Situations, Presuppositions, and Contexts

Lukas Lewerentz

St. Hugh's College

University of Oxford

A thesis submitted for the degree of

Doctor of Philosophy

in Philosophy

2021

Abstract

Definite descriptions (such as 'the cat') can often be used felicitously even when more than one object satisfies the overt descriptive material (such as 'cat'). Situation semantics has been invoked to reconcile this observation with the idea that definite descriptions presuppose uniqueness. This thesis examines some of the challenges that this reconciliatory project faces. The focus is, in particular, on anaphoric uses that cross sentential boundaries and on the question of what role situations could play in modelling global and local conversational contexts as well as assertoric update.

Acknowledgements. In writing this thesis, I have been very lucky to have benefitted from a lot of support, without which this thesis would not exist. First and foremost, I am extremely grateful to my supervisors Paul Elbourne and Ofra Magidor for their generous help, their suggestions, comments, and criticism, which have shaped this thesis in many crucial ways. I am also very grateful for tremendously helpful feedback and support, at various stages of working on this thesis, from Matt Mandelkern, Felix Frühauf, Matt Hewson, James Kirkpatrick, Emanuel Viebahn, Julia Zakkou, Christian Nimtz, Robin Solberg, Annina Loets, Rory Harder, Richard Roth, Aglaia von Götz, Martin Schlombs, Philipp Koralus, Yasu Sudo, Manuel Križ, to members of the Research Seminar Theoretical Philosophy at Bielefeld University, and to audiences at the DPhil Seminar and at the Ockham Society at the Faculty of Philosophy in Oxford. Many thanks to Anne Lewerentz, Paul Geiling, Arnaud Petit, Amartya Sanyal, Benjamin Marschall, Jakob Ohlhorst, Olaf L. Müller, and Barbara Vetter, who have all, in different ways, helped me reach this point.

My work on this thesis was generously funded by the Arts and Humanities Research Council Doctoral Training Partnership at the University of Oxford (grant number AH/L503885/1), a Scatcherd European Scholarship, a Jacobsen Studentship from the Royal Institute of Philosophy, and by the Vice-Chancellors' Fund at the University of Oxford. I am very grateful for the support.

Contents

Chapter 1

Introduction

Conversations develop over time. By asking questions, making promises, assertions, suggestions, and other speech acts, speakers can steer a conversation in certain directions. Describing this conversational dynamics is one of the aims of pragmatics.

Robert Stalnaker has suggested that we can describe the state of a conversation with a so-called context, a set of possible worlds that the participants of the conversation treat as candidates for being the actual world. By excluding worlds from the context, the participants try to narrow down what the actual world is like. For example, if all worlds in the context are worlds in which it's raining in Oxford, the interlocutors have accepted, at least for the purposes of the conversation, that it is raining in Oxford. After all, they have accepted that one of the worlds in the context is ours. By making assertions, speakers try to get everyone to accept what they assert. If a speaker asserts that the sun is shining in London, they propose to exclude all those worlds from the context where the sun isn't shining in London.[1]

Stalnaker assumes that the content of an assertion, a proposition, is a function from possible worlds to truth values (or, equivalently for most purposes, a set of possible worlds). This view has been challenged for example by situ-

[1]See e.g. Stalnaker 1978, Stalnaker 2002, Stalnaker 2014

ation semantics. Situation semantics assumes that situations, parts of possible worlds, play an important role in the semantics. In particular, they assume that a proposition is a function from possible situations to truth values. On this view, a proposition may be true at some part of the world without also being true at all other parts of the world. For example, the proposition that it's raining may be true at some part of the world while it is false at a different part. And when a speaker makes an assertion, the assertion may be not about the world as a whole and may instead aim to describe a particular part of it, often called the topic situation.[2]

The question of how to combine these two approaches, the view that we can characterize the dynamics of a conversation with an evolving context and the situation semantic view of propositions and assertion, has to my knowledge not received a lot of attention.[3] On Stalnaker's view, contexts are sets of possible worlds, and an assertion excludes a world from the context based on whether the asserted proposition is true at that world as a whole. But on the situation semantic view, an assertion need not describe the whole world. It seems that something needs to be changed if one wants to combine the two views. In this thesis, I want to discuss different ways of combining the two, and I want to explore some applications of one combination.

