sue does not smoke now.

(7) Bill thinks there are two statues in Mary's garden.
   a.   # He is imagining that there were three statues and both fell.
   b.   ≉ He is imagining that there were three statues and all (of them) fell.

The presupposition triggered by, e.g. 'only Sue will come to the party' in (5a), namely that Sue will attend the party, can be bound at the matrix level by the claim that Sue will come. The overall effect is that the most salient reading of (5a) should be one where the complement of 'believe' is 'bleached' of its presuppositions, which is roughly equivalent to (5b). But these sentences are clearly not equivalent. Unlike (5b), there is simply no good reading of (5a)—the latter sounds incoherent. By contrast, the satisfaction theory has a straightforward explanation for why (5a) is unacceptable: the presupposition triggered by 'only' in (5a) cannot be satisfied in its local context.

 In what follows, we present the above problem for the binding theory in more detail. To be clear, aspects of this challenge have been discussed before.[3] However, the particular range of data that we focus on has not been surveyed up until now. And the problem it raises for the binding theory has not been made as sharp as it is here. For instance, we critically assess several attempts to respond to this challenge, but argue that they all have significant shortcomings. Perhaps most strikingly, some of the more sophisticated responses we consider bring the binding theory closer to the satisfaction theory. For example, in §4.2 we consider a response which forces presupposed material to make "copies" of itself as it

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3   Most notably by Geurts (1999), Zeevat (1992) and Zeevat (2005). Geurts' account is discussed in §4.1, while Zeevat's (1992) response is considered in §4.2, and Zeevat's (2005) proposal is assessed in §4.3. Schlenker (2011) uses an example similar to (5a) in the course of arguing against Geurts' (1999) principle of "Importation" (see §4.1 for further discussion of this principle). Although Schlenker might have anticipated the importance of these examples, he left the point relatively underdeveloped: he does not conclude—as we do—that these cases pose a problem for the binding theory in general.

leaves its triggering site en route to being bound. This condition essentially amounts to a locality constraint on presupposition resolution. Thus, the resulting account inherits some of the problems that have been raised for the satisfaction theory, e.g. it predicts that (4) should be unacceptable since we will end up contributing incoherent beliefs to Sue, namely that her boyfriend is both a genius and an idiot.

To reiterate, we have focused on this challenge for the binding theory because it has been relatively underdiscussed. But we do not mean to suggest that the satisfaction theory is at an overall advantage when it comes to attitudes. Indeed, as we briefly discuss in §5, the satisfaction theory has its own concerns. Our general conclusion, then, is that there are considerable challenges for both the satisfaction theory and the binding theory when it comes to projection out of attitudes.

The paper is structured as follows. §2 presents the binding theory, while §3 raises a challenge for it. In §4, we consider several responses. Finally, §5 concludes.

2. THE BINDING THEORY

As mentioned in §1, according to the binding theory presuppositions are parts of the logical form of a sentence that can "move about", and stand in anaphoric relations to other parts of the sentence. The most popular way of trying to spell out this idea appeals to Discourse Representation Theory (DRT). We briefly review this framework, and then consider projection out of attitudes.

In DRT, interpretation functions operate on Discourse Representation Structures (DRSs). DRSs function as logical forms do in familiar static semantics, and are constructed from surface syntactic forms through construction algorithms.[4] A DRS K is comprised of a universe of "discourse referents" (represented by a set of variables, e.g. $\{x, y, z\}$), and a set of conditions. Conditions can be atomic, e.g. $dance(x)$, or complex in the sense that they involve other DRSs, e.g. $\neg G$, where G is a DRS. DRSs can be represented in graphical form through so–called "box notation". To get a feel for how the basic system is supposed to work, (8b) gives the DRS corresponding to (8a):
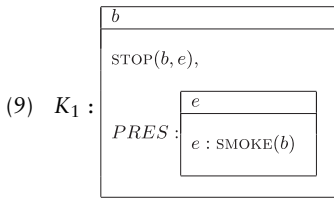
(8) a. A woman danced.

  b. K_1 :
$$\begin{array}{|l|}\hline x \\ \hline \text{WOMAN}(x), \\ \text{DANCE}(x) \\ \hline \end{array}$$

Presuppositions are encoded in separate DRSs labeled *PRES*, which are generated at the site of the presupposition trigger. For instance, the (preliminary) DRS for (1a) ('Bill stopped smoking') is given in (9):[5]
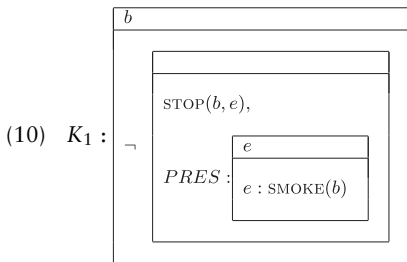
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4   See (Geurts et al., 2016) for an introduction to DRT, and (Kamp et al., 2011) for a more detailed presentation. The machinery of DRT is fairly complex. However, since the problem we will pose for the binding theory is quite general, and does not hang on the details of the DRT setup, we have left our presentation of DRT at a fairly informal level. For instance, we do not present the fundamental semantic notion in DRT, namely that of a "verifying embedding." Nevertheless, hopefully, our presentation will still give the reader a good enough sense of the framework so that our central arguments will be clear.

5   Here and in what follows we omit certain details that are irrelevant for our purposes, and simplify the presentation as appropriate. For instance, proper names are standardly handled by unary predicates in DRT (Kamp et al., 2011), but we treat them as simple constants. Also, names are usually taken to
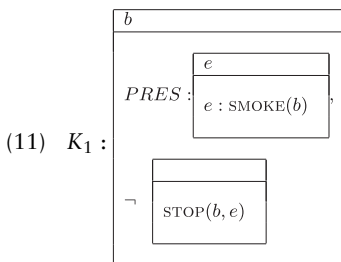
(9) K_1 :

$$\boxed{\begin{array}{l} b \\[4pt] \text{STOP}(b,e), \\[6pt] PRES : \boxed{\begin{array}{l} e \\ e : \text{SMOKE}(b) \end{array}} \end{array}}$$

The discourse referent b refers to Bill, and the DRS $PRES$ represents a (past) event e of Bill smoking.[6]

Now, the binding theory can be implemented in DRT as follows. The idea is that presuppositions triggered in one DRS can be "bound" in an accessible DRS, if there is an appropriate antecedent for the presupposition in the latter DRS. DRS material forms an appropriate antecedent for a presupposition if that material entails the presupposition. Pre-suppositions with no appropriate antecedent, i.e. unbound presuppositions, are understood to be the source of presupposition projection. According to DRS resolution algorithms, there is a preference for presuppositions to be bound in the lowest accessible DRS, otherwise there is a preference for presuppositions with no appropriate antecedents to "percolate up" to the highest accessible DRS. Unbound presuppositions may be accommodated, if possible.[7]

To illustrate, consider an initial representation of (1b) "Bill didn't stop smoking":

(10) K_1 : $\neg$

$$\boxed{\begin{array}{l} b \\[4pt] \boxed{\begin{array}{l} \text{STOP}(b,e), \\[6pt] PRES : \boxed{\begin{array}{l} e \\ e : \text{SMOKE}(b) \end{array}} \end{array}} \end{array}}$$
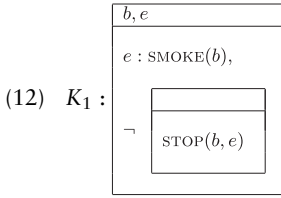
(10) is a "preliminary DRS," which represents the state of affairs before presuppositions have been resolved. There is no appropriate antecedent for the presupposition here, i.e. there is no material in higher DRSs that entails that Bill used to smoke. So, the presupposition moves up into the matrix DRS labeled K_1:

(11) K_1 :

$$\boxed{\begin{array}{l} b \\[4pt] PRES : \boxed{\begin{array}{l} e \\ e : \text{SMOKE}(b) \end{array}}, \\[6pt] \neg \boxed{\text{STOP}(b,e)} \end{array}}$$

trigger a presupposition, for example the name 'Bill' triggers a presupposition that there is an individual identical to Bill. We ignore this in what follows.

6   More specifically, the notation $e : smoke(b)$ means that there is a (past) event e in which b, i.e. Bill, smokes.

7   Roughly equivalent statements of the binding theory can be found in (van Der Sandt, 1992) and (Geurts, 1999).

This is supposed to explain why a discourse-initial utterance of (1b) presupposes that Bill used to smoke. If the presupposition is accommodated, then its discourse referents will be combined with the universe of K_1, as will its conditions:

(12) K_1 :

To see how presuppositions may be bound, consider the following discourse:

(13)   Bill used to smoke. But he stopped smoking.

The DRS corresponding to the first sentence in (13) is given in (14a), while the DRS corresponding to the second sentence is given in (14b):[8]

(14)   a. K_1 :

       b. K_1 :
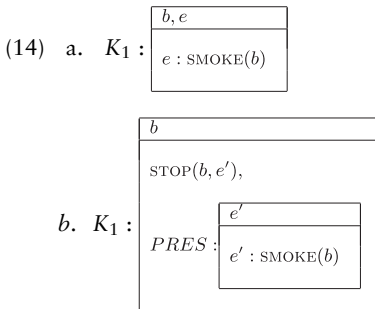
Consecutive sentences in a sequence are treated like conjunctions, and conjunction corresponds to the operation of "DRS merge" (Geurts et al., 2016). This involves combining universes of discourse and conditions into a single DRS. For (14a) and (14b), this yields (15):

(15) K_1 :
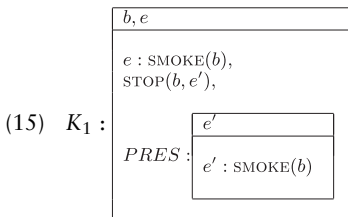
(15) is a preliminary DRS which represents the state of affairs after merging has taken place, but before presuppositions have been resolved. The presupposition that Bill used to smoke has an appropriate antecedent in the main DRS. Presupposition resolution algorithms dictate

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8   Strictly speaking, standard treatments use different variables for a pronoun and its antecedent (e.g. 'Bill' and 'he' in (13)) at the initial stage of DRS construction. These discourse references are then only equated at the stage of anaphora/presupposition resolution. See (Kamp et al., 2011; Maier, 2015) for discussion. But since nothing hangs on it, we suppress this step in our representation of DRSs. However, we will still use distinct variables for non-pronominal anaphora and their antecedents, e.g. as with the event variables e and e' in (14a) and (14b) below.

that the presupposition should be bound there, which involves equating the event e with the event e'. This yields (16):

(16) K_1 :
$$\boxed{\begin{array}{l} \underline{b, e} \\ e : \text{SMOKE}(b), \\ \text{STOP}(b, e) \end{array}}$$
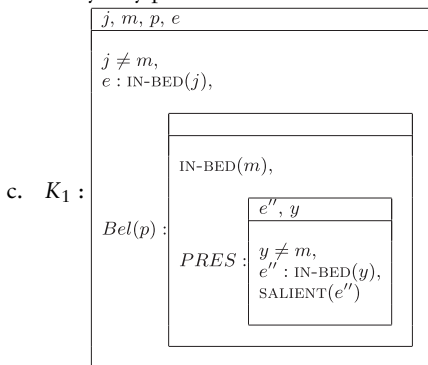
(16) has no unresolved presuppositions, since all presuppositions in the preliminary DRS have found appropriate antecedents. This is supposed to explain why (13) presupposes nothing.

Now let us turn to attitudes. The binding theory maintains (i) that the matrix context is accessible to attitude contexts, which means that presuppositions triggered in attitudes may percolate up to the matrix DRS; and (ii) that non-doxastic attitudes are "parasitic" on belief in the sense that belief contexts are accessible to non-doxastics, which means that presuppositions triggered inside a subject's non-doxastic attitudes may be bound in their beliefs.[9]

To illustrate, let us consider how the account explains why additive particles do not put constraints on the subject's beliefs. A preliminary DRS for (17b) (repeated from above) is given in (17c):

(17)   *Context*: John and Mary are talking to each other over the phone.
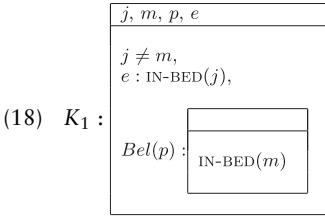   a.   John: I am already in bed.
    b.   Mary: My parents think I am also in bed.
    c. K_1 :

$$\boxed{\begin{array}{l} \underline{j,\ m,\ p,\ e} \\ j \neq m, \\ e : \text{IN-BED}(j), \\ \\ Bel(p) : \boxed{\begin{array}{l} \text{IN-BED}(m), \\ PRES : \boxed{\begin{array}{l} \underline{e'',\ y} \\ y \neq m, \\ e'' : \text{IN-BED}(y), \\ \text{SALIENT}(e'') \end{array}} \end{array}} \end{array}}$$

The DRS-labeled *Bel(p)* is Mary's parents' 'belief DRS' that is supposed to represent the content of her parents' reported beliefs. The presupposition that there is a conversationally salient event involving someone distinct from Mary being in bed has an appropriate antecedent in the matrix DRS K_1.[10] So, presupposition resolution algorithms dictate that the presupposition should be bound there. This yields (18):

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9   See, e.g. (Geurts, 1999) and (Maier, 2015). The treatment of attitudes in DRT that we present below is essentially a simplified version of Maier's (2015) account. But the challenge raised in §3 carries over to Geurts' approach as well. Indeed, we will present a challenge for virtually any implementation of the binding theory that assumes (i) and (ii) above.

10   Although we have not indicated this explicitly, we assume that every event in the matrix DRS is automatically salient.
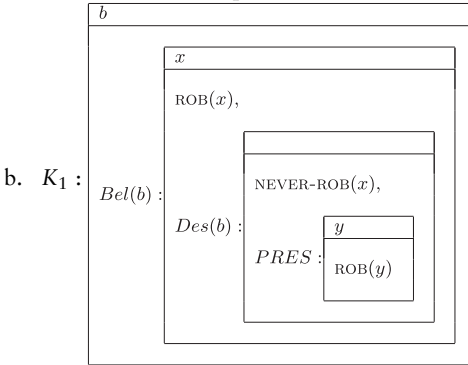
(18) K_1 :

$$\boxed{\begin{array}{l} j, m, p, e \\[4pt] \hline j \neq m, \\ e : \text{IN-BED}(j), \\[6pt] Bel(p) : \boxed{\text{IN-BED}(m)} \end{array}}$$

(18) has no unresolved presuppositions, which explains why the discourse comprised of John's and Mary's utterances does not presuppose anything. More specifically, the presupposition triggered by 'also' is resolved in the matrix DRS, *not* Mary's parents' belief DRS. So, Mary's parents are not required to have any beliefs about which propositions are contextually salient for John and Mary.

To illustrate projection from non-doxastics, let us consider a "de re" construal into a subject's beliefs (Ninan, 2008; Yanovich, 2011; Maier, 2015; Blumberg, 2018; Blumberg, 2023). For instance, (19a) has a reading on which the definite is resolved in Bill's beliefs; it means something like 'Bill wishes that the person *who he thinks robbed him* had never robbed anyone'. A preliminary DRS for (19a) is given in (19b):[11]

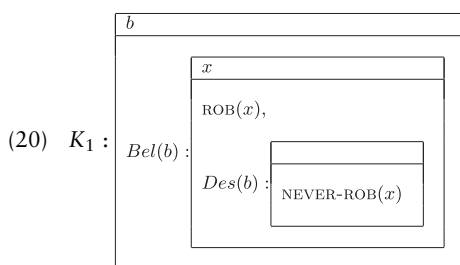(19) *Context*: Bill thinks that somebody robbed him but nobody actually did …
   a.   Bill wishes that the person who robbed him had never robbed anyone.

   b. K_1 :

$$\boxed{\begin{array}{l} b \\[4pt] \hline Bel(b) : \boxed{\begin{array}{l} x \\ \hline \text{ROB}(x), \\[4pt] Des(b) : \boxed{\begin{array}{l} \text{NEVER-ROB}(x), \\[4pt] PRES : \boxed{\begin{array}{l} y \\ \hline \text{ROB}(y) \end{array}} \end{array}} \end{array}} \end{array}}$$

The DRS-labeled $Des(b)$ is Bill's "desire DRS" that is supposed to represent the content of Bill's reported desires.[12] The presupposition triggered by the definite, namely that there is someone who robbed Bill, has an antecedent in Bill's belief DRS. So, the presupposition will be bound there, yielding (20):

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11   In (19b) and below we "lexicalize negation" and represent x's failure to rob as never-rob(x) rather than through a negated DRS that includes the condition rob(x). We do this to avoid clutter in our presentation of DRSs; it makes no substantial difference to our arguments.

12   Even though a subject's desire DRS is embedded inside their belief DRS, the former should not be taken to be a standard DRS condition of the latter. Instead, the relationship between these DRSs is given in terms of a two-dimensional notion of a DRS "capturing a subject's overall mental state"—see (Maier, 2015) for the details. Also, some desire DRSs are "improper" in the sense that their conditions contain variables not represented in their respective universe of discourse. This is also handled by appealing to the two-dimensional notion mentioned previously.

(20) K_1 : $\boxed{\begin{array}{l} b \\ Bel(b) : \boxed{\begin{array}{l} x \\ \text{ROB}(x), \\ Des(b) : \boxed{\boxed{\text{NEVER-ROB}(x)}} \end{array}} \end{array}}$

Once again, all presuppositions are resolved. In particular, the presupposition triggered by the definite is resolved in Bill's belief DRS, *not* Bill's desire DRS. So, Bill is not required to have the incoherent desire that there exists someone who both robbed him and never robbed him.[13]

To summarize, the binding theory tries to capture presupposition projection out of attitudes by making belief DRSs accessible to non-doxastics DRSs, and by allowing presuppositions triggered in attitudes to be resolved in the matrix DRS. As we show in the next section, these conditions lead to serious overgeneration.
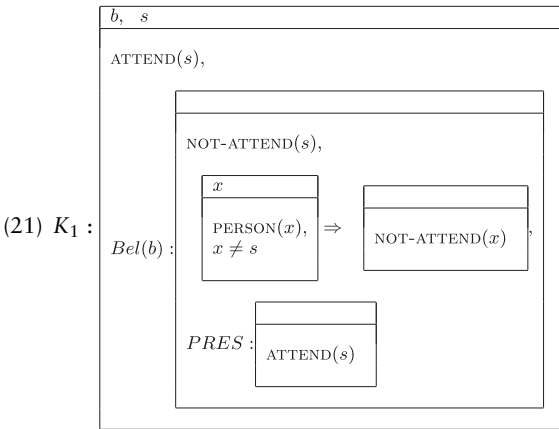
3. A PROBLEM

As we have seen, according to the binding theory a presupposition need not be bound in the DRS in which it is triggered. Instead, a presupposition can be bound in any accessible DRS that contains an appropriate antecedent for the presupposition. In particular, a presupposition triggered in an attitude DRS can be bound in any accessible DRS, regardless of what that subject's attitude DRS is like. However, consider the following examples (repeated from §1):
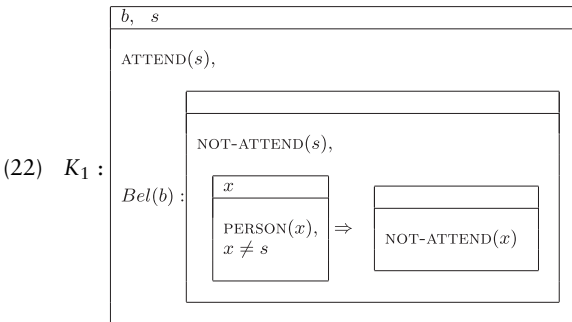
(5)   Sue will come to the party, but Bill is sure that she will not.
    a.   # He is sure that only Sue will come to the party.
    b.   ≉ He is sure that nobody else will come to the party either.
(6)   Sue used to smoke regularly, but Bill is sure that she has never smoked up to now.
    a.   # He hopes that Sue stopped smoking.
    b.   ≉ He hopes that Sue does not smoke now.
(7)   Bill thinks there are two statues in Mary's garden.
    a.   # He is imagining that there were three statues and both fell.
    b.   ≉ He is imagining that there were three statues and all (of them) fell.

According to our own intuitive judgments (and those of our informants) there are simply no good readings of the (a)-sequences; they are incoherent. However, the binding theory predicts that these should be equivalent to the perfectly acceptable (b)-sequences. Let us illustrate with (5a). Let us assume, as is standard, that ⌜only x VPs⌝ entails that no one other than x VPs, and presupposes that x VPs (Horn, 1969; von Fintel, 1999; Coppock & Beaver, 2015). Then the preliminary DRS for (5a) will look as follows:

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13   It is worth noting that Romoli & Sudo (2009) also argue for a broadly presuppositional approach to de re construal, although they do not explicitly frame their account in terms of DRT or the binding theory.

(21) K_1 :

$$\boxed{\begin{array}{l} b, \quad s \\[4pt] \text{ATTEND}(s), \\[4pt] Bel(b) : \boxed{\begin{array}{l} \text{NOT-ATTEND}(s), \\[6pt] \boxed{\begin{array}{l} x \\ \hline \text{PERSON}(x), \\ x \neq s \end{array}} \Rightarrow \boxed{\text{NOT-ATTEND}(x)} \, , \\[20pt] PRES : \boxed{\text{ATTEND}(s)} \end{array}} \end{array}}$$
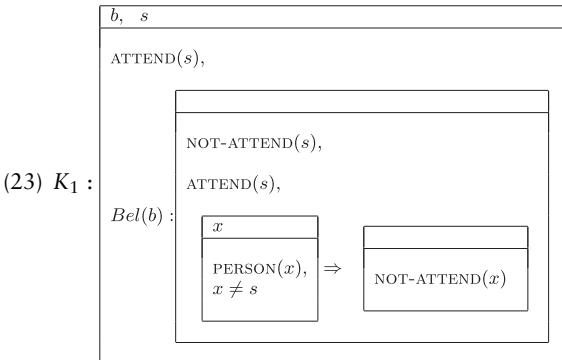
Since there is an appropriate antecedent for the presupposition in the global DRS, presupposition resolution algorithms dictate that the presupposition should be bound there. This yields (22):

(22) K_1 :

$$\boxed{\begin{array}{l} b, \quad s \\[4pt] \text{ATTEND}(s), \\[4pt] Bel(b) : \boxed{\begin{array}{l} \text{NOT-ATTEND}(s), \\[6pt] \boxed{\begin{array}{l} x \\ \hline \text{PERSON}(x), \\ x \neq s \end{array}} \Rightarrow \boxed{\text{NOT-ATTEND}(x)} \end{array}} \end{array}}$$

But (22) represents a perfectly coherent state of affairs, and corresponds to the DRS for (5b). The other (a)-examples presented above raise a similar issue.

We should be clear about what the problem is here. Notice that the binding theory does predict that there should be a bad reading of, e.g. (5a). This will be one where instead of the presupposition being bound at the matrix level, it is accommodated in Bill's belief DRS. The result is illustrated in (23):

(23) K_1 :

$$\boxed{\begin{array}{l} b, \quad s \\[4pt] \text{ATTEND}(s), \\[4pt] Bel(b) : \boxed{\begin{array}{l} \text{NOT-ATTEND}(s), \\[4pt] \text{ATTEND}(s), \\[6pt] \boxed{\begin{array}{l} x \\ \hline \text{PERSON}(x), \\ x \neq s \end{array}} \Rightarrow \boxed{\text{NOT-ATTEND}(x)} \end{array}} \end{array}}$$

(23) attributes incoherent beliefs to Bill: he is required to believe both that Sue will and will not attend the party. So, accommodation of the presupposition does yield a bad reading of (5a). However, the challenge posed by (5a)–(7a) is that there are simply *no* good readings of these reports. So, although the binding theory predicts that there should be *some* bad readings, it also predicts that the default, or most salient, readings should be perfectly acceptable.

It is worth observing that a similar problem arises with counterfactual conditionals. Notice that presuppositions in the antecedents of counterfactuals project. For example, (24) presupposes that Bill smoked in the past:

(24)   If Bill had stopped smoking, then Mary would have been happy.

Thus, the binding theory must allow that the matrix DRS is accessible to the antecedent DRS. But then we can construct examples analogous to our target sequences:

(25) Sue came to the party.
    a.   # If only Sue had come to the party and Sue had not come to the party either, then it would have been dreary.
    b. ≉ If nobody had come to the party, then it would have been dreary.
(26) There are two statues in Mary's garden.
    a.   # If there had been three statues and both had fallen, then Mary would have been upset.
    b. ≉ If there had been three statues and all (of them) had fallen, then Mary would have been upset.

Clearly, the (a)-sequences are not equivalent to the (b)-sequences, but they should be if the presuppositions triggered in the antecedent can be bound in the matrix DRS. In short, the problem we have raised for the binding theory does not only arise for attitude reports, but other constructions as well. This should be kept in mind even though in the discussion that follows we will, for convenience, continue to focus on attitude reports.

4. RESPONSES

In this section, we consider some responses to the problem raised in §3. First, we consider a pragmatic account from Geurts (1999) (§4.1). Then we assess the prospects for a principle inspired by Zeevat (1992), which copies presupposed material into the relevant DRSs (§4.2). Finally, we discuss a response which imposes a consistency condition on presupposition resolution from Zeevat (2005) (§4.3). We argue that each response has shortcomings.

4.1. *Importation*
The first response that we will consider is from Geurts (1999). Following others, he observes that a report, such as (27) gives rise to a 'two-sided inference' (167):

(27)   Bill thinks it was Mary who tripped him.

Not only do we infer that someone tripped Bill but also that Bill believes that someone tripped him. Geurts calls the former inference the "e-inference" (for *external*), and the latter inference the "i-inference" (for *internal*). The e-inference is predicted by the binding theory through the presupposition triggered by the cleft rising to the matrix DRS. However, the i-inference is not. Instead, Geurts maintains that this stems from a pragmatic mechanism which he calls "Importation": 'if a presupposition is neither bound nor accommodated within the

belief context in which it is triggered (hence is projected to an external position), it will often be construed internally, to boot' (164). That is, presupposed material will be "imported" into the subject's beliefs. Geurts does not provide clear conditions on when Importation is licensed. However, he seems to suggest that triviality of the reported belief is sufficient for Importation to occur. Geurts tries to motivate this as follows. Suppose, as is standard, that the complement in (27) presupposes that some individual x tripped Bill, and asserts that x is identical to Mary. Then, once presuppositions have been resolved, (27) is equivalent to (28):

(28)   Some individual x tripped Bill and Bill thinks that Mary is x.

The embedded clause reports that Bill believes Mary is identical to x, but all descriptive content relating to x is outside the scope of the attitude report. So, Bill is not predicted to ascribe any particular qualities to x, and the belief ascription in (28) essentially reports that Bill believes Mary is identical to someone. According to Geurts, this belief is fairly trivial, so hearers will assume that this is not all that the speaker meant. More specifically, they will "import" the presupposition that x tripped Bill into Bill's beliefs, and ultimately infer that Bill also believes that x, i.e. Mary, tripped him.

Returning to the problematic examples from §3, the idea would be that in, e.g. (5a), Importation is operative and implies that Bill thinks Sue will attend, which contradicts the given information, and thus explains why the sequence is bad.

(5)   Sue will come to the party, but Bill is sure that she will not.
    a.   # He is sure that only Sue will come to the party.
    b.   ⊀ He is sure that nobody else will come to the party either.

However, the central concern with this approach is simple: since the conditions in which Importation is supposed to operate have not been specified, it is unclear why it should apply in our cases. For instance, our examples do not satisfy the condition of triviality motivated by examples such as (28). For example, in (5a) the belief ascribed to Bill is that Bill thinks nobody distinct from Sue will attend the party. This belief is in no obvious sense trivial, and it is not clear why speakers would find this to be an insubstantial piece of information. Of course, this is not to say that Geurts' account could not be developed further to handle our target sequences. But we leave it to proponents of this approach to say more about the constraints on Importation, and show that they generate the right results in our cases.[14]

4.2. *Copying*

The second response that we will consider is essentially from Zeevat (1992).[15] On this proposal, when a presupposition triggered in an attitude DRS is bound by an antecedent outside of that DRS, a copy of the presupposition is left in the relevant attitude DRS, as well as any attitude DRS between the triggering site and the binding site. These copies

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14   It is also worth noting that, as stated, Importation is an attitude-specific mechanism. Thus, it is unclear how this process could account for the data involving counterfactual conditionals discussed at the end of §3. Thanks to an anonymous reviewer for helpful discussion here.

15   Zeevat (1992) notes that 'Mary left and John believes that Bill regrets that Mary left' is acceptable only if John believes that Mary left, and that this poses a problem for the binding theory.

are then accommodated in their respective attitude DRSs. Let us call this *the copying principle*:

> **The Copying Principle:** If a presupposition *PRES* triggered in an attitude DRS K_0 is bound by an antecedent in DRS K_n, then (i) a copy of *PRES* is added to K_0 as well as every accessible DRS between K_0 and K_n; and (ii) if *PRES* is added to DRS K_i at step (i), then *PRES* is accommodated in K_i.

To see how the copying principle accounts for the badness of our sequences, consider (5a) once again:

(5) Sue will come to the party, but Bill is sure that she will not.
    a.   # He is sure that only Sue will come to the party.
    b.   ⚹ He is sure that nobody else will come to the party either.

The preliminary DRS for (5a) looks as follows (repeated from above):
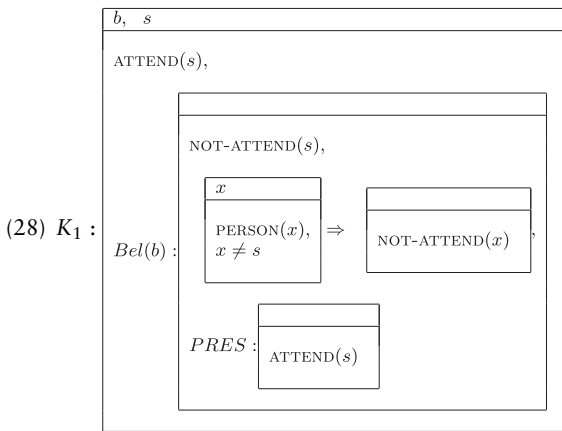
(28) K_1 :

Since there is an appropriate antecedent for the presupposition in the global DRS, presupposition resolution algorithms dictate that the presupposition should be bound there. But the copying principle dictates that as this presupposition moves from Bill's belief DRSs, a facsimile of this presupposition should be placed there, and should be accommodated. This yields (29):

(29) K_1 :
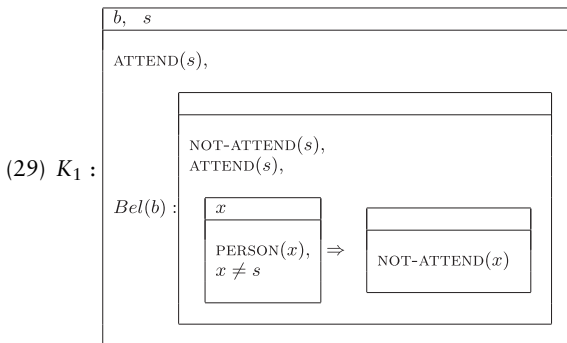
But (29) attributes incoherent beliefs to Bill: he is required to believe both that Sue will and will not attend the party. So, the copying principle explains why (5a) is unacceptable, and is not equivalent to (5b).

However, the copying principle essentially recreates a central aspect of the satisfaction theory's treatment of attitudes: presuppositions triggered inside the scope of attitudes are required to be believed by the ascribee. Thus, the copying principle brings the binding theory closer to the satisfaction theory, at least when it comes to attitudes. This is significant because it means that the binding theory in combination with the copying principle cannot capture either de re construals or additive particles.[16] Recall that the binding theory tries to capture de re construals by maintaining that the relevant presupposition is bound in the matrix DRS. However, the copying principle interferes with this type of resolution. For instance, consider (4) from §1:

(4)   Sue thinks her idiot boyfriend is a genius.

As the presupposition triggered by the definite moves out of Sue's belief DRS, the copying principle forces us to add the presupposition to this DRS. But this leads to incoherence, so (4) is predicted to be bad.[17]

To be sure, binding theorists could use other, non-presuppositional mechanisms to resolve the ambiguities that arise when determiner phrases interact with intensional operators, e.g. world pronouns, "split-scope", etc.[18] However, for binding theorists, appealing to such accounts would constrain their ambitions considerably, and delimit the intended application of the binding theory. Indeed, it is a central goal of the binding theory to be able to capture the relevant ambiguities through presuppositions (Geurts, 1999; Maier, 2009; Maier, 2015). Geurts (1999, 147) is very explicit about this:

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16   Geurts (1999, 136–137) raises a conceptual worry for the copying principle. He says that the proposal 'lacks a sound conceptual foundation', since 'presuppositions are supposed to be *given* pieces of information. What could ever be the rationale for requiring that the same piece of information be given more than once?' (my emphasis). However, if we take note of a suggestion of Schlenker (386, 2011b)'s, it is not clear how compelling this worry is. The binding theory takes its inspiration from the mechanisms of anaphora resolution. One could then see the structures that result from the copying principle as involving split antecedents, e.g. as analogous to examples such as (30), where *PRO* has both *Mary* and *John* as antecedents:

(30) Mary[1] wondered whether John[2] really wanted $PRO_{1,2}$ to meet at 1 a.m. (Schlenker, 2011, 386).

17   In response, some might be tempted to appeal to Maier's (2009) account of de re construal. Maier essentially marries an acquaintance-based account of the de re with the binding theory. The idea would be that in cases of de re construal, the material that gets checked for consistency is not identical to the triggered presupposition, but rather involves reference to a salient "acquaintance relation". We will not try to make this proposal more precise, since it simply is not general enough. At best, it still predicts that belief-relative construals, e.g. (19a) ('Bill wishes that the person who robbed him had never robbed anyone') from §2 should be unacceptable, since such construals cannot be said to involve acquaintance with an existing individual.

18   See e.g. (von Fintel & Heim, 2011), (Keshet, 2008), and (Blumberg, 2018) for the world pronoun approach; and see (Keshet, 2010) for an account that involves split-scope.

> If presuppositions already have a natural tendency to float up from embedded positions anyway, why should they need help from a mechanism for de re construal? I take it that we should prefer a theory that is in a position to say that de re interpretations of presuppositional expressions are the outcome of the standard mechanisms of presupposition projection, and that a special mechanism for de re construal is only required in exceptional cases, as with marked indefinite noun phrases. Given the theory that I present below, all typical de re construals fall out automatically as instances of presupposition projection, and I take it that, ceteris paribus, this type of account is to be preferred...

So, although binding theorists could perhaps capture, e.g. the de dicto/de re distinction by non-presuppositional means, this will be a fairly significant cost.

As for additive particles, consider (3) once again:

(3) *Context*: John and Mary are talking to each other over the phone.
     a.   John: I am already in bed.
     b.   Mary: My parents think I am also in bed (Heim, 1992).

The presupposition triggered by 'also' in the complement of (1) is that there is a conversationally salient proposition to the effect that someone distinct from Mary is in bed. As this presupposition moves out of Mary's parents' belief DRS, the copying principle forces us to add the presupposition to this DRS. But this could well lead to falsity, e.g. suppose Mary's parents are certain that Mary is fast asleep, and not talking to John.

The binding theorist might hope to respond to these problems by applying the copying principle selectively, on a trigger-by-trigger basis. The idea is that some triggers, e.g. 'only', require the copying principle, but other triggers, e.g. definites and additive particles, do not. One challenge for this response is to make the distinction between the types of triggers sufficiently clear and precise. To make this challenge more concrete, consider Zeevat's (1992, 397–398) distinction between "resolution triggers" and "lexical triggers". The primary function of resolution triggers is to 'collect entities from the environment in order to say new things about them'. Prime examples of resolution triggers are supposed to be definite descriptions. On the other hand, lexical triggers 'are concepts with...applicability conditions. In these cases, the application of a concept is only an option if certain conditions are already met. The conditions that must be met are the lexical presuppositions of the concept'. Prime examples of lexical triggers are supposed to be 'sortal information associated with verbs and nouns...[and]...the preconditions of actions and states'. Zeevat then suggests that lexical triggers, but not resolution triggers, are governed by the copying principle.

Zeevat's distinction fails to yield a clear and appropriate categorization. Virtually all presupposition triggers have applicability conditions, and apply only if 'certain conditions are already met'. So it is difficult to see why, for example, definite descriptions do not count as lexical triggers. Moreover, at a fairly intuitive level, the primary function of a trigger, such as ′both NP′ is to collect the two NPs from the environment in order to say new things about them. Does this make 'both' a resolution trigger? If so, how should we explain why (7a) is not equivalent to (7b)?

(7) Bill thinks there are two statues in Mary's garden.
     a.   # He is imagining that there were three statues and both fell.
     b.   ⤳ He is imagining that there were three statues and all (of them) fell.

And if 'both' should not be classified as a resolution trigger, why not? What principled distinction can be drawn between definite descriptions on the one hand, and quantifiers, such

as 'both' on the other? More generally, the worry here is that the resolution trigger/lexical trigger distinction feels more like a redescription of the problem rather than a solution to it.

A further possible concern with basing applications of the copying principle on a distinction between triggers comes from Tonhauser et al. (2013). On one view of additive particles, these triggers place no constraints on their local contexts.[19] However, Tonhauser et al. (2013) argue that this is incorrect, and that even additive particles trigger some presuppositions that must be locally satisfied. To motivate this, they provide the following variants of (3):

(31) *Context*: John and Mary are talking to each other over the phone.
    a.   i.   John: I am already in bed.
        ii. # Mary: My parents think I am also in bed but that you aren't.[20]
    b.   i.   John: I am wearing the PJs that you left behind last time we had a sleepover.
        ii. # Mary: My parents think I am also wearing those PJs.

As Tonhauser et al. observe, both (31a-ii) and (31b-ii) are "strikingly unacceptable" here. On these grounds, they suggest that additive particles come with an "obligatory local implication" that includes both the existence of another individual satisfying the relevant predication, and the possibility that the actual antecedent in the discourse is true (101–102).[21] If this is correct, then the copying principle cannot simply be applied on a trigger-by-trigger basis. Instead, it would somehow need to be employed at the level of individual presuppositions. The principle would need to take effect for select presuppositions, e.g. the existential presupposition triggered by 'also', but not others, e.g. the salience presupposition triggered by 'also'. For those wedded to the binding theory, this could be an intriguing place for further work. However, at this point it is not clear to us how exactly such an account could be developed within the DRT framework.

Finally, we end this subsection with a more general concern with the copying principle. As we have seen, according to the binding theory presuppositions are parts of logical forms that are "mobile". This means that when presuppositions are accommodated inside

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19   Tonhauser et al. (2013) attribute this view to Heim (1992).
20   It would also be unacceptable for Mary to say 'My parents think I am also in bed but that nobody else is'.
21   It is worth noting that Tonhauser et al. consider examples similar to our target sequences. More specifically, they observe that sentences such as 'Jane believes that Bill has stopped smoking and that he has never been a smoker' are infelicitous. They argue that triggers such as 'stop' and 'only' have what they call "obligatory local effect": when these triggers are syntactically embedded in the complement of a belief-predicate *B*, the implications they trigger are necessarily part of the content that is targeted by, and within the scope of, *B* (93). Tonhauser et al. conclusions are clearly related to our arguments. However, there are also some important differences. For instance, we consider a richer data set: we show that the target effects also arise with triggers such as 'both' and 'back', and we also consider projection from non-doxastics such as 'hope' and 'imagine'. Moreover, Tonhauser et al. do not draw out the consequences of their examples for existing approaches to presupposition projection, as we do here.

a DRS, they become part of the at-issue content of that DRS.[22] This is significant because Sudo (2012) has proposed a test which allows us to determine whether a presupposition is also at-issue. We will not consider Sudo's work in detail here; we will just report some of the results: according to Sudo's test, the presuppositions triggered by 'again' and 'back' do not form part of at-issue content (Zehr & Schwarz, 2018).[23] Once again, proponents of the binding theory might hope to respond to this problem by applying the copying principle selectively, on a trigger-by-trigger basis. The idea is that the copying principle would not apply to triggers like 'back' and 'again'. However, this move would fail to solve the problem that motivated the copying principle in the first place. As (34) shows, these triggers also exhibit the relevant effects:[24]

(34) a.   # Bill thinks that Mary's computer crashed in the past. Now he is imagining that Mary's computer crashed again for the first time.

   b.   # Bill thinks that Mary went to the shops earlier today. Now he is imagining that she went back to the shops and did not go to the shops earlier today.

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22 It is important to distinguish between the copying principle, and a proposal on which presupposed material forms part of the at-issue meaning of the trigger from the beginning. The latter approach (but not the former) predicts that all presuppositions should have antecedents in the DRS in which they are triggered, and should be bound there (assuming standard resolution algorithms), i.e. it essentially predicts that there should be no presupposition projection. Thanks to Cleo Condoravdi for helpful discussion here.

That said, it is worth mentioning a further potential challenge for the copying principle. It is generally taken to be very difficult/impossible to accommodate the presuppositions triggered by certain triggers, e.g. 'too'. But it is fairly straightforward to construct variants of our examples featuring such triggers, for instance:

(32) Sue will come to the party, but Bill is sure that she will not.

     # But he thinks that Mary will come to the party too.

     ⚇ But he thinks that Mary will come to the party.

One might wonder how the copying principle could handle such examples given its reliance on accommodation.

23 Sudo's test essentially involves embedding the relevant trigger in a non-monotonic environment, e.g. under the quantifier 'exactly one'. For instance, Sudo suggests that the presupposition triggered by 'again' is not also part of at-issue content by considering cases such as the following (Zehr & Schwarz, 2018):

   Context: we have two Linux computers and two Windows computers. The two Linux computers always crashed at launch last week, but the two Windows computers never crashed. This week, it was one of the two Linux computers and one of the two Windows computers that always crashed at launch . . .

(33) Exactly one computer crashed again this week.

   a. ⚇ The number of computers that continued to crash is one.

   b. ≈ The number of computers that just crashed is one.

Intuitively, (33) is false in context, and is similar in meaning to (33b). However, if the presupposition was also at-issue, then (33) would be roughly equivalent to (33a), which is true. For a detailed discussion of Sudo's test, see (Schwarz & Zehr, 2016) and (Zehr & Schwarz, 2018).

24 Zehr & Schwarz (2018) point out that there are also broader theoretical considerations that militate against treating all presuppositions as at-issue. In particular, both Gajewski (2011) and Chierchia (2019) argue that non-entailed presuppositions play an important role in explaining NPI licensing. More specifically, Chierchia argues that emotive factives such as 'surprise' and 'regret' do not entail their presuppositions. But it is quite easy to construct variants of our examples from §3 featuring these verbs.

4.3. Consistency

The final response we consider imposes a consistency condition on presupposition resolution. The proposal we discuss comes from (Zeevat, 2005).[25] Zeevat maintains that presuppositions should be resolved relative to "incremented consistent" DRSs. Incremented consistent DRSs are constructed recursively as follows: given a base DRS, increment this set with as many conditions as possible from the most directly accessible DRS, while preserving consistency.[26] To illustrate, consider (35):

(35) K_1 :

HAPPY(b)

K_2 :

TALL(b)

K_3 : SAD(b)
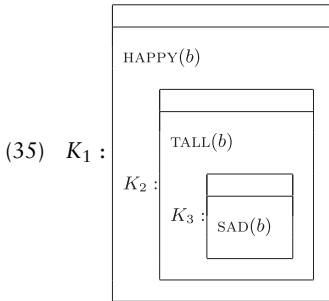
Let us suppose that K_3 is the base set, containing the condition that Bill is sad. In order to construct the incremented consistent set corresponding to (35), we must check which conditions in K_2 are consistent with K_3. The only relevant condition in K_2 is the condition that Bill is tall. Bill being tall is consistent with him being sad, so $tall(b)$ is added to K_3. Let us call the resulting DRS K'. Next we must check whether the conditions in K_1 are consistent with K'. The only relevant condition here is the condition that Bill is happy, which is not consistent with him being sad. So $happy(b)$ cannot be added to K'. Thus the maximal incremented set in this case is just K'.

Zeevat proposes that presuppositions should be resolved relative to incremented consistent DRSs, with the base DRS given by the relevant trigger site. Let us call this resolution process *the consistency principle*:

> **The Consistency Principle:** Presuppositions should be resolved relative to incremented consistent DRSs, with the base DRS given by the relevant trigger site.

Given standard assumptions about DRS accessibility, the consistency principle implies that presuppositions triggered in a belief DRS should be resolved relative to the belief DRS with the addition of as many conditions from the matrix DRS as possible while still preserving consistency. Similarly, presuppositions triggered in a desire DRS should be resolved relative to the desire DRS with the addition of as many conditions from the belief and matrix DRSs as possible (while still preserving consistency).

The consistency principle can explain why the examples from §3 are unacceptable, for instance (5a):

25 Zeevat's (2005) account is motivated by the observation that examples such as 'Jane has been to Spain before, but Harry believes that she has made that up and also that she will go there again next week' are unacceptable.

26 We leave our presentation of Zeevat's account at a fairly informal level. See his paper for a much more precise implementation.

(5) Sue will come to the party, but Bill is sure that she will not.
  a. \# He is sure that only Sue will come to the party.
  b. ≉ He is sure that nobody else will come to the party either.

Here is the preliminary DRS for (5a) once again:

(21) K_1 :
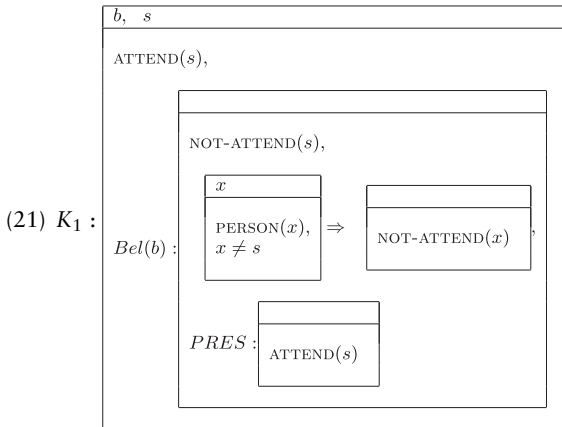
Since Bill's belief DRS contains the condition that Sue will not attend, the incremented consistent DRS corresponding to (21) contains this condition as well. Thus, the information that Sue will attend in the matrix DRS will not appear in the incremented consistent DRS, and so this information cannot be used to resolve the presupposition triggered by 'Only Sue will attend'. Put another way, Bill's belief that Sue will not attend "screens off" the antecedent in the matrix DRS, so that the presupposition cannot be bound there. The presupposition cannot be consistently accommodated in the incremented DRS either. So, (5a) is predicted to be infelicitous.

    The consistency principle also does better than the copying principle in some respects. For instance, it is able to capture additive particles. Consider (3) once again:

(3) *Context*: John and Mary are talking to each other over the phone.
  a. John: I am already in bed.
  b. Mary: My parents think I am also in bed (Heim, 1992).

The incremented consistent DRS based on Mary's parents' beliefs will include the condition that John is in bed. Thus, there will be an appropriate antecedent for the presupposition triggered by 'also' inside this DRS, and the presupposition will be bound. Moreover, the consistency principle derives Tonhauser et al.'s (2013) observations about local implications discussed in §4.2. For instance, it predicts that Mary's reply should degrade if it is made explicit that her parents do not think that anyone else is in bed:

(36) *Context*: John and Mary are talking to each other over the phone.
  a. i.   John: I am already in bed.
      ii. \# Mary: My parents think I am also in but that nobody else is.

For in this case the incremented consistent DRS based on Mary's parents' beliefs will not include the condition that John is in bed, so the presupposition triggered by 'also' cannot be bound. The presupposition cannot be consistently accommodated inside the incremented consistent DRS either.

    Finally, the consistency principle does not require that presupposed material become at-issue, and so does not struggle with the problems raised by Sudo's test discussed in §4.2.

However, just like the copying principle, the consistency principle undermines some of the original arguments for DRT over the satisfaction theory, and makes several problematic predictions. We take each point in turn. First, the binding theory in combination with the consistency principle cannot capture de re construals. For instance, consider (4) again:

(4)   Sue thinks her idiot boyfriend is a genius.

The condition that Sue's boyfriend is a genius is inconsistent with the condition that he is an idiot, so the incremented consistent DRS based on Sue's beliefs does not contain a suitable antecedent for the definite description in (4). Thus, the presupposition cannot be bound. Moreover, the presupposition cannot be consistently accommodated in the incremented consistent DRS. So, (4) is predicted to be unacceptable.[27]

Second, the consistency principle only predicts infelicity when either (i) the subject's attitude DRSs contain information that contradicts the relevant presupposition, which screens off antecedents in non-attitude DRSs; or (ii) DRSs accessible from attitude DRSs contain material that contradicts the presupposition, and so antecedents in more distantly accessible DRSs are screened off. However, the challenge we have raised for the binding theory does not only come from cases where accessible DRSs contain material that contradicts the relevant presupposition. More specifically, it does not only come from cases where the subject *believes* that the presupposition does not hold. It also arises in cases where the subject is *agnostic* about whether the presupposition holds, i.e. the presupposed material is consistent with, but not entailed by, the subject's beliefs. Consider the following examples:

(37)   Sue will come to the party, but Bill is not sure whether she will come.
    a.   # But he is sure that only Sue will come to the party.
    b.   ⊮ But he is sure that nobody distinct from Sue will come to the party.

(38)   There are two statues in Mary's garden, but Bill is not sure how many statues there are.
    a.   # He is imagining that both statues fell.
    b.   ⊮ He is imagining that all of the statues fell.

These examples are just as infelicitous as their counterparts from §3. However, this cannot be explained by the consistency principle. If Bill is not sure whether Sue will come to the party, then the condition that Sue attends is consistent with Bill's beliefs.[28] Thus, the condition that Sue attends from the matrix DRS will be included in the incremented consistent DRS

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27   In response, some might again be tempted to appeal to something like Maier's (2009) account of de re construal. See fn.17 for discussion.

28   This follows from the familiar 'test' conception of epistemic modality on which epistemic modalized claims do not add any first-order information to the DRSs in which they are embedded, but only test whether these DRSs meet certain consistency constraints (Veltman, 1996). For instance, a DRS K satisfies the condition imposed by 'may p' just in case p can be consistently added to K. Thanks to Cleo Condoravdi, Matt Mandelkern, and an anonymous reviewer for very helpful discussion here.

based on Bill's belief DRS, and the presupposition triggered in Bill's belief DRS will have an appropriate antecedent. Similar remarks apply to (38a).[29]

In response to the problem posed by examples, such as (37a) and (38a), a reviewer suggests a bifurcated strategy: the copying principle from §4.2 should be taken to apply to triggers, such as 'only' and 'both', while the consistency principle covers the rest of the triggers. Although the condition that Sue will come to the party is consistent with Bill's belief DRS in (37a), this condition cannot be coherently copied into Bill's belief DRS, for this would essentially require that Bill both be certain that Sue will come to the party and not be certain that she come. Similarly with (38a). Thus, the thought is that the infelicity of (37a) and (38a) does not stem from the consistency principle, but rather from the copying principle.

There are conceptual concerns with this proposal which are similar to those raised in §4.2. For instance, it remains to be seen whether a principled distinction can be drawn between triggers that induce copying and triggers that induce consistency. But there is also an empirical argument against this approach.[30] Sudo's test implies that triggers, such as 'back' and 'again' do not entail their presuppositions. It follows that the copying principle cannot apply to these triggers, and thus that the consistency principle must apply. Then the (a) examples below are predicted to be equivalent to the (b) examples:

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29 Examples such as (37a) are ones where the original binding theory and the binding theory supplemented with the consistency principle both make incorrect predictions. But there are also cases where the former makes better predictions than the latter. To see this, note that presupposition resolution is partly a semantic matter, and does not require an exact match between presupposed material and its antecedent. In some cases it is sufficient for binding to occur that the target presupposition is merely entailed by prior material. For instance, the presupposition triggered by 'both' in (39) is bound by previous material:

(39) There are at least two presidential candidates, and there are at most two presidential candidates, and both presidential candidates are crooked.

With this observation in mind, consider (40):

(40) There are at most two presidential candidates, but Mary thinks there are at least two.
    a. ?? She thinks that both candidates are crooked.
    b. ⚹ She thinks that all of the candidates are crooked.

According to the consistency principle, the presupposition triggered in (40a) should be resolved relative to an incremented consistent DRS containing the condition that there are at least two candidates (from Mary's beliefs), as well as the condition that there are at most two presidential candidates (from the matrix context). But then given our observation in (39), the presupposition triggered in (40a) should have an antecedent in the incremented consistent DRS, and should be able to be bound. Thus, the consistency principle predicts that (40a) should be equivalent to (40b). However, this is not the case: (40a) sounds odd and implies that Mary thinks there are exactly two candidates, but (40b) is perfectly felicitous and does not carry this implication. Note that the standard binding theory without the consistency principle has a ready explanation for the oddness of (40a). The de re construal of 'both candidates' is blocked, since the only information available in the matrix context is that there are at most two candidates. This information is not sufficient to bind the presupposition triggered by 'both'. So, we then have to try to accommodate the presupposition in Mary's beliefs. This plausibly meets with some resistance given that it has been explicitly specified that Mary believes something weaker than the presupposition. Similar examples featuring other triggers can be constructed. Thanks to Sam Carter for discussion here.

30 Thanks to Cleo Condoravdi for very helpful discussion here.

(41) Sue visited Paris last year, but Bill is not sure whether she has ever visited Paris.
    a.   # But he is sure that Sue will visit Paris again next year.
    b.   ≉ But he is sure that Sue will visit Paris next year.

(42) Sue visited Paris last year, but Bill is not sure whether she has ever visited Paris.
    a.   # But he is sure that Sue will go back to Paris next year.
    b.   ≉ But he is sure that Sue will visit Paris next year.

However, the (a) examples are infelicitous. So, even if the binding theorist tried to selectively implement both the copying principle and the consistency principle, the resulting account still would not be able to capture all of the relevant data.

5. CONCLUSION

The difference between the way in which the binding theory and the satisfaction theory treat our target sequences stems from fundamental differences in the way that presuppositions are understood in each framework. Geurts (1999, 114) describes this contrast in literary terms:

> Although this should not be taken too literally, the binding theory pictures presuppositions as agile creatures eager to leave their homes immediately after they have been triggered, in search for suitable antecedents. The satisfaction theory, on the other hand, pictures presuppositions as lethargic beings that keep hanging around in the neighbourhood, content to get local satisfaction.

What we hope to have shown is that the "agility" of presuppositions on the binding theory is detrimental when it comes to our central examples. On the other hand, the "lethargy" the satisfaction theory attributes to presuppositions puts it in a better position with respect to these cases.

That said, we do not mean to suggest that the satisfaction theory is at an overall advantage when it comes to attitudes. To reiterate, we have focused on our challenge for the binding theory because it has been relatively underdiscussed. But the satisfaction theory has its own concerns. For example, as mentioned in §1 it incorrectly requires that *all* of the presuppositions triggered by additive particles must be locally satisfied, even those pertaining to conversational salience. Heim (1992, 209) suggests that this problem can be solved by employing the same mechanism that is used for de re construals. However, (i) we do not know of any empirically adequate account of de re construal that has application to additive particles; and (ii) our discussion in §4.2 suggests that it would also be incorrect to resolve all of the presuppositions triggered by these particles entirely outside of attitude contexts—some requirements appear to require local satisfaction.[31,32]

In short, neither the binding theory nor the satisfaction theory appears to provide us with a wholly adequate account of presupposition projection out of attitudes. At this point, then, perhaps the most judicious conclusion that should be drawn from our discussion is that there are serious challenges for dynamic treatments of presuppositions in attitude contexts.

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31   In fairness to Heim (1992, 209), she says that she is 'not convinced that [de re construal] is the right approach' to examples involving additive particles.

32   Also see Blumberg (2023) for further concerns with the satisfaction theory's treatment of attitudes, on certain implementations of the approach.

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