Existence Commitments and Presuppositions*

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ABSTRACT Russell's (1905) celebrated analysis of definite descriptions is often said to provide a straightforward way of assigning adequate truth conditions to non-denoting descriptions in attitude contexts. This assumption has however been seriously questioned by Heim (1991), Elbourne (2005, 2008), and Kripke (2005) who argue that Russell's existential analysis yields incorrect predictions in e.g. non-doxastic contexts. Heim and Elbourne both contend that the unfortunate predictions are avoided by a presuppositional analysis. In this paper, I argue that Heim and Elbourne's solution is inadequate and I present an alternative. I contend that the presuppositional analysis is the correct way to solve the problem, but that such a solution requires much more radical semantic changes than Heim and Elbourne assume. I begin, following Hawthorne and Manley (2008), by demonstrating that the problem arises for weak determiners, e.g. indefinites, and I argue that these must be analyzed as triggers of existence presuppositions. Second, I show that if existence presuppositions are captured in terms of partial functions, as is standard, the problem cannot be solved. I then argue that if the puzzle presented is to be solved, we need a semantic framework that is dynamic — i.e. a framework that permits presuppositions to bind into asserted contents.

KEYWORDS presuppositions, weak/strong determiners, presupposition projection, presupposition accommodation, definites, indefinites.

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1 The Existence Puzzle

The gospel among proponents of Russell's (1905) analysis of definite descriptions is that it provides a straightforward way of assigning truth conditions to sentences such as (1), namely sentences with non-denoting descriptions embedded under propositional attitude verbs.

(1) Bertrand believes that the king of France is bald.

Two key features of Russell's analysis enable this assignment of truth conditions, namely (a) that the definite description is analyzed as an existentially quantified formula and thus assumed to assert existence, and (b) the assumption that quantifier scopes resolve de dicto/de re ambiguities. On the true intensional reading of (1), the definite description must take scope under the modal (narrow scope) since this yields an interpretation according to which the existence of a French king is part of Bertrand's belief. The Russellian analysis given in (2) thus appears to predict the correct truth conditions and this prediction requires only the aforementioned conditions (a) and (b) which are already integral parts of the Russellian analysis.[1]

(2) Bertrand believes that [ιx: King of France(x)](bald(x))

Against this often emphasized virtue of Russell's theory, Heim (1991), Kripke (2005), and Elbourne (2005, 2008) observe that Russell's analysis works only for doxastic attitudes. In particular, when definite descriptions are embedded under non-doxastic modal operators, the Russellian analysis yields incorrect predictions. Consider this example from Elbourne (2005, 2008).

(3) Hans wants the ghost in his attic to be quiet tonight.

There is both a narrow and a wide scope interpretation of the definite description in (3) but neither yield the correct truth conditions.

(4) Hans wants that [ιx: ghost-in-Hans'-attic(x)](quiet-tonight(x))
(5) [ιx: ghost-in-Hans'-attic(x)] Hans wants that (quiet-tonight(x))

The narrow scope analysis predicts that Hans desires that there is a unique ghost in his attic and that it be quiet, but this is clearly inconsistent with the most natural interpretation of (3). The truth of (3) is perfectly compatible with Hans also desiring that his attic is ghost-free. Yet the wide scope interpretation is no improvement. To be true, there must be a unique ghost in Hans' attic, but (3) can certainly be true without the ontological requirement that there are ghosts.

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1 I've here adopted Neale's (1990) generalized quantifier notation. The ι-formula abbreviates the classic Russellian analysis of a definite description. $\ulcorner \iota x\text{: } P(x) \urcorner :=_{\text{def.}} \ulcorner \exists x[P(x) \wedge \forall y[P(y) \rightarrow x = y]] \urcorner$.

In other words, regardless of the scopal position of the definite description, Russell's analysis makes an incorrect prediction.

Heim and Elbourne take this deficiency in the Russellian analysis to be an argument in favor of a *presuppositional* analysis of definite descriptions.[2] On a presuppositional analysis, definite descriptions do not assert existence but rather presuppose it. That is, the existence of an individual satisfying the restrictor of the definite is a precondition on felicitous assertion. The definite description is not analyzed as making an existentially quantified claim, but rather as an expression whose use is licensed only if the existence of a unique individual is already established in the discourse context. Moreover, it's assumed (cf. Heim 1992) that when presuppositions are triggered in the scope of a propositional attitude verb, the presupposition *projects* to a belief context. In other words, when [[the ζ] ξ] is embedded under an attitude verb, the precondition on felicitous assertion is not that it's common ground that there is a unique ζ, but rather that the subject of the attitude verb *believes* that there is a unique ζ. So, for a sentence such as (3) to be true, it must be established in the discourse context that Hans believes that there is a ghost in his attic and what is asserted is that Hans wants that ghost to be quiet. This analysis is supposed to evade the problem faced by the Russellian analysis, because the definite description embedded under the attitude verb does not assert the existence of a unique ghost and the existence of a unique ghost is therefore not part of Hans' desire. Intuitively, this is a highly compelling analysis which becomes even more clear if we consider a case where a speaker attempts to convey that Hans *does* have the (somewhat odd) desire that there is a unique and quiet ghost in his attic. Absent substantial contextual clues, such a desire on Hans' part cannot be expressed using a sentence like (3). Rather, the speaker would have to use an *existential-there* sentence, e.g. (6).

(6) Hans wants there to be exactly one ghost in his attic and that it be quiet.

In contrast, the Russellian analysis incorrectly predict that the meanings of (3) and (6) are identical and as a result, a presuppositional analysis appears to have a non-negligible empirical advantage.[3]

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2 The precursors to this analysis were given in Frege (1892, 1918) and vigorously defended in Strawson (1950, 1952, 1964). For this reason it's often labeled the Frege/Strawson analysis.

3 Kaplan (2005) and Neale (2005) both argue that the people who advance this objection have overlooked an important fact, namely that standard entailment relations fail under propositional attitudes. E.g. sentences of the form ⌜S prop[$\phi \wedge \psi$]⌝ fail to entail ⌜S prop[ϕ]⌝. Now, it's correct that standard entailment relations *can* fail in propositional attitudes, but this certainly doesn't mean that these entailments invariably fail. There are numerous cases of conjunctions embedded under propositional attitude verbs where inferences to either conjunct under that attitude are valid. Hence, if definite descriptions are analyzed as existentially quantified conjunctions, an explanation is needed as to why the inferences for these constructions invariably fail. Moreover, as convincingly

2 The Problem for the Presuppositional Solution

Solving the existence puzzle by adopting a presuppositional analysis is however not without its difficulties. Indeed, when the presuppositional analysis is closely examined, it reveals a fundamental concern regarding the existence commitments of natural language determiners and their semantic representations. In the next two sections I outline a particularly pressing problem and argue that in order to solve the existence puzzle, some substantial revisions of standard semantics are required. Subsequently, I suggest a solution to this puzzle.

2.1 Existence Presuppositions and Partial Functions

The existence commitments of definite descriptions can be semantically represented in several ways. Let's begin by distinguishing between at least three.

i. Definite descriptions *assert* existence, i.e. an existential quantifier is part of the asserted content. A speaker uttering a sentence such as [[the ζ] ξ] effectively asserts that a unique ζ exists.

ii. Definite descriptions *presuppose* existence, i.e. there's no existential quantifier in the asserted content, but an existential formula is established in the common ground and this licenses the use of the definite description. A speaker uttering a sentence such as [[the ζ] ξ] does thereby not assert that a unique ζ exists.[4]

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demonstrated in Elbourne (2008), if the existential analysis is adopted, it should license a range of assertions that are clearly infelicitous. For details, please see Elbourne (2008). Another response on behalf of Russell is to assume (a) that the modal 'want' quantifies over a set of desire-worlds, (b) that there's a partial preference ordering on these worlds, and (c) that context restricts the set of worlds, i.e. rules out certain irrelevant worlds. In the context of (3), the relevant worlds are only worlds that contain ghosts, and while these are not among Bertrand's *most desired* worlds, these are the only relevant in the context. In other words, Bertrand's desire is conditional on the contextually determined fact that the available desire-worlds are ghost-worlds. This is a more promising proposal, but it fails to get to the heart of the problem. While both world orderings and contextual world-restrictions are needed for independent reasons, see e.g. Kratzer (1977, 1981), the problematic predictions persist. In particular, we fail to remove the prediction for (3) that Hans desires that there is a ghost in his attic. But Hans needs no such desire for (3) to be true. Now, if the response is that the assertion of existence (in the complement clause) is only a backgrounded world-determining component of the meaning, the question arises how to distinguish, in a non-ad hoc way, the world-determining component of the meaning from the actual desire component of the meaning. It's quite hard to envision how to establish such a distinction, which must be systematic in the case of definite descriptions, without assuming that there are two essentially different types of content. Yet, if there is no systematic way of distinguishing, the existential analysis incorrectly predicts that the sentences (3) and (6) have the same meaning.

4 Here I should dispel what appears to be a common confusion, namely that existence is not entailed on the strictly presuppositional analysis, (ii.). It is, because on any reasonable analysis of presuppositions, a sentence ϕ containing a definite description can be true only if its presuppositions are

iii. Definite descriptions both presuppose *and* assert existence.

The Russellian analysis discussed above corresponds to (i). Here the asserted content contains an existentially quantified formula and existence thus becomes part of the content of the sentence in which it occurs. For this reason the Russellian analysis runs headlong into the problem posed by the existence puzzle; the assertion of existence becomes part of the content on which propositional attitude verbs operate. Two different types of content are distinguished on a presuppositional analysis, namely the presupposed content and the asserted content. The intuitively correct solution to the existence puzzle is to analyze existence as part of the presuppositional content rather than the asserted content and so the challenge is to provide a formal analysis that adequately achieves this goal. Now, since presuppositions effectively constrain assertability, namely by imposing the contextual requirement that the presupposition must be common ground, existence presuppositions are standardly captured using *partial functions*. That is, the definite determiner is treated as a function which is defined only if its input argument, its restrictor set, has exactly one member – and otherwise undefined. This captures the constraint on assertability since a computation of the truth conditions of a sentence containing a definite description succeeds only if the definite's restrictor argument has one unique member. Treating the definite determiner as a quantificational determiner, we can represent this presuppositional requirement formally as in (7).

(7) $[\![\text{The}]\!] : \lambda P\ \exists!xP(x)\ \lambda Q\ .\ \exists x[P(x) \wedge \forall y[P(y) \rightarrow x = y] \wedge Q(x)]$ sem. type: ⟨et,⟨et,t⟩⟩

Here the expression $\ulcorner \exists!xP(x) \urcorner$ (read 'there is exactly one x') is not part of the asserted content but merely an indicator that the initial λ-function is partial — it's only defined if the restrictor set, P, has a cardinality of one. Presuppositionality is thus captured in the sense that unless the restrictor set contains precisely one individual, the computation crashes. For example, consider (8) and (9).

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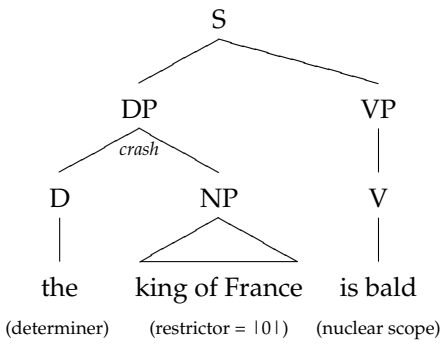
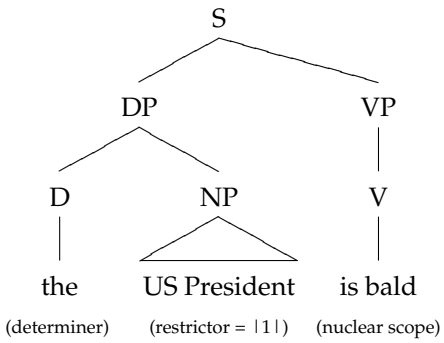
satisfied. And since entailments depend on truth, this means that if ϕ contains a definite description and ϕ is true, it automatically entails the existence of a unique individual satisfying the restrictor (or it could not be true).

(8)



(9)



Since the restrictor set in (8) is empty, the function denoted by the determiner is undefined for this NP argument. And as a result the computation of (8) fails. In contrast, the restrictor set in (9) contains exactly one individual and the computation of D+NP therefore succeeds. The lexical entry in (7) thereby succeeds in imposing the requirement that unless a unique individual satisfying the restrictor exists, a sentence such as (8) fails to express a truth evaluable proposition. However, notice that this lexical entry is not purely presuppositional in the sense of (ii), but rather in the sense of (iii). The asserted content generated by (7) is an existentially quantified formula, so existence is not only presupposed, it's also asserted. For example, a computation of (9) yields the formula in (10).

(10) $\exists x[\text{US-President}(x) \wedge \forall(y)[\text{US-President}(y) \rightarrow x = y] \wedge \text{bald}(x)]$

Even though this lexical entry succeeds in imposing a presuppositional requirement on the definite determiner, it fails as a solution the existence puzzle. If the formula in (10) is embedded under an attitude, the existence of a unique individual becomes part of the content of that attitude. The type (iii) analysis therefore retains the prediction that for (3) to be true, Hans must desire that there is a ghost in his attic, and this is exactly what must be avoided.

In sum, if the correct solution to the existence puzzle is a presuppositional analysis of existence commitments, a *purely* presuppositional analysis in the sense of (ii) is required; an analysis where the asserted content contains no expressions that assert existence. This means that if existence presuppositions are to be captured using partial functions, the pressing challenge is properly characterizing the asserted content. In particular, the challenge is characterizing this content without the use of existentially committing expressions. This is standardly achieved by resorting to a *referential* treatment of the definite determiner. Consider for example, the following lexical entry.[5]

(11) $[\![\text{the}]\!] : \lambda P : \exists!x P(x) \,.\, \iota x\, P(x)$ sem. type: ⟨et,e⟩

This lexical entry is typed as a function from properties to individuals, and again the function is partial, defined only for predicate sets whose cardinality equals one. The ι-expression here is not to be understood as shorthand for a Russellian definite description but rather as a referential term which *refers* to the unique individual established to exist by the partial function. That is, the computation of the definite determiner plus its NP argument succeeds only if the restrictor set contains exactly one individual, and if successful the ι-expression is effectively a constant that names this unique individual. A computation of e.g. (9) thus yields the asserted content [ιx: US-President(x)] which contains no existentially quantified formula. When this is embedded under an attitude verb, the problem posed by the existence puzzle fails to arise.[6] This treatment of definite descriptions combined with previously mentioned auxiliary assumptions about presupposition projection in attitude contexts provides a solution to the existence puzzle as characterized above. It does so because the asserted content on this analysis contains no expressions which assert existence. Here, existence is *only* presupposed.

Whether a referential analysis of definite descriptions is feasible is a much discussed, and in general controversial, issue. I concur with critics of the refer-

5 This (or notational variants) is the standard lexical entry in the formal semantics literature, see e.g. Elbourne (2005), Heim and Kratzer (1998), Schwarz (2009). In some cases the lexical entries are embedded in an (intensional) situation semantics and thus amended to contain λ-abstractions over situation variables. This makes no difference to the points I'm pursuing here. It should also be emphasized that a referential treatment in this sense is compatible with an analysis of the definite determiner where it's typed as a quantificational determiner, viz. a relation between two predicate sets, $[\![\text{the}\,]\!] : \lambda P : \exists!x P(x) \,.\, \lambda Q : Q(\iota x\, P(x))$. However, this is only quantificational in the sense of it having a certain semantic type. The asserted content does not contain any quantificational elements.

6 The formalism here is slightly misleading, because the ι-expression above is not a genuine quantificational formula. If it was, the lexical entry in (11) would be equivalent to the lexical entry in (7) — and it would therefore be unable to solve the existence puzzle. In other words, even if the ι-expression in (11) *appears* to be a variable-binding expression, and thus a genuine quantificational expression, it's not — it should rather be understood as a constant.

ential analysis that it introduces a number of conceptual worries, but since the problem I turn to next demonstrates conclusively that resorting to a referential analysis of the definite determiner fails to solve the existence puzzle, I leave such conceptual worries for another occasion.

2.2 *Existence Commitments and Weak Determiners*

A rather urgent problem for any putative presuppositional solution to the existence puzzle, noted by e.g. Hawthorne and Manley (2008), is that other determiners, i.e. indefinites, are also prone to the problem exhibited by the existence puzzle. For example, suppose that three known murderers are on trial for their crimes and suppose that Bertrand has a desire that at least one of the three murderers is convicted. Now, let's assume that Bertrand has no specific individual in mind; if either of the three murderers are convicted, Bertrand's desire is satisfied. We can imagine that Bertrand has a bet that at least one of the murderers will be convicted, but also that Bertrand is a normal and rational individual who prefers that murders were never committed. Bertrand therefore has no desire that there is a murderer. His desire that a murderer be convicted is conditional on the antecedent belief that the individuals on trial are in fact murderers. Nevertheless, in this context, one can felicitously and truly assert (12).

(12) Bertrand wants a murderer to be convicted.
   a. Bertrand wants [$\exists x$: murderer(x)](convicted(x)).
   b. [$\exists x$: murderer(x)] $\wedge$ Bertrand wants (convicted(x))

On the narrow scope reading of the indefinite in (12), the existence of a murderer is absorbed into the content of Bertrand's desire. Consequently, the truth of (12) is incorrectly predicted to require that Bertrand desires the existence of a murderer. Yet, as before, wide scoping the indefinite description is equally problematic. This forces a *de re* interpretation of the indefinite, but since Bertrand is stipulated to have no desire pertaining to a particular individual, this yields an incorrect result. Moreover, it also imposes the requirement that murderers exists, but this is orthogonal to the present case. It could easily be reconstructed so that Bertrand merely *believes* that there are murderers on trial etc. As a result, no scope permutation yields adequate truth conditions. The problem here is completely parallel to the problem with definite descriptions, viz. there is a very strong intuition that the existence of murderers is not part of the content of Bertrand's desire and therefore that existence is not part of the asserted content, viz. the content on which the propositional attitude verb operates. In addition, the problem with (12) extends straightforwardly to other *weak* determiners such as *three*, *many*, *several* etc. which indicates quite strongly that there is a general problem here, not a problem pertaining exclusively to definite descriptions.

Weak determiners are not standardly assumed to trigger existence presuppositions but rather assumed to assert existence, viz. contribute an existentially quantified formula. Nevertheless, it seems intuitively correct that in cases such as (12), existence is not *asserted*. Given this strong intuitive appeal, let's assume for now that the solution to the existence puzzle really *does* require an analysis of these problematic determiners as triggers of existence presuppositions. If so, it's quite clear that the strategy of capturing existence presuppositions using partial functions and referential assertive components is a non-starter. If we analyze indefinites as existence presupposition triggers, a lexical entry along the lines of (11) is inadequate, because this lexical entry requires that the asserted content of the description is a referential term. As regards *definite* descriptions, this is unproblematic, because these determiners pick out a *unique* individual, but with *indefinite* descriptions, such an analysis is bound to fail. If the asserted content of the indefinite description in (12) is analyzed as a referential term, Bertrand is predicted to have a desire about a specific individual which by stipulation he fails to have. Bertrand's desire is satisfied *regardless* of which murderer is convicted and in order to capture this, we must allow the indefinite description to range over multiple individuals, viz. we must treat the indefinite description as a genuine quantificational expression. A referential analysis is thus by its very definition incapable of capturing that Bertrand's desire is *general* rather than specific. The failure of the referential analysis as a general solution to the existence puzzle is quite instructive: It fails because it relies importantly on the possibility of exploiting uniqueness. But the above generalization, viz. that the existence problem generalizes to indefinite determiners, shows that this problem arises even in cases where there is no uniqueness to exploit. And, to make matters worse, we've already established that if the asserted content contains an existentially quantified formula, the problem posed by the existence puzzle simply repeats itself.[7]

2.3 The Existence Puzzle and Propositional Attitude Verbs

We seem to have reached an impasse. Since the asserted content of the relevant descriptions cannot be existentially quantified formulas nor referential terms, it seems that there is no available characterization of the asserted content that avoids the problem. Consequently, it might seem tempting to infer that the

7 I should note here that this generalization problem also rules out an analysis on which the asserted content contains just a universal quantifier ranging over every individual satisfying the restrictor predicate. As regards definite descriptions, the partial function guarantees that the predicate set is singleton and as a result, universal quantification over that set in the asserted content would range only over a single individual without incurring existential commitments. However, for e.g. indefinite descriptions, this strategy fails miserably, since on such an analysis an utterance of (12) would be predicted to be equivalent to asserting that Bertrand wants every murderer to be convicted.

existence puzzle poses a problem which neither can nor should be solved by revising the semantics of the relevant determiners. For example one could be tempted to conclude that the existence puzzle is a result of various complexities introduced by propositional attitude verbs. Indeed, the fact that standard monotonicity entailments often fail for sentences embedded under propositional attitude verbs might suggest that the existence puzzle is part of a more general problem not exclusively related to determiner phrases. If so, perhaps we should just rest content with a Russell type analysis. This appears to be the conclusion drawn by both Hawthorne and Manley (2008), Kaplan (2005), and Neale (2005). I think there are strong reasons to resist this conclusion. First, the fact that presuppositional analyses face a somewhat exigent problem is hardly a vindication of Russell's analysis. Indeed, since the problem generalizes, the result on the Russellian analysis is simply an increase in incorrect predictions. And while it's correct that propositional attitude verbs, and more generally *intensionality*, introduce a variety of semantic complexities, there is, as regards the problem arising from the existence puzzle, no obvious reasons to place the blame on intensionality. After all, what's intuitively the problem with Russell's analysis in intensional cases is also a problem in extensional cases. For example, it's frequently observed that the contents conveyed by (13a) and (13b) are manifestly different.

(13) a. There is exactly one exam and it lasts two hours.
b. The exam lasts two hours.

On the Russellian analysis, the logical forms of these sentences, and hence their truth conditions, are identical. And while this subtle difference in meaning has no clear truth conditional effects in extensional cases, it does so, as demonstrated by the existence puzzle, in intensional and complex cases.[8] Since the existence puzzle appears to arise only with bare determiners, cf. the difference between (3) and (6), there are very strong reasons to believe that in order to solve the problem, our semantic analysis must be capable of distinguishing existential-there sentences from bare determiners. But if the problem posed by the existence puzzle is assumed to result solely from complexities introduced by propositional attitude verbs, and if our semantic analysis remains incapable of distinguishing between the meanings of existential-there sentences and bare determiners, we then need an analysis of propositional attitude verbs which is capable of computing different truth conditions while operating on indistinguishable propositional contents, viz. identical logical forms. In particular, if propositional attitude verbs are treated as propositional operators and (13a) and (13b) are assumed to

8 While I confine attention to propositional attitudes here, a very similar problem arises in conditional constructions. This is nicely demonstrated in Elbourne (2008).

express identical propositions, attitude verbs must be functions that can take identical arguments and yet systematically produce different outputs. It seems highly implausible that this is in any way feasible. And if the existence puzzle is solvable only if our semantic analysis is capable of distinguishing the meanings of existential-there sentences from the meanings of sentences with bare determiner phrases, an analysis that permits a presuppositional analysis of weak determiners has a clear non-negligible advantage.

In conclusion, there are convincing reasons to think that the problem posed by the existence puzzle is a problem concerning semantic representations of existence commitments and not (solely) a problem concerning intensionality. Placing the blame entirely on intensionality looks more like throwing your hands up in the air. Here it should also be noted that the existence puzzle presents a problem not only to proponents of Russell's analysis, e.g. Neale (1990), Ludlow and Neale (1991), Neale (2005), but also to strictly speaking non-Russellian analyses such as Szabó (2000), Ludlow and Segal (2004), Hawthorne and Manley (2008). Any analysis which maintains that definite and indefinite descriptions uniformly *assert* existence of a (unique) invididual is immediately subject to the incorrect predictions outlined above.

2.4 Outline of a Solution to the Existence Puzzle

In the remainder of the this paper, I outline a strategy for solving the existence puzzle. Given that the asserted content of a presuppositional determiner cannot be treated as a quantified formula nor as a referential term, the only immediate option left is to treat the asserted content of these determiners as mere variables. I therefore argue in favor of the presuppositional solution but propose to rely on an alternative formal analysis of existence presuppositions, namely a semantic analysis according to which both definite and indefinite descriptions presuppose an existentially quantified formula and have as their asserted content simply a variable. However, this apparently free variable is bound by the existentially quantified presupposition triggered by these determiners. The presupposed existentially quantified formula will obviously vary depending on the relevant determiner, i.e. a definite description will effectively presuppose a formula a kin to a Russellian definite description. Thus, one can think of the meaning of e.g. (8) as consisting of a presupposed part $\mathcal{P}$ and an asserted part $\mathcal{A}$. The use of a definite description is licensed only if $\mathcal{P}$ is already established in the common ground (pace presupposition accommodation) and if $\mathcal{P}$ is common ground, it functions as a binder for the free variable in $\mathcal{A}$.

(8) The king of France is bald.
$\mathcal{P}$ $\exists x[\text{King-of-France}(x) \wedge \forall y[\text{King-of-France}(y) \rightarrow x = y \ldots]]$
$\mathcal{A}$ x is bald.

This analysis succeeds in solving the existence puzzle; when the asserted content of a sentence such as [[The ζ] ξ] is simply an open sentence, existence is genuinely presupposed in the sense of (ii) above. And since the variable in the asserted content is bound by a presupposed existential formula, the available values for the variable depend on the domain of the relevant quantifier. We thereby avoid the problem which arose on the referential analysis, namely that the asserted content becomes specific.

In order to justify this proposed analysis, several issues need to be addressed. For example, this proposal requires an analysis where weak determiners are capable of triggering existence presuppositions. This is certainly not a standard assumption, but neither is it an entirely novel idea. For example, it has been argued by e.g. Strawson (1952, 1964), Milsark (1977), Partee (1989), Diesing (1992), and von Fintel (1998) that there is both syntactic and semantic evidence for presuppositional weak determiners and in my discussion I rely extensively on data discerned in von Fintel (1998). In addition to the raw data in favor of a presuppositional analysis of weak determiners, I also discuss the phenomenon of presupposition accommodation and how this repair strategy helps explain a range of prima facie problems for a presuppositional analysis. The next step is to reevaluate how existence presuppositions are to be formally captured. Since my proposed analysis requires that presuppositions project out from their triggering positions and subsequently bind into asserted contents, I spend some time demonstrating that when insights from dynamic semantics are taken into consideration, this is a completely innocuous assumption which requires no substantial revisions to existing dynamic frameworks. Of course, this does entail abandoning standard truth conditional semantics, but it's already widely argued that in order to explain the curious behavior of presuppositions, a dynamic framework is needed. Here I simply extend these considerations. This is clearly a lot of ground to cover in a single paper, so in the interest of maintaining my readers attention, I try to avoid excessive technical detail and rely on informal characterizations whenever feasible. One disclaimer: when one engages in writing a paper on the semantics of definite or indefinite descriptions, it's virtually impossible to address every potential problem. I strive here to cover what I consider the relevant problems, but have no illusions — several of the pertinent issues covered in the hugely voluminous literature on descriptions won't be addressed.

2.5 The Plan

Throughout section 3. I provide evidence in favor of the claim that so-called *weak determiners* have the potential to trigger existence presuppositions and that an analysis which permits such a treatment is less problematic than standardly assumed. While there are several candidate explanations of this data, e.g. (a) that weak determiners are ambiguous between *weak* and *strong/presuppositional* read-

ings, (b) that presuppositional readings are a result of a particular topic/focus articulation, or (c) that weak determiners lexically trigger existence presuppositions, I remain neutral on this issue. The aim here is merely to justify that weak determiners embedded under propositional attitude verbs can feasibly be analyzed as triggering existence presuppositions. In section 4. I provide a brief introduction to dynamic semantics and explain the immediate advantages obtained by adopting such a semantic system. I then show that the assumptions needed to justify my proposed analysis are consistent with standard assumptions in dynamic frameworks. In section 5. I outline in detail how my proposed analysis provides a straightforward solution to the existence puzzle and in section 6. I discuss certain potential problems but also a range of advantages to my proposed analysis.

3 Weak Determiners and Presupposition Projection

As observed by Milsark (1977), there is a syntactic two-way division of natural language determiners witnessed by the distributional effects of so-called existential-there sentences (or there-insertion sentences). In particular, insertions of a determiner in the postcopular NP position of 'there BE'-constructions yield grammatical sentences for only a restricted set of determiners.

(14) STRONG DETERMINERS

a. * There is every book on the table.
b. * There is the book on the table.
c. * There are all three books on the table.
d. * There are both books on the table.

(15) WEAK DETERMINERS

a. There is some/a book on the table.
b. There are many books on the table.
c. There are three books on the table.
d. There are no books on the table.

Why natural language exhibits this syntactic distribution is a matter of controversy and I introduce the distinction only to mark the determiners which I'll discuss in the remainder of section 3. namely determiners that are grammatical in there-insertions. It's occasionally assumed that this syntactic distribution should be explained by a difference in semantic properties, namely that *strong* determiners are presuppositional whereas *weak* determiners are not. As a result, the orthodox analysis of weak determiners maintains that these determiners assert existence and that the semantic content of a singular weak determiner phrase is an existentially quantified formula ranging over individuals while the semantic content of a plural determiner phrase, e.g. a numerical determiner,

is either an existentially quantified formula ranging over groups (with some specified cardinality) or a range of successive existentially quantified formulas ranging over individuals.[9] I assume that a presuppositional treatment of strong determiners is already independently justified and focus on supplying arguments for a presuppositional treatment of weak determiners.[10] As already noted, this is not an entirely novel idea since even Milsark observed that weak determiners seem to have presuppositional uses. In particular, it seems that there is a rather striking contrast between uses of weak determiners in existential-there sentences and as simple sentence subjects.

(16) There are some ripe apples in the pantry.

(17) Some apples in the pantry are ripe.
(18) Several apples in the pantry are not ripe.

In (16) there is no immediate temptation to infer that the existence of apples in the pantry is taken for granted, but this is not clearly the case for (17) and (18). The latter elicit a much stronger intuition that the speaker is taking this information for granted. This contrast is subtle, but one way to detect it is to consider which assertion seems more natural if the existence of apples in the pantry is not already established in the discourse.

Nevertheless, as emphasized by Reinhart (1995/2006) and von Fintel (1998), even if it's acknowledged that (17) and (18) give rise to putatively presuppositional inferences, and (16) doesn't, this contrast is inadequate to establish that bare *weak* determiners trigger existence presuppositions. The apparent presuppositional inferences licensed by (17) and (18) are perfectly consistent with an analysis where these weak determiners both assert *and* presuppose existence. One could therefore maintain the orthodox existential analysis and attempt to explain the putative presuppositional inference in purely pragmatic terms, viz. in terms of pragmatic principles governing their use. So, in order to conclusively establish that these determiners are genuine existence presupposition triggers, stronger evidence is required, namely evidence that there are uses of these determiners where if existence was asserted in the sentence, they would be infelicitous.

One can think of both logical entailments, implicatures, and presuppositions as licensing certain inferences, but what sets the inferences licensed by presuppositional expressions apart from the inferences licensed by logical entailments and implicatures is that presuppositional inferences tend to *project*. That

9 It's well known that plural determiners introduce a number of complexities and to the extent possible, these complexities are ignored throughout the remainder of this paper.

10 For arguments in favor a presuppositional treatment of strong determiners, see e.g. De Jong and Verkuyl (1985).

is, when the sentences in which these presuppositional expressions occur are embedded in complex syntactic environments, the presuppositional inferences licensed by the atomic sentences in isolation are also licensed by the complex constructions. It's therefore widely agreed that to test whether an expression is a genuine presupposition trigger, one must embed the expression in a range of relevant complex syntactic environments and check whether the previously available inferences project.[11] Now when this test is applied to weak determiners, as in von Fintel (1998), it reveals that there is quite strong evidence in favor of the hypothesis that weak determiners are capable of triggering existence presuppositions. I rely extensively on von Fintel's clear exposition of the data to demonstrate this in the following sections.[12]

3.1 Projection I — Questions

When a declarative sentence is converted into a polar questions, a yes/no question, a presuppositional inference licensed by the declarative sentence tends to survive this conversion. These inferences therefore contrast standard classical entailments and implicatures which tend to to disappear when the declarative is converted into a polar question. I've supplied a couple of representative examples in (19). '$\rightsquigarrow$' signals the inference that these questions are intuitively understood as licensing.

(19) ASPECTUAL VERBS

a. Bertrand stopped smoking.
   $\rightsquigarrow$ Bertrand used to smoke. *(presuppositional inference)*
   $\rightsquigarrow$ Someone stopped smoking. *(classical entailment)*

b. Did Bertrand stop smoking?
   $\rightsquigarrow$ Bertrand used to smoke. *(presuppositional inference)*
   $\not\rightsquigarrow$ Someone stopped smoking. *(classical entailment)*

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11 This is a basic assumption in almost every paper on presuppositions in the last two decades. For a select few, cf. Heim (1990), Geurts (1999), Beaver (2001).

12 The data in sections 3.1 and 3.2 is adapted from von Fintel's (1998) paper. Diesing (1992) discusses data concerning scrambling in German which is also discussed in von Fintel's paper, but I don't reproduce that data here. Instead, I've added the data in sections 3.3 and 3.5. I should note that while von Fintel argues that the data reveals clear presuppositional effects, he remains intentionally neutral as regards explaining this data. Whether these effects are best explained in terms of topic/focus articulation, in terms of an ambiguity view, or lexically triggered is left open. One argument against the topic/focus explanation is supplied in section 3.4, where it's shown that these effects can arise even when the putatively presuppositional expression is not topical.

(20) DEFINITES

a. The Governor of Texas wants to secede.
   ⇝ There is a Govenor of Texas. *(presuppositional inference)*
   ⇝ Someone wants to secede. *(classical entailment)*

b. Does the Governor of Texas want to secede?
   ⇝ There is a Govenor of Texas. *(presuppositional inference)*
   ⇏ Someone wants to secede. *(classical entailment)*

The difference between presuppositional inferences and classical entailments is evident here. The presuppositional inferences available on the basis of the declarative (a)-sentences are preserved when converted into the interrogative (b)-sentences, but the standard classical entailments are not. Now, if weak determiners are analyzed as asserting existence, adding an overt assertion of existence (i.e. an existential there-construction) should not affect which inferences are available. So, using an existential-there sentence as the contrast, let's evaluate whether this is indeed the case.

(21) a. There are some/many/several rotten apples in the pantry.
   ⇝ There are some/many/several apples in the pantry

b. Are there some/many/several rotten apples in the pantry?
   ⇏ There are some/many/several apples in the pantry

As indicated above, it seems that when the declarative existential-there sentence is converted into a polar question, the inference that there are apples in the pantry is no longer intuitively available. However, now consider the examples in (22a).

(22) a. Some/Three/Several apples in the pantry are rotten.
   ⇝ There are some/many/several apples in the pantry.

b. Are some/three/several apples in the pantry rotten?
   ⇝ There are some/many/several apples in the pantry.

As indicated above, it seems quite natural to infer from the examples in (22a) that there are apples in the pantry. In other words, the inference available from the declarative (22a) appears to survive when converted into a polar question which strongly contrasts the result of converting (21a) into a polar question. But if the weak determiners in (22a) simply asserted existence as in (21a) and the existence of a non-empty restrictor set was a classical entailment of (22a), this inference should not be available when converted into a polar question. In contrast, if weak determiners are analyzed as presupposing existence of a

non-empty restrictor set, the availability of an existential inference in (22a) is straightforwardly explained; the existential presuppositions project.

3.2 Projection II — Conditionals

Another standard test for detecting presuppositional expressions is considering their inferential potentials in conditionals. It's well known that a sentence which contains a presuppositional expression licenses a presuppositional inference even when the sentence is embedded in the antecedent of a conditional. Presuppositional inferences thereby contrast inferences which are based on classical entailments and implicatures since the latter tend to disappear when embedded in such syntactic environments.

(23) a. Bertrand stopped smoking.
   ⇝ Bertrand used to smoke. *(presuppositional inference)*
   ⇝ Someone stopped smoking. *(classical entailment)*

   b. If Bertrand stopped smoking, his boss gave him a raise.
   ⇝ Bertrand used to smoke.
   ⇏ Someone stopped smoking.

(24) a. The Governor of Alaska resigned
   ⇝ There is a Governor of Alaska. *(presuppositional inference)*
   ⇝ Someone resigned. *(classical entailment)*

   b. If the Governor of Alaska resigned, she's running for president.
   ⇝ There is a Governor of Alaska.
   ⇏ Someone resigned.

We can test whether there is an important difference between existential-there sentences and sentences with bare weak determiners by considering which inferences survive when these sentences are embedded in the antecedent of a conditional. In order to facilitate detection of a contrast, I use the method devised in von Fintel (1998) where each conditional is prefaced with a sentence indicating that the speaker is not opinionated about the existence of *F*s (with *F* being the restrictor for the determiner). If the speaker is openly agnostic about existence of *F*s and the existence of *F*s therefore is not common ground, it should be infelicitous for the speaker to use an expression which requires that a non-empty set of *F*s is already established in the discourse. Each sentence in (25a-25c) is to be read as immediately following the initial assertion in (25).

(25) I'm not sure whether there are any apples in the pantry.

a. If there are some apples in the pantry and they're ripe, we should bake an apple pie.
b. If there are several apples in the pantry and they're ripe, we should bake an apple pie.
c. If there is an apple in the pantry and it's ripe, we should bake an apple pie.

The discourse continuations in (25a-25c) are felicitous even though the speaker has openly declared herself agnostic about the existence of apples in the pantry. But, now compare these to the continuations in (26a-26c).

(26) I'm not sure whether there are any apples in the pantry.
a. # If some apples in the pantry are ripe, let's bake an apple pie.
b. # If several apples in the pantry are ripe, let's bake an apple pie.
c. # If an apple in the pantry is ripe, let's bake an apple pie.

In contrast to (25a-25c), the discourse continuations in (26a-26c) are *not* felicitous. It seems that when the speaker declares herself agnostic about the existence of apples in the pantry, this blocks these continuations. But if weak determiners simply assert existence, this should license an interpretation where existence of apples in the pantry is embedded under the if-clause (as surface form would indicate).[13] In other words, the continuations in (26a-26c) should be perfectly on par with the continuations in (25a-25c) which license an interpretation where existence of apples in the pantry is a simple epistemic possibility compatible with the speaker's open agnosticism. Yet that interpretation of (26a-26c) appears to be unavailable and as a result the contrast above is but a mystery. In contrast, if these bare weak determiners are assumed to trigger existence presuppositions, the contrast is entirely unsurprising. If uses of bare weak determiners require that an existential presupposition is common ground (or could become common ground), it's no surprise that a speaker cannot first declare herself agnostic about whether a proposition should be common ground and then proceed to use a term which requires that it already is.

Before proceeding to the next projection test, it should be noted that the presence of certain discourse particles, e.g. 'but' or 'however', do seem to improve felicity judgments about (26a-26c). However, these discourse particles are prototypical *contrast markers*. Their discursive function is to contrast information already given with information to be conveyed. To explicate precisely the semantic and pragmatic effects of discourse particles such as 'but' or 'however'

13 In fact, the interpretation on which the determiner phrase is embedded inside the scope of the if-clause should not only be *compatible* with these sentences, it should be *mandatory* since if-clauses are standardly assumed to be syntactic scope islands, viz. syntactic structures that prohibit quantifier movement.

is a complicated affair, but observe that these discourse particles also succeed in improving felicity judgments for sentences that contain standardly accepted presuppositional expressions, e.g. definites and aspectual verbs.

(27) I'm not sure whether there is a janitor at the school...
  a. ...but if the janitor/he is smart, he avoids a conflict with Mr. Mills.
  b. #...and if the janitor/he is smart, he avoids a conflict with Mr. Mills.
  c. #...if the janitor/he is smart, he avoids a conflict with Mr. Mills.

(28) I'm not sure whether Sue used to smoke
  a. ...but if she stopped, she's probably drinking more coffee.
  b. #...and if she stopped, she's probably drinking more coffee.
  c. #...if she stopped, she's probably drinking more coffee.

The contrast is perfectly clear, viz. the (b)- and (c)-sentences sound significantly worse than the (a)-sentences. This, I take it, is not evidence that definites or aspectual verbs fail to trigger presuppositions. Rather, it's evidence that these discourse particles are facilitating a coherent interpretation.[14]

3.3 Projection III — Modals

The final projection test for detecting presuppositional expressions considered here is projection under modal embeddings. Similar to the effects observed with if-clauses, inferences based on presuppositional expressions survive even when the sentence licensing the inference is embedded in the scope of a modal. In contrast, inferences based on classical entailments and implicatures disappear in such syntactic environments.

(29) a. Bertrand stopped smoking.
  $\rightsquigarrow$ Bertrand used to smoke. *(presuppositional inference)*
  $\rightsquigarrow$ Someone stopped smoking. *(classical entailment)*

14 Explaining this phenomenon in detail is a comprehensive task which I'm unable to complete here, but a tentative (yet rather vague) suggestion would be that these contrast markers shift modal salience; the contrast markers indicate to the interlocutors that the continuation should be interpreted at a possible world where the presupposition is satisfied. I.e. one could imagine that these discourse particles license *local accommodation* (the notion of local accommodation is explicated in details later). Other examples which support this explanation would be the following.

  i. I might go to Disney Land with you tomorrow, but I'll never go again.
  ii. # I might go to Disney Land with you tomorrow, and I'll never go again.

(30) a. Bertrand might/ought-to have stopped smoking.
⇝ Bertrand used to smoke.
↛ Someone has stopped smoking.

(31) a. The Governor of Alaska is running for president.
⇝ There is a Govenor of Alaska. *(presuppositional inference)*
⇝ Someone is running for president. *(classical entailment)*

(32) a. It's possible that the Governor of Alaska is running for president.
⇝ There is a Govenor of Alaska.
↛ Someone is running for president.

Given these facts, we should expect existential there-sentences embedded under modals not to give rise to existential inferences. In contrast, if bare weak determiners are genuine existence presupposition triggers, we should expect these to license existential inferences. And this is exactly what the examples below reveal. Here I vary the modal expressions in order to guarantee that the putative presuppositional effects are not caused by incidental features of the modals.

(33) I'm not sure whether there are any apples in the pantry.
a. There might be several apples in the pantry that are ripe.
b. There ought to be a couple of apples in the pantry that are ripe.
c. It's possible that there are three apples in the pantry that are ripe.
d. Perhaps there is an apple in the pantry and it's ripe.

As expected, embedding existential-there sentences under these modals yield perfectly felicitous sentences even when the speaker is openly agnostic about the existence of apples in the pantry. Compare this to the discourse continuations in (34).

(34) I'm not sure whether there are any apples in the pantry.
a. # Several apples in the pantry might be ripe.
b. # A couple of apples in the pantry ought to be ripe.
c. # It's possible that three apples in the pantry are ripe.
d. # Perhaps an apple in the pantry is ripe.

This result parallels the previous results involving conditional embeddings. The discourse continuations in (34a-34d) are infelicitous. So, if the speaker is openly agnostic about the existence of apples in the pantry, the continuations above become illicit. Again, if it's assumed that the existential inference triggered by a non-complex sentence such as (17) is explained simply by the presence of an existential quantifier, these inferences should disappear when the quantifier is embedded in the prejacent, yet they do not. Moreover, if the standard existential analyses is correct, the contrast pairs involving both conditionals and

epistemic/root modals should be assertable in identical contexts, yet they're not. In sum, there is, at best, an explanatory problem for the existential analysis. In contrast, this data is straightforwardly explained, indeed predicted, by a presuppositional analysis.[15]

3.4 Presuppositions and Topics

The projection data above indicates quite strongly that weak determiners are capable of triggering existence presuppositions and thus that there is less reason to be concerned about a solution to the existence puzzle which requires a presuppositional treatment of weak determiners. However, it's worth noticing that the weak determiners in the examples above only occur in grammatical subject position. Presuppositions and topicality are closely related phenomena, and if these presuppositional inferences only project when the weak determiner occurs in subject position, one could be tempted to conclude that these inferences result from interpreting the determiner phrases as sentence topics. However, things are not quite this simple. While infelicity judgments are less prevalent for non-subject weak determiners, presuppositional effects do remain clearly detectable in certain cases where the determiners occur in object position, cf. (36), and as prepositional objects, cf. (35).

(35) S_1: Who hacked the mainframe?
S_2: I'm not sure whether there are any bright students here.

S_2: #Perhaps [the mainframe]$_t$ was hacked by a bright student here.
S_2: Perhaps there is a bright student here and [it]$_t$ was hacked by him.

S_2: #[It]$_t$ might have been hacked by a couple of bright students here.
S_2: There might be a couple of bright students here who hacked [it]$_t$.

S_2: #It's possible [it]$_t$ was hacked by several bright students here.
S_2: It's possible that there are several bright students here and that [it]$_t$ was hacked by them.

15 The projection behavior for determiners embedded in conditionals and under modals is strictly speaking consistent with the view that existence is both presupposed and asserted (i.e. existence is presupposed, but an existential quantifier is also contributed by the weak determiner), but this view is not consistent with the data in section 3.1 (conversions into yes/no questions) nor the data expounded in section 3.5. Moreover, it's unclear what would motivate adopting this view. Notice that on a strict presuppositional analysis, it's a precondition on the truth of the relevant sentences that the presupposed existential claim is true. So, if the relevant sentences are true, existence is entailed by the context.

(36) S_1: What did John buy?
S_2: I'm not sure whether there are any pink striped labradors.

S_2: #Perhaps [John]$_t$ bought a pink striped labrador.
S_2: Perhaps there are and [John]$_t$ bought one.

S_2: #[John]$_t$ probably bought a couple of pink striped labradors.
S_2: Probably there are and John]$_t$ bought a couple.

It's not entirely clear what general conclusions to draw from this data, but it seems fair to tentatively conclude the following: even if a weak determiner occurs in the object position of a propositional attitude verb's complement clause, this does not preclude us from assuming that it should be given a presuppositional analysis.

3.5 The 'Hey, Wait a Minute'-Test

The final piece of evidence offered here in favor of there being presuppositional weak determiners is the so-called 'Hey, wait a minute!'-test proposed by von Fintel (2004). This test is designed to show that presuppositional contents are questionable in ways that asserted contents are not. If for example a speaker asserts the sentence (37), it's felicitous to give a response prefaced by the locution 'hey, wait a minute!' only if one is questioning the presupposed component. In contrast, it's not felicitous to respond in that way if one is targeting the asserted component.

(37) S_1: The president of Buganda is bald.
⇝ Buganda has a president. *(presuppositional component)*
⇝ The president of Buganda is bald. *(asserted component)*

S_2: Hey, wait a minute. I didn't know that Buganda has a president!
S_2: ? Hey, wait a minute. I didn't know that the president of Buganda is bald!

The 'Hey, wait a minute'-test is a useful heuristic for distinguishing assertive from presuppositional components. If some component of the conveyed meaning has no suitable 'Hey, wait a minute'-response, this indicates that the conveyed information is not presupposed. Let's consider how existential-there sentences compare to sentences with weak determiner subjects.

(38) S_1: There are three apples in the pantry. Please fetch them.
S_2: ? Hey, wait a minute. I didn't know that there are apples in the pantry!

S_1: There are several apples in the pantry. Please fetch them.
S_2: ? Hey, wait a minute. I didn't know that there are apples in the pantry!

The 'Hey, wait a minute'-responses sound fairly awkward here. The reason is that the asserted component contains an existential claim. It's thus somewhat strange for the interlocutor to question that content using the 'hey, wait a minute' response. Now, consider sentences with weak determiner subjects.

(39) S_1: Fetch three apples from the pantry.
S_2: Hey, wait a minute. I didn't know that there are apples in the pantry!

S_1: Go fetch some apples from the pantry.
S_2: Hey, wait a minute. I didn't know that there are apples in the pantry!

These seem a lot more natural, which is explained only if the questioned content is taken for granted by the speaker, viz. part of the utterance's presuppositional component.

3.6 Analysis

What should we conclude? It seems safe to conclude that the data reveals the impropriety of certain conversational moves. For example, we can conclude that it's inappropriate for a speaker to raise to salience the possibility of the non-existence of xs and subsequently proceed to predicate a property of an x. This impropriety also explains why contrast markers like 'but' or 'however' are often required to restore coherence. But the important thing to observe here is that for the orthodox existential analysis of weak determiners there is an explanatory gap. The data reveals that in hypothetical contexts (i.e. in if-clauses or in the scope of modals) such discourse continuations are inappropriate *only* if the speaker refrains from using an existential-there sentence. That is, if in a hypothetical context a speaker uses an existential-there sentence, this impropriety simply disappears. In other words, there is an important contrast between existential-there sentences and sentences containing bare determiners. In particular, it demonstrates that uses of weak determiners are illicit when existence of a non-empty restrictor set cannot be established in the discourse. This indicates quite strongly that weak determiners often (if not always) bear a presuppositional requirement which is absent in existential-there sentences. As a result, there are convincing reasons to think that a presuppositional analysis of weak determiners, as they occur in propositional attitude ascriptions, is perfectly feasible as a solution to the existence puzzle. These determiners are not only capable of triggering existence presuppositions but clearly appear to do so in the problematic cases described above. While this is a somewhat weak conclusion to draw, given the ambition of this paper, it suffices.

Before proceeding to a discussion of dynamic semantic systems and how existence presuppositions can be captured in these, I want to touch briefly on a range of pragmatic issues related to the contextual requirements of presuppositional expressions. This should make it clear that the contextual requirements imposed on discourse participants by a presuppositional analysis of weak determiners are much more lax than one might immediately assume. Indeed, even if weak determiners do trigger existence presuppositions and thus impose certain contextual constraints on use, reflection on these constraints reveal that they're completely unproblematic in the vast majority of cases. This pragmatic fact about the presuppositions of weak determiners also explain why these presuppositions are much harder to detect than the presuppositions triggered by strong determiners such as 'the' or 'both'.

3.7 Presupposition Accommodation

Büring (1996) argues that any presuppositional analysis of weak determiners cannot appeal to the standard notion of presupposition, viz. the notion where presuppositional expressions impose the contextual requirement on use that their presuppositions are common ground.

> It should be noted, however, that [the existential presupposition] cannot be a presupposition in the usual sense, e.g. knowledge assumed to be shared by speaker and hearer, since examples like [(40)] clearly do not involve any existential commitments on the part of the person asking. (Büring 1996)

(40) a. Are there any cookies in this room?
b. [SOME]$_T$ cookies are [in the cupboard]$_F$

Büring has examples such as (40) in mind. Here, since the interlocutor in (40a) is explicitly questioning whether the domain of cookies is empty, she is not presupposing a non-empty domain of cookies. But according to a presuppositional analysis, the weak determiner in (40b) requires that a non-empty domain of cookies is presupposed and since felicitous uses of presuppositional terms require that the presuppositions are antecedently established in the common ground, the reply in (40b) should be infelicitous. Büring thus concludes that the notion of presupposition, that proponents of a presuppositional view must appeal to, cannot be the standard notion.

However, when we consider a range of equally felicitous responses, e.g. those supplied in (41), it becomes quite clear that Büring has overlooked a rather important factor, namely the phenomenon of *presupposition accommodation*.

(40) a. Are there any cookies in this room?

(41) a. The cookies are in the cupboard.

b. The [chocolate CHIP]$_F$ cookies are in the pantry
c. All the cookies are under the sink.
d. Bertrand puts them in the fridge.

If, as standardly assumed, definites, partitive constructions, and pronouns trigger existence presuppositions, then according to Büring's view it should be mysterious that speakers can felicitously respond using (41a-41d). But this is, of course, not mysterious. These responses do trigger existence presuppositions which are not antecedently established in the common ground, but on the assumption that the speaker is cooperative, the interlocutor is simply prompted to revise or *repair* the common ground so that it admits a sentence that presupposes a non-empty domain of cookies. In a word, the presuppositions are *accommodated*.[16]

While providing an exact characterization of the phenomenon of presupposition accommodation is exceedingly complicated, it's nevertheless practically indisputable that such a procedure is employed in discourse interpretation. Indeed, without a repair strategy like accommodation, it would be impossible to explain a variety of facts about natural language discourse. But one particular reason why it's hard to provide an exact characterization of accommodation is that the procedure relies extensively on extra-linguistic facts. For example, while it's quite probable that the presupposition triggered in (42a) is accommodated in most contexts, the presupposition triggered in (42b) is not. This difference must almost certainly be explained in terms of the extra-linguistic fact that it's normal to own a car, whereas it's quite unusual to own a spaceship.

(42) You were supposed to be here at 9.15. It's 10.30 now!
a. Yes, I know. I'm sorry, my car broke down.
b. ?? Yes, I know. I'm sorry, my spaceship broke down.

It's generally agreed that discourse initial uses of weak determiners are perfectly acceptable whereas many uses of definite descriptions are not. This contrast in contextual restrictions on e.g. indefinites and definites is standardly taken as an argument in favor of a presuppositional analysis of definites; these determiners are subject to a clear conversational constraint which e.g. indefinites are not, namely that it's common ground that the restrictor of the definite description has precisely one member. However it's important to observe that this is a quite strong presuppositional requirement. This determiner presupposes not only existence of a non-empty domain, but also existence of a unique individual in the domain satisfying the restrictive component. Often, this requirement is not

16 The notion of accommodation is standardly attributed to Lewis (1979). I provide only a cursory introduction to the topic, but for detailed discussions of accommodation, see the excellent Beaver and Zeevat (2007) and von Fintel (2008).

satisfied and even more often it's not established in the common ground. In many contexts, it's not obvious that there is a unique individual who satisfies the restrictive component, and as a result, discourse initial assertions of definite descriptions are quite hard to accommodate. Weak determiners, in particular indefinites, are the evident contrast, because comparatively these determiners bear a minimal presuppositional requirement, namely that their domain is non-empty. In standard discourse contexts, that requirement is trivially satisfied, i.e. it's simply common ground in normal discourses that a very large number of relevant domains are non-empty. Moreover, since the only requirement imposed on the discourse participants is accepting that *some* individual in the domain satisfies the restrictive component, this requirement is easily satisfied. In the vast majority of cases, it's entirely uncontroversial, and therefore unproblematic, to assume that *some* individual satisfies the restrictive component. If this is right, it's no surprise that discourse initial uses of weak determiners are felicitous – their presuppositions are in general antecedently established in the common ground and, if not, simply accommodated. Compare this to the determiner 'every' which is also often assumed to trigger an existence presupposition. If I'm correct, then uses of 'every' and 'some' are subject to very similar contextual requirements.[17] What is worth noticing is that discourse-initial uses of 'every' are also in general unproblematic and a candidate explanation is that the presuppositions triggered by uses of 'every' are ordinarily antecedently established in the common ground — and, if not, accommodated. In other words, it's the concomitant uniqueness presupposition triggered by definites which makes them hard to accommodate, not their existential presupposition.

3.8 A Note on Truth Value Intuitions

From the point of view of standard classical semantics, a presuppositional analysis of weak determiners has the consequence that false presuppositions engender computational crashes, and therefore truth value gaps. One might therefore object that truth value gaps fit poorly with purported truth value intuitions about sentences where the presupposition of a weak determiner is unsatisfied. For example, if there are no apples in the pantry, one might be inclined to judge a sentence such as (17) false, rather than neither true nor false.

(17) Some apples in the pantry are ripe.

However, it's commonly acknowledged that truth value judgments are unreliable for tracking presuppositional expressions.[18] For example, it's argued at

17 For example, one might think that the existence presupposition associated with 'every F' is that there is at least one individual (perhaps at least two) in the domain which is F.

18 See e.g. Lasersohn (1993), Glanzberg (1992), von Fintel (2004), Geurts (2007), Schoubye (2009).

length in von Fintel (2004) and Schoubye (2009) that a whole class of truth value judgments, namely judgments about cases involving existential presupposition failure, fail to track the semantic status of the relevant sentences. Instead, these judgments appear to track various pragmatic factors which are irrelevant to truth value determination. The reason that projection tests are considered reliable is that these tests rely on inferential judgments rather than truth value judgments, and the former have simply proven more stable. Now, if the presuppositions of weak determiners are effortlessly accommodated, this is liable to impact judgments. Indeed, it's liable to make detection of these presuppositions quite hard, and thus obscure that these determiners do presuppose existence. Nevertheless, these presuppositions are detectable using the projection tests. So even if the hypothesis that weak determiners trigger existence presuppositions lead to seemingly incorrect truth value judgments, it's quite plausible that these judgments fail to reflect the semantic status of the sentences in question, and thus that such judgments should be ignored. It's also possible that the proposals to explain such intuitions in von Fintel (2004) and Schoubye (2009) are applicable here. The moral is that when we acknowledge the ease with which the presuppositions of weak determiners, here especially indefinites, are accommodated, then in a wide range of cases the predictions of a presuppositional analysis simply coincide with that of the orthodox analysis.

3.9 Conclusion

It now seems warranted to assume that a solution to the existence puzzle which requires a presuppositional treatment of weak determiners is feasible, in fact even plausible, when considering the available data. In the next section, I therefore turn to another putatively controversial, but necessary, assumption for my proposed analysis of natural language determiners, namely that existence presuppositions can project out of their triggering positions and bind variables outside their immediate scope.

4 Semantics

According to my proposed semantic analysis of weak determiners, a sentence such as (43) should, on its presuppositional reading, be analyzed as presupposing the existentially quantified sentence $\ulcorner \exists x[\text{man}(x)] \urcorner$ and as asserting the open formula $\ulcorner \text{whistles}(x) \urcorner$.

(43) A man whistles.

(42′) $\underbrace{\exists x\text{: man}(x)}_{\text{PRESUPPOSED CONTENT}}\ \underbrace{\text{whistles}(x)}_{\text{ASSERTED CONTENT}}$

The function of the existential presupposition, the existentially quantified formula, is to bind the variable in the asserted content. This might seem prima

facie problematic—after all, if an existential presupposition is an existentially quantified formula, it should be a closed formula which is incapable of binding any variables in adjacent syntactic environments. So, if my proposed analysis is to have any chance of succeeding, the standard analysis of binding must be revised. In this section I provide an informal sketch of what I take to be the natural implementation in a dynamic semantic system. Opting for a dynamic analysis is natural since (a) it provides a straightforward way to explain basic projection behavior, and (b) these systems are designed to license non-standard binding relations. In addition, it turns out that adopting a dynamic perspective provides additional explanatory advantages. In this section I focus on the indefinite determiners *a/some*, since these appear to present the most difficulties.

Dynamic semantic systems were originally developed to explain two broad phenomena, namely discourse anaphora and presupposition projection. The so-called *projection problem* for presuppositions is the problem of providing a compositional procedure for predicting the presuppositions of a complex sentence from the presuppositions of its constituents.[19] Since presuppositional inferences survive in complex syntactic constructions, it was initially assumed that the presuppositions of a complex sentence ϕ equal the sum of the presuppositions of its constituents—the so-called *cumulative hypothesis* (cf. Langendoen and Savin 1971). However, it was quickly observed that in certain complex constructions, presuppositional inferences can also disappear. This is illustrated in (44-45) where a presuppositional expression occurs in each sentence, but only the (a)- and (b)-sentences trigger *presuppositional* inferences (while the (c)-sentences do trigger the same inference as the (a)- and (b)-sentences, notice that the (c)-inferences are classical entailments. In order to assert the full compounds in (c), it's not intuitively required that the available inference is already common ground, viz. presupposed).

(44) ASPECTUAL VERBS

a. Sue stopped smoking.
   $\rightsquigarrow$ *Sue used to smoke.* *(presuppositional inference)*

b. Sue stopped smoking but she's drinking coffee now.
   $\rightsquigarrow$ *Sue used to smoke.* *(presuppositional inference)*

c. Sue used to smoke but she stopped.
   $\rightsquigarrow$ *Sue used to smoke.* *(classical entailment)*

19 The literature on the problem of presupposition projection is excessive, but notable highlights include Karttunen (1974), Karttunen and Peters (1979), Gazdar (1979), Soames (1982), Heim (1983), Soames (1989), van der Sandt (1992), Geurts (1999), Beaver (2001).

d. If Sue used to smoke, she stopped.
   $\not\rightsquigarrow$ *Sue used to smoke*.

(45) DEFINITES

a. The king of France is bald.
   $\rightsquigarrow$ *There is a King of France*. *(presuppositional inference)*

b. The king of France is bald but he wears a wig.
   $\rightsquigarrow$ *There is a King of France*. *(presuppositional inference)*

c. There is a king of France and the king of France is bald.
   $\rightsquigarrow$ *There is a King of France*. *(classical entailment)*

d. If there is a king of France, the king of France is bald.
   $\not\rightsquigarrow$ *There is a King of France*.

To explain and predict the behavior of presuppositions in complex contexts, dynamic systems incorporate the incremental structure of discourse into the semantic system. The central notion in dynamic semantics is therefore the notion of an *update*. In these systems, the meaning of a sentence is not understood in terms of its truth conditions but instead in terms of its *update potentials*, its effects on a given discourse context. The underlying idea, deriving from Stalnaker (1970, 1974, 1978), is that a discourse context c is a set of possible worlds and that this set is determined on the basis of the relevant discourse participants. For example, if the discourse participants agree that ϕ, the context set contains only ϕ-worlds, whereas if the discourse participants are agnostic or disagree about ϕ, the context set contains both ϕ-worlds and $\neg\phi$-worlds. So, if ϕ is asserted in a discourse and accepted by the discourse participants, every $\neg\phi$-world is eliminated from the context set.

In the influential implementation of Heim (1983), which builds extensively on the insight of Karttunen (1974), sentence meaning is analyzed in terms of *context change potentials* (CCPs). CCPs are update procedures from context to context, formally set theoretic operations on sets of worlds. Propositions are assumed to denote sets of possible worlds (to be revised) and for simple sentences S, updates are performed by intersecting the context set c with the set of worlds denoted by the sentence S. This update operation for simple sentences is however constrained by the condition that if S triggers a presupposition χ, an update of c with S is defined only if c entails χ. If the presuppositions of S are not entailed by c, the update is undefined. For complex sentences ϕ, CCPs are compositionally derived from the CCPs of ϕ's constituents. Updating with a complex sentence ϕ proceeds in increments, one constituent at a time, and requires that each constituent of ϕ is *admitted* by its corresponding *local* context. This means that updating c with e.g. a conjunction $\phi \wedge \psi$, requires that c updated

with ϕ, $c[\phi]$, is defined and that the resulting context, c' updated with ψ is also defined, $c'[\psi]$. The local context for ϕ is thus c, whereas the local context for ψ is $c[\phi]$. In contrast, the *global* context for ψ is c.

(46) CONTEXT CHANGE POTENTIALS

$$\begin{aligned} c[S] &= \{w \mid w \in c\} \cap \{w \mid w \in S\} \\ c[\neg\phi] &= c \,/\, c[\phi] \\ c[\phi \wedge \psi] &= c[\phi][\psi] \\ c[\phi \rightarrow \psi] &= c \,/\, (c[\phi] \,/\, c[\phi][\psi]) \end{aligned}$$

The CCPs are designed to provide an explanation of the peculiar behavior of presuppositions in complex constructions and Heim's theory correctly predicts that only the (a) and (b)-sentences above trigger presuppositions. The explanation is simple and intuitive: no presuppositional inferences are triggered by the (c) and (d)-sentences, because their local contexts entail the triggered presuppositions. In other words, when the context is incremented with the constituent containing the presupposition trigger, the presupposition is entailed by that context. In contrast, the presuppositions triggered by the presuppositional expressions in the (a) and (b)-sentences are not entailed by their corresponding local contexts and consequently these sentences give rise to presuppositional inferences. The truly innovative feature of Heim's proposal is the dual role of the CCPs. CCPs provide *admittance conditions*, viz. conditions on definedness, which are central to explaining projection behavior in complex sentences. But CCPs also provide an explanation of information incrementation in discourse – a formal representation of the evolution of particular discourses.

4.1 Binding and Bound Presuppositions

A general feature of dynamic systems is that anaphora is analyzed in terms of binding. In contrast to static semantic systems where binding is clause-bounded, and cross-sentential binding thus prohibited, dynamic systems license such binding relations. In a sequence of sentences such as (47), the pronoun in the second sentence is thus resolved via binding.

(47) [A man]$_i$ walks in the park. He$_i$ whistles.

The formal explanation is that dynamic systems abandon the strict identification of context with propositions (or rather a set of worlds determined on the basis of propositions) and instead extend the context to a set of world/variable-assignment pairs. Updates are therefore defined as operations on world/variable assignment pairs, i.e. transitions from a set of worlds and initial assignments to a set of worlds and an extended assignments. As a metaphorical illustration, Heim characterizes a context as a collection of 'file cards' each of which has a discourse referent and a range of concomitant conditions attached to it. For

example, updating the context c with (47) requires that a *discourse referent*, x, is introduced—a file card is opened—and that the conditions *man*(x) and *walks-in-the-park*(x) are added to the file card. Since the pronoun in the second sentence is anaphoric on the indefinite, it's mapped to its anaphoric antecedent (effectively, bound) and the conditions pertaining to the pronoun, viz. *whistles*(x) is added to the initial file card. In other words, indefinites are capable of binding free variables in subsequent sentences.[20]

A substantial part of Heim's proposal is motivated by considerations concerning presuppositions in quantified context. Previous proposals for analyzing the semantic and pragmatic properties of presuppositions, for example Gazdar's (1979) cancellation analysis, treat presuppositions uniformly as propositions. But Heim observes that some sentences trigger open sentence presuppositions. Thus, if contextual updates are defined in terms of propositions, such presuppositions cannot be accounted for. Consider (48).

(48) a. Every nation cherishes its king. Heim (1983)
b. [Every x_i: x_i is-a-nation](x_i cherishes x_i's king)
c. $\Rightarrow$ x_i has a king.

(48a) triggers the non-propositional presupposition in (48c). However, when contexts are analyzed as sets of ordered pairs, $\langle g, w\rangle$, where g is a function from indices to individuals and w is a world, a general compositional procedure, a CCP, for open sentences can be defined.[21]

(46) CONTEXT CHANGE POTENTIALS (continued)

$$\begin{aligned} c[F(x_i)] &= c \cap \{\langle g,w\rangle \mid g(i) \text{ is } F \text{ in } w\} \\ c[\text{Every } x_i, \text{A, B}] &= \{\langle g,w\rangle \in c \mid \text{for every } a \text{ if } \langle g^{[i/a]}, w\rangle \in c[\text{A}], \\ &\quad \text{then } \langle g^{[i/a]}, w\rangle \in c[\text{A}][\text{B}]\} \end{aligned}$$

Heim's observation is important because it demonstrates that presuppositions enter into binding relations with asserted contents and, as a consequence, that an adequate analysis of presuppositions must feature a mechanism for interpreting

20 It's assumed in both Heim's (1982) File Change Semantics and Kamp; Kamp and Reyle's (1981; 1993) Discourse Representation Theory that indefinites introduce discourse referents rather than existentially quantified formulas. But in more recent systems, e.g. Groenendijk and Stokhof's (1991) Dynamic Predicate Logic, indefinites introduce existentially quantified formulas. For the present purposes, it's inessential which option is chosen. The general requirement proposed here is that an indefinite description presupposes a non-empty restrictor set. So, if this requirement is met, then in a Heim/Kamp-style analysis a discourse referent is established and in a Groenendijk and Stokhof's style analysis an existentially quantified formula is established.

21 As Heim observes, the CCP of 'every' requires that x_i is a 'new' variable. She therefore assumes that 'every' presupposes that for any two sequences g and g' which differ at most in their i-th member and for any world w: $\langle g, w\rangle \in c$ if and only if $\langle g', w\rangle \in c$.

such presuppositions. Now, since presuppositions in dynamic systems are simply constraints on the update procedure, the distinction between asserted and presupposed contents is in a sense vacuous; when a presupposition is admitted into a context (i.e. accommodated), it's simply another interpreted formula in the context. I.e. there's no longer any relevant distinction between presuppositional contents and asserted contents. We therefore see that if an expression triggers an existentially quantified sentence as its presupposition and this presupposition is admitted by the context, it's a natural consequence that this existentially quantified sentence is capable of binding free variables in its scope. When a dynamic system is adopted, it's thus entirely unproblematic for descriptions to have as their asserted contents a mere variable, because this variable is simply bound by the presupposition triggered by the relevant description. If the presupposition is not satisfied, the update procedure crashes, and if it is satisfied, it functions as the anchor for the variable in the asserted content. An update of the context with (49) therefore requires that (50) holds. If (50) holds, updating the context with (51) is straightforward and if (50) doesn't hold, (51) is undefined.

(49) c[The king of France is bald]
(50) $c \vDash \exists x_1$[king-of-France(x_1) $\wedge$ $\forall y$[king-of-France(y) $\rightarrow$ $x_1 = y \ldots$]
(51) c[bald(x_1)]

It should thus be clear that this analysis of descriptions captures that a presupposition is a constraint on definedness—if the presupposition is not entailed by the context, the update procedure crashes. This result is obtained simply by adopting the resources made available by standard dynamic systems, viz. no changes to the semantic framework are required.[22]

22 Heim's proposal is not without its problems. Consider (i).

(i) A fat man was pushing his bicycle. Heim (1983)

Since indefinites contribute a discourse referent in Heim's system, c[(i)] requires that ⌜x_i is a fat man⌝ is added to c, and that ⌜x_i was pushing x_i's bicycle⌝ is added to the resulting context. However, the nuclear scope of (ii) triggers the presupposition ⌜x_i has a bicycle⌝. In other words, the update proceeds only if c[A] entails ⌜x_i has a bicycle⌝. However, given Heim's proposed analysis of open sentences, this means that c[A] admits the nuclear scope of (i) only if every $\langle g,w\rangle \in c$[A] maps every individual in the domain onto the bike that he owns. This in turn means that (ii) is predicted to presuppose that every fat man owns a bicycle. This is clearly not the correct prediction. However, this problem is avoided if indefinites are assumed to presuppose the existence of an individual satisfying the restrictor. So, updating effectively imposes the constraint that $c \vDash \exists x_i$ fat-man(x_i)—viz. this is the initial presupposition that must be satisfied by the context. The nuclear scope of (i) ⌜x_i was pushing x_i's bicycle⌝ now triggers the presupposition ⌜x_i owns a bicycle⌝ but this presupposition can now be anchored to the already established invididual x_i. The resulting prediction is that (i) presupposes that for each $\langle g,w\rangle \in c$ there is an x_i, x_i is a fat man, and x_i owns a bicycle. This appears to capture the relevant presuppositions of (i). So, if we permit indefinites to trigger existence

4.2 *Indefinites and Discourse Referents*

In dynamic systems, indefinites are afforded a rather special treatment. Heim's (1982) and Kamp's (1981) crucial observation was that the paradigmatic function of indefinite NPs is to introduce *new* discourse referents into a discourse which can then subsequently serve as anaphoric anchors for various expressions, e.g. pronouns, definite descriptions, complex demonstratives etc. This observation is what motivated the dynamic semantic system where binding is no longer clause-bounded. In other words, this paradigmatic function of indefinites (and of weak determiners more generally) should be captured even if we're permitting presuppositional treatments of these determiners. Thus, in cases where an indefinite description such as 'a man' triggers an existential presupposition, this presuppositional requirement does not merely consist in checking whether the domain of men is non-empty. Rather, we must assume that when weak determiners are used to introduce new discourse referents, they impose the presuppositional requirement that a *new* individual satisfying the restrictor is already established in the context. So, if the second occurrence of the determiner phrase 'one politician' in (52) is analyzed as triggering an existence presupposition, the presuppositional requirement is not simply that there is an individual satisfying the restrictor (since this is trivially satisfied given the first conjunct) but rather that there is a *new* invidividual satisfying the restrictor in addition to the individual already introduced in the first conjunct.

(52) One politician voted for the bill and one politician voted against it.

Thus, instead of uniformly analyzing presuppositional indefinites as triggering a simple existential requirement that an individual satisfying the restrictor exists, we should analyze these as triggering the requirement that an individual satisfying the restrictor, *who is not already introduced into the discourse*, exists.

Adopting an analysis where weak determiners are capable of triggering existence presuppositions has a range of advantages. While weak determiners are paradigmatically used to introduce new discourse referents, this discursive function is not mandatory. Rather than introduce *new* discourse referents, weak determiners are, in a variety of cases, used simply to pick out a subset of individuals already introduced into the discourse. In such cases it becomes particularly clear that an analysis of weak determiners which permits presuppositional interpretations has a significant advantage. To illustrate, consider (53) and (54).

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presuppositions, we're thereby permitted to process the presupposition that x_i owns a bicycle after we've processed the presupposition that there is an x_i such that fat-man(x_i). And the problem is thereby avoided.

(53) Ten conservatives supported the president's health care plan, but many conservatives didn't and were genuinely upset by it.
(54) Ten conservatives voted against their own party and three even publicly stated their dislike of their party's policy.

Here the pertinent question is: what is the cardinality of the set of individuals introduced? In (53), it seems quite clear that the cardinality is greater than 10, i.e. ten conservatives were for the health care plan, but many conservatives, in addition to these ten, were against it. This contrasts the most natural reading of (54) where the set of individuals introduced has a cardinality of no more than ten. Here the determiner phrase in the subordinate clause, 'three [conservatives]', is used to simply pick out three of the ten conservatives already introduced. The intuitive explanation is that the domain of the weak determiner 'three [conservatives]' is anaphoric on the domain of the determiner phrase in the previous clause, viz. 'ten conservatives'. Now, if we permit presuppositional treatments of indefinites, this natural reading of (54) is easily explained. The determiner phrase 'three [conservatives]' triggers a presupposition that three conservatives exists but since the previous determiner phrase has already introduced ten conservatives into the discourse, the presupposition triggered by 'three [conservatives]' is resolved by already existing information. That is, the presuppositional reading disappears because the presupposition triggered in the subordinate clause is entailed by the determiner phrase in the previous clause. We thereby obtain the reading where the cardinality of introduced individuals equals ten. The reading where the cardinality of introduced individuals is thirteen can be obtained either by not resolving the presupposition to its anaphoric antecedent, viz. global accommodation, or by assuming that the determiner phrase in the subordinate clause is not presuppositional and thus asserts existence.[23]

In contrast, if weak determiners are uniformly treated as introducing new discourse referents, or if weak determiners are treated uniformly as asserting existence, then, pace a range of auxiliary assumptions, the reading of (54) where

23 There are other examples in the literature of sentences that are ambiguous between different resolutions of presuppositional expressions. For example,

(i) If John has grandchildren, his children must be adult. van der Sandt (1992)

As van der Sandt observes, (i) has two distinct readings, a presuppositional reading and a non-presuppositional reading. The reading where the possessive construction 'his children' is resolved by entailment from the antecedent—if John has grandchildren, it follows that he has children too—is non-presuppositional. On this reading, it's not presupposed that John has children. However, there is a second reading where it *is* presupposed that John has children, and then asserted that if he has grandchildren, these children (which are presupposed to exists) must be adult. The first is a case of presupposition resolution to the available antecedent, the second is a case of global accommodation.

the cardinality of introduced individuals equals ten is not available.

Now, a defender of an orthodox analysis of weak determiners might object by observing that the weak determiner phrase in (54) is intuitively equivalent to a partitive construction, e.g. 'three [of the conservatives]' and thus that a form of deletion is taking place in (54). However, if we consider additional examples, it becomes clear that an explanation in terms of deletion is not so straightforward.

(55) Policitians are often corrupt. For example, ten members of the house used their donations to buy cars and three members even bought cars for their friends.

There is a natural reading of (55) where the cardinality of the set of individuals introduced equals ten, but if this is to be explained in terms of deletion, the deleted material would need to be 'three [of the] members'. The obvious problem is that 'of the' is not a proper syntactic constituent and therefore not material that is in general assumed to be a candidate for deletion.[24] This means that an explanation in terms of deletion requires a range of not uncontroversial syntactic assumptions whereas a presuppositional analysis provides a straightforward and plausible explanation with no extra costs.

5 Solving the Existence Puzzle

Throughout the previous sections I've attempted to justify two assumptions: (a) weak determiners are capable of triggering existence presuppositions and (b) if a dynamic semantic system is adopted, an analysis of descriptions according to which their asserted content is simply a variable, which is bound by the triggered presupposition, is unproblematic. Assuming that these assumptions are adequately justified, the existence puzzle now has a straightforward solution. Consider again the problematic (12).

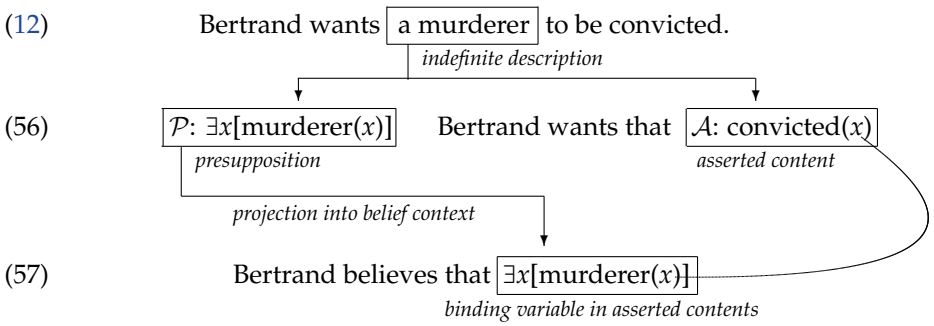
(12) Bertrand wants a murderer to be convicted.

It's felicitous and true to assert (12) in the context described in section 2.2 and this now has the following explanation. Since the indefinite in the complement clause intuitively triggers the presupposition that the set of murderers is non-empty, we treat this indefinite description as an occurrence of a presuppositional indefinite, viz. we treat it as triggering an existence presupposition. Moreover, we assume, following Heim (1992), that when presuppositions are triggered in the scope of an attitude verb, the presupposition projects into a belief context, namely the belief context of the subject of the attitude verb. Consequently, the existential presupposition triggered by the indefinite in the complement clause

24 Ref.

doesn't require that the set of murderers is non-empty, but rather that Bertrand, the subject of the attitude verb, *believes* that it's non-empty. I.e. Bertrand believes that there is at least one murderer. The existential claim embedded under Bertrand's belief must then bind the variable in the asserted contents of (12). This also seems plausible, since intuitively there is an important connection between Bertrand's beliefs and his desires, in particular, a belief in the existence of murderers is a prerequisite condition on the truth of (12).

The proposed semantic analysis is thus to to treat the complement clause of (12) as consisting of a presuppositional component and an assertive component, cf. (56). The presupposed component which is triggered by the indefinite in (12) is an existential formula and its asserted content is simply a variable, x. The presuppositional content then projects to a belief context from where it binds the free variable in the asserted content, (57).



This proposed solution does require a range of assumptions about discourse structure but this is exactly what a dynamic system provides. Now existence is genuinely presupposed because there are no existentially committing formulas in the asserted content. That is, there is no problematic assertion of existence embedded under the attitude verb and existence is thus not part of the content of the attitude described. Yet it's now strictly speaking a mistake to talk about propositional attitude verbs as *operating* on propositions (since the object of the attitude is not a proposition). Rather, the content of the attitude, the content that the attitude verb *operates* on, is now simply an open sentence, the value of which is supplied by the existential formula embedded under the belief ascription. This means, as shown above, that the analysis is general enough to cover instances of the puzzle involving indefinite descriptions and weak determiners in general—cases where the referential analysis fails. Unlike the referential analysis, this analysis succeeds in capturing that in (12) the murderer(s) convicted can vary with Bertrand's desire worlds and that regardless of which murderer is convicted, Bertrand's desire is satisfied. Since Bertrand has a general existential belief that the domain of murderers is non-empty, the individuals that can be picked out by the indefinite in the complement clause of (12) depends on the

domain of the quantifier embedded under Bertrand's belief. Since Bertrand believes that the domain of murderers is non-empty, and more specifically that there are (at least) three murderers, the existential quantifier ranges over (at least) these three individuals, each of which are suitable witnesses for the existential quantifier. Whichever witness is chosen determines which individual the indefinite in the complement clause of (12) is anaphorically linked to. In other words, either of the relevant individuals in the domain of the existential quantifier renders (12) true. And this yields the desired truth conditions for (12). In conclusion, by adopting a dynamic framework and by analyzing the existence commitments of descriptions and weak determiners as genuinely presupposed and asserted contents as mere variables, the problem posed by the existence puzzle disappears.

This concludes the primary aim of this paper. Next, I turn to a brief discussion of certain pertinent issues which arise from the proposed dynamic/presuppositional analysis. For reasons of space, I'm unable to address these issues in detail here but I acknowledge that they are important and should be addressed in subsequent work.

6 General Remarks

6.1 Presuppositional vs. Non-Presuppositional Weak Determiners

While weak determiners standardly fail to elicit strong presuppositional interpretations, several uses of weak determiners also fail to elicit the intuition that existence is asserted. This is puzzling because it's hard to understand how sentences containing weak determiners can be meaningful unless existence is either asserted or presupposed. I've attempted to demonstrate that these determiners *can* presuppose existence despite the fact that these presuppositions are hard to detect. And while my proposed solution relies crucially on this assumption, I've supplied a wide array of data in support of it. Nevertheless a rather important question has been left unanswered, namely *when* weak determiners should be analyzed as presuppositional. This is clearly a very difficult question to answer. I've focused on justifying the assumption that on some occasions, a presuppositional analysis of these determiners is warranted but intentionally left it open *when* this is the correct analysis. As I've emphasized already, there are several candidate explanations available. For example, one could maintain that weak determiners are simply ambiguous between presuppositional and non-presuppositional readings—in effect assuming that the lexicon contains both presuppositional and non-presuppositional weak determiners. Such an ambiguity view for certain weak determiners is not uncommon, cf. Partee (1989) and Diesing (1992). Another option is to assume that weak determiners uniformly trigger existence presuppositions and explain cases where these determiners appear to assert existence in terms of local accommodation. While these options clearly fail to exhaust the space of possible explanations, justifying

either requires a substantial amount of work which I'm unable to undertake here. However, regardless of which explanation is ultimately correct, it seems fairly improbable that this explanation could obviate my proposed solution to the existence puzzle. The problematic cases considered here do seem to be very strong candidates for cases where weak determiners should be analyzed as presuppositional and thus an important desiderata for adequate analysis of weak determiners.

6.2 Final Remarks

I do concede that several important questions remain unanswered. A number of general problems related to the semantics of weak determiners is simply ignored in this paper, for example generic indefinites, semantics for plurals, and other potential ambiguities. My explanation of the data has also relied on an informal characterization of Heim's theory and to ensure that the present proposal is workable, a formal explication would ultimately be required. However, with regards to the latter endeavor, I see no reason for immediate skepticism.

It's worth emphasizing that the predictions provided by a presuppositional analysis are strikingly similar to the predictions of the standard existential analysis. In the vast majority of cases, the predictions of these two analyses simply coincide. The real advantage of a presuppositional analysis is the freedom of movement it provides. Since presuppositions are not subject to standard syntactic constraints, then with the resources of a presuppositional analysis one can avoid putatively problematic existential claims, and explain why. In the end, this is the only significant difference between the analysis proposed here and the orthodox existential analysis.

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