The view that I will explore in most detail assumes that a context is a set of possible situations rather than a set of possible worlds. A context captures what the interlocutors have accepted by including only situations at which what they have accepted is true. If, for example, the interlocutors accept that there is a cat, then every situation in the corresponding context contains a cat. Moreover, I assume that the situations in the context are just big enough so that what the in-

[2]This characterization of situation semantics is rough and not all aspects of it are accepted by all situation semanticists. See Kratzer 2019 for a helpful recent overview of situation semantics; contributions to situation semantics include e.g. Barwise and Perry 1981, Barwise and Perry 1983, Kratzer 1989, Elbourne 2005, Elbourne 2013.

[3]A notable exception is F. Schwarz (2009), whose view I discuss in section 2.4.

terlocutors have accepted is true at these situations. If all that has been accepted is that there is a cat, then the situations in the context contain a cat, but nothing else. I call such contexts *minimal contexts*.

One of the applications of contexts is in the study of linguistic presuppositions. It is a common assumption, again going back to the work of Stalnaker, that presuppositions of an utterance impose constraints on the context: If an utterance presupposes some proposition p, then the utterance is appropriate only if p was already accepted in the conversation and therefore already true at all worlds in the context. For example, if someone asserts that Mary quit smoking, the utterance is appropriate only if it was already accepted that Mary used to smoke.[4]

Presuppositions are also at the centre of one important application of situation semantics: the semantics of definite descriptions such as 'the table' or 'the cat'. According to one view, a definite description ⌜the F⌝ comes with a presupposition that there is exactly one F. Situation semanticists have suggested that this presupposition is restricted to a situation, which may be much smaller than the whole world.[5]

(1) The cat is hungry.

For example, a speaker may assert (1) to make a claim about their garden, and so (1) would presuppose that there is exactly one cat at a situation that contains nothing but the speaker's garden. Assuming that presuppositions have to be accepted in the context, this presupposition, too, would have to be accepted in the context. This is where the situation semantics of definite descriptions meets the theory of contexts. This meeting point will be at the centre of much of this thesis.

[4]For an overview on presuppositions, see e.g. Potts 2015. For Stalnaker's work on presuppositions, see e.g. Stalnaker 1970, Stalnaker 1973, Stalnaker 1978, Stalnaker 2014, chapter 3. Stalnaker also suggests that the context of a conversation depends on what the interlocutors presuppose: roughly, the context of a conversation is the set of all those worlds that are compatible with what the interlocutors presuppose; see e.g. Stalnaker 2002.

[5]See e.g. Barwise and Perry 1983, Heim 1990a, Elbourne 2005, Elbourne 2013

One reason why the semantics of definites is an interesting case to consider is the ongoing dispute between so-called dynamic semantics and static semantics. Situation semantic accounts of definite descriptions are often presented as static semantic competitors to dynamic semantic theories. How exactly one should best understand the divide between static and dynamic semantics is not entirely clear (to me, at any rate). Static semantic theories typically accept that declarative sentences express propositions, whereas dynamic semantic theories typically assume that sentences express functions from contexts to contexts, also called context update potentials. Moreover, dynamic semantic accounts of definite terms typically reject the claim that definite terms come with a uniqueness presupposition, and they assume that definites are essentially (individual) variables.[6] One motivation for dynamic semantics comes from intersentential anaphora, as in the following sequence:[7]

(2) There's a cat. The cat is hungry.

Here, the definite description 'the cat' in the second sentence appears to be linked to the indefinite 'a cat' in the first sentence. Explaining this link has been argued to be particularly problematic for static situation semantic theories of definite terms. The sequence as a whole does not seem to presuppose that there is at most one cat. After all, it is felicitous to continue as follows:

(3) There's a cat. The cat is hungry. And there's another cat right next to it.

It is not obvious how situation semantic theories can account for observations like this.[8] One aim of this thesis is to explore whether combining a situation semantics of definites with the view that contexts are sets of (generally rather small) situations could help explain what is going on in such cases, thereby hopefully

[6]See e.g. Heim 1982 for an influential dynamic semantic theory of definite terms along these lines.

[7]See for example Heim 1982, pp. 24–8

[8]For recent arguments that such sequences are a problem for situation semantic accounts, see Mandelkern and Rothschild (2020) and K. Lewis (2021).

also shedding some new light on the dispute between dynamic semantic and situation semantic theories of definite descriptions.

In chapter 2, I introduce in some more detail Stalnaker's account of contexts and of how contexts change. I also provide some background on presuppositions, on situation semantics, and on the role of topic situations for situation semantics. In addition, I discuss how F. Schwarz (2009) suggests combining Stalnaker's account of contexts with the view that assertions describe topic situations.

In chapter 3, I explore the idea that contexts are sets of possible situations rather than sets of possible worlds. I introduce different ways of thinking about contexts that are sets of situations. In particular, I distinguish between *minimal* and *non-minimal* contexts, and between *definite* and *indefinite* contexts.

In chapter 4, I turn to definite descriptions. I introduce a situation semantics for definite descriptions, along the lines suggested by Elbourne (2013). Then I discuss why sequences such as (2) are so challenging for the situation semantic view, mainly by arguing against various things the situation semanticist might say about such sequences. Finally, I try to explain why appealing to contexts of the sort introduced in chapter 3 could be of help to the situation semanticist.

In chapter 5, I discuss two problems for the view sketched at the end of chapter 4. Both problems have to do with sequences where a definite description ⌜the F⌝ is used felicitously even though the sequence can only be true if there is more than one F. Dealing with such sequences seems to require some significant modifications of the view.

Until chapter 6, my focus is on sequences of sentences. In chapter 6, I turn to single sentences and ask how what I say about sequences may relate to the behaviour of presuppositions in complex sentences. In particular, I look at conjunctions, disjunctions, negation, and at the semantics of indefinites and other quantifiers.

Chapter 7 concludes.

Chapter 2

Preliminaries

2.1 Assertions and Contexts

According to a view that may sound familiar, we assert propositions, propositions are things that are true or false at possible worlds, and an assertion is true just in case the asserted proposition is true at the actual world:

(4) *Worldly Assertion.* An assertion of a proposition p is true just in case p is true at the actual world.[9]

Assertions are not isolated events. Often, we assert one thing after another, building upon what we have already asserted. The information that we contribute by assertion piles up, so to speak. Roughly, a *context* is such a pile of information, and an account of *context update* is an account of how the pile changes.

The perhaps most influential account of contexts is Stalnaker's.[10] According to Stalnaker, a context captures what is *common ground* in a conversation. A proposition is common ground in a conversation just in case the interlocutors take it for granted, or presuppose it, for the purposes of that conversation. To-

[9]By and large, I'm assuming that the assertions under consideration are made at the actual world. What I say about assertions could be generalised to apply also to assertions made at other worlds. For example, we could say that an assertion of a proposition p made at a world w is true just in case p is true at w.

[10]For Stalnaker's account of contexts, see e.g. Stalnaker 1978; 2002; 2014.

gether, the propositions that are common ground determine the context: the context of a conversation is the set of all those possible worlds in which everything that is common ground in the conversation is true.[11] For instance, if all interlocutors take it for granted that Witney is west of Oxford, then every world in the context is a world where Witney is west of Oxford. If, however, the interlocutors don't take it for granted that Witney is west of Oxford, and also don't take it for granted that Witney is not west of Oxford, then Witney is west of Oxford in some but not all of the worlds of the context.

The worlds that are in the context are those worlds the interlocutors treat as candidates for being the actual world. The actual world is one of the worlds in the context, as far as the conversation is concerned. As long as the actual world is in fact one of the worlds in the context, everything that is common ground is true. We may say that, in this case, the context is accurate:

(5) *Accuracy of Stalnakerian Contexts.* A context c is accurate just in case the actual world is a member of c.

If something that is not true at the actual world is common ground, then the actual world is not in the context, and so the context is inaccurate.

Assertions can change what is taken for granted in a conversation and so affect the context. If I assert that Wheatley is east of Oxford, and you accept what I assert, we may then take it for granted in our conversation that Wheatley is east of Oxford, and so our context will contain only worlds where Wheatley is east of Oxford. That assertions can change the context in this way is, for Stalnaker, no coincidence. Assertions are, according to Stalnaker, "proposals to change the context [...] in a certain way" (Stalnaker 2014, p. 51). When a speaker asserts that p, the speaker proposes to add p to the common ground and so to exclude from the context all those worlds in which p is false. The audience may not accept the proposal, but if accepted, the context changes in the way proposed. If we take a

[11] Stalnaker also calls this the *context set* (see e.g. Stalnaker 1978, p. 321) .

proposition to be a function from possible worlds to truth values (1 for true, 0 for false), the change proposed by an assertion can be described as follows:[12]

(6) *Stalnakerian Update.* $c[p] = c \cap \{w : p(w) = 1\}$

Here, c is a context, a set of possible worlds, and p is the proposition the speaker asserts. By asserting p, the speaker proposes to keep only those worlds in the context where p is true; that is, the speaker proposes to move from the old context c to a new context $c[p]$, which is the set of all those worlds of c at which p is true. If the assertion that p is accepted, the context c is *updated* with p, and the result of this update is $c[p]$.

Changing the context in this way is, according to Stalnaker, the "essential effect" (Stalnaker 2014, p. 52) of an assertion. As Stalnaker emphasizes, assertions can affect the context in other ways as well. For example, if a speaker makes an assertion, it may become common ground that the speaker made an assertion, and the context will change accordingly.[13]

On the view of contexts and assertions just sketched, the accuracy of contexts and the truth of assertions are closely related. If any world is treated as a candidate for being the actual world, the context is the set of all worlds W. This context we could call the *empty context*:

(7) *Empty Context.* $c_\circ = W$

The assertion of a proposition p is true just in case p is true at the actual world. The context $c_\circ[p]$ is the set of all worlds in which p is true; this context is accurate just in case the actual world is one of the worlds it contains, that is, just in case the actual world is one of the worlds in which p is true. Therefore, an assertion of a proposition p is true just in case $c_\circ[p]$ is accurate, that is, just in case the context is accurate if p is the only proposition that has been accepted.[14]

[12] See e.g. Stalnaker 1978, p. 323 on how assertions reduce the context

[13] See e.g. Stalnaker 2014, p. 52

[14] Links between context update and truth are exploited in dynamic semantics; see e.g. Heim 1982, chapter III, sections 3.2 and 3.3, where Heim defines the truth of an utterance in terms of

2.2 Contexts and Presuppositions

Stalnaker argues that the common ground affects which speech acts are appropriate (or felicitous). Since, for Stalnaker, the context is a model of what is common ground, the way the common ground needs to be in order for a speech act to be appropriate can be described in terms of the context. For instance, if we're standing in the rain, it is usually odd to assert that it's raining. Usually, if we're standing in the rain, it immediately becomes common ground that it's raining, without anyone asserting that it is. Assuming that the aim of an assertion is to make what one asserts common ground, asserting that it's raining would therefore be superfluous in such a case. This may suggest that, in general, asserting what is already common ground is inappropriate. Stalnaker (1978) expresses this constraint on appropriate (or felicitous) assertions in terms of the context: asserting p is appropriate only if p is not already true at all worlds of the context set.[15]

Stalnaker thinks that the phenomenon of linguistic presuppositions can also be elucidated in terms of the context, in a similar way. What exactly linguistic presuppositions are remains controversial.[16] Here's a first approximation. Utterances implicate many things. Someone who asserts that it's raining implicates that it's raining, but with this assertion, they may implicate other things as well: that they've just looked out of the window, or that they don't want to go outside, or that the plants in the garden don't need to be watered anytime soon, or something else.[17] Not all implications are equal. For example, some are part

the truth of a file (context).

[15]This is part of Stalnaker's principle: "A proposition asserted is always true in some but not all of the possible worlds in the context set." (Stalnaker 1978, p. 325) That the proposition is required to be true in some worlds rules out assertions of propositions that have already been accepted as false in the conversation.

[16]For an overview of the debate on presuppositions, see e.g. Beaver, Geurts, and Denlinger 2021

[17]I use 'implication' in a broad sense for anything a sentence or use of a sentence suggests, implies, conveys, ...; implications may be part of the semantic content of a sentence but may also be conveyed differently, e.g. as conversational or conventional implicatures (see Grice 1989).

of the semantic content of a sentence uttered, others aren't. And there are other differences among implications. Linguistic presuppositions, we might say, are implications of a certain type: they are implications that have certain characteristic features which set them apart from other types of implications, for example from those implications that are asserted. One feature that sets presuppositions apart is their pragmatic status.[18] Compare for example the following two sentences:

(8) Jane bought ice cream.
(9) It was Jane who bought ice cream.

(9) presupposes that someone bought ice cream, whereas (8) entails that someone bought ice cream but doesn't presuppose it. These sentences would typically be used under different circumstances. Stalnaker suggests that these circumstances can be described in terms of the common ground or the context, as a model of the common ground: if it were not already part of the common ground that someone bought ice cream, asserting (9) would be rather strange, whereas asserting (8) would be fine; or, in terms of the context: if it were not already true at all worlds of the context that someone bought ice cream, asserting (9) would be strange, whereas asserting (8) wouldn't. More generally, if an utterance presupposes some claim p, p needs to be already true at all worlds of the context in order for the utterance to be appropriate.[19] On this view, a presupposition of an utterance imposes a constraint on the context in which the utterance is made; the presuppositions of an utterance need to be already accepted in the context.[20]

[18]Another crucial feature is how presuppositions *project*, which I will discuss in subsequent chapters. How these two features are related is an interesting question but one that I won't discuss.

[19]Contrast this with the constraint on assertions briefly mentioned at the beginning of this section: according to these two constraints, an assertion of p is appropriate only if a presupposition of p isn't, and a presupposition of p is appropriate only if an assertion of p isn't.

[20]See e.g. Stalnaker 2014, chapter 3, for discussion; for earlier versions of Stalnaker's views on presuppositions, see e.g. Stalnaker 1973 and Stalnaker 1999. Note that presuppositions are in fact often informative; the audience may decide to accept what is presupposed even if it wasn't already common ground, which is known as *accommodation* (the label goes back to D. Lewis 1979). Speakers often rely on accommodation, knowing that what their utterance presupposes

Often, this pragmatic status of presuppositions is modelled as a difference of the conditions under which a context can be updated: if an assertion of a proposition p presupposes q, a context c can be updated with p only if q is true throughout c, that is, only if q is true at all the worlds of c. In other words, c can only be updated if it *satisfies* the presupposition q. If q is not true at all worlds of c, then $c[p]$ is undefined:

(10) *Presuppositional Constraint.* If an assertion of p presupposes q, then $c[p]$ is defined only if $\forall w(w \in c \rightarrow q(w) = 1)$.

If by asserting p in a context c, the speaker proposes to update the context with p, then $c[p]$ better be defined; if it weren't, the proposal would be futile and therefore inappropriate.[21]

Many have argued that presuppositions are not just a pragmatic phenomenon but also a semantic one.[22] The idea is that the semantics somehow distinguishes between semantic content that is presupposed and semantic content that isn't. The semantic presuppositions of a sentence then affect how the sentence may be used: if the sentence is used literally, the utterance presupposes what the sentence presupposes; the utterance requires that the semantic presuppositions of the sentence used are already common ground.[23]

Among those who assume that there are semantic presuppositions, it is controversial how the semantics distinguishes between presuppositional and non-presuppositional semantic content. According to one tradition, semantic presuppositions are closely tied to truth-value gaps: a sentence may fail to be true or false under certain conditions, and the sentence presupposes that these condi-

isn't already common ground before their utterance. For further discussion of accommodation, see e.g. von Fintel 2008.

[21]See e.g. von Fintel 2008, pp. 138–40

[22]Or, as Stalnaker might say, at least some presupposition requirements have semantic sources; see e.g. Stalnaker 2014, section 3.4.

[23]Non-literal uses of a sentence that presupposes p may also inherit semantic presuppositions of the sentence. For example, someone might utter 'Sure, it was Jane who bought ice cream' ironically, and thus non-literally, to convey that it wasn't Jane who bought ice cream, and the utterance would still presuppose that someone bought ice cream, which is arguably a semantic presupposition of the sentence.

tions don't obtain.[24] In particular, some assume that a sentence may express a proposition that fails to be true or false under certain conditions, and that the sentence presupposes that these conditions don't obtain. If the sentence is used literally, the truth-value gap becomes a presupposition of the use of the sentence and constrains the conditions under which the use is appropriate:

(11) *Stalnakerian Bridge.* If a proposition p is true or false only if q is true, $c[p]$ is defined only if $\forall w(w \in c \rightarrow q(w) = 1)$.[25]

According to this bridge principle, a context c can be updated with a proposition p only if p is true or false at all the worlds of c. Truth-value gaps lead to presuppositional constraints on the contexts the proposition can update. If by asserting a proposition p in a context c, the speaker proposes that c is updated with the proposition, $c[p]$ better be defined. That way, semantic presuppositions lead to pragmatic presuppositions.[26]

Many aspects of Stalnaker's approach to assertions and presuppositions have been challenged in one way or another. For example, one might wonder whether the connection between assertion and context update is as tight as Stal-

[24]This kind of view is often associated with Frege and Strawson; see e.g. Frege 1892; Strawson 1950; Strawson 1952. Other accounts of semantic presuppositions reject the close connection of semantic presuppositions and truth-value gaps; see e.g. Karttunen and Peters 1979, who provide an account of what they call conventional implicatures but suggest that many alleged presuppositions really are conventional implicatures. It should be noted that the view that some sentences (and the propositions they express) are under certain conditions neither true nor false is controversial; see e.g. Williamson 1994, pp. 187–98, for critical discussion. For the purposes of this thesis, I nonetheless accept without argument that sentences and propositions may fail to be true or false. (I am sympathetic to the idea that the 'truth-value gaps' of sentences with presuppositions are cases of a particular kind of falsity rather than genuine truth-value gaps, and that the third truth value I use (further below) to model 'gaps' does not stand for being neither true nor false but for being false in a particular way, but I won't argue for this view here; see Dummett 1959, p. 156, on using a third truth value for sentences with singular terms that fail to refer, in order to distinguish "two kinds of falsity".)

[25]See e.g. Stalnaker 1973, p. 452, Stalnaker 2014, p. 64; see also von Fintel 2008, p. 139.

[26]Truth-value gaps of sentences need not be gaps of a proposition the sentence expresses; a sentence may also fail to be true or false if it fails to express a proposition under certain conditions. Such cases may also lead to pragmatic presuppositions. The corresponding bridge principle would say that a (declarative) sentence may be used literally in a context c only if the sentence expresses a proposition at every world of the context c. (This is the first part of Stalnaker's principle: "Any assertive utterance should express a proposition, relative to each possible world in the context set, and that proposition should have a truth value in each possible world in the context set." (Stalnaker 1978, p. 325)) See Soames 2008a for some discussion of the difference between different kinds truth-value gaps and their connection to pragmatic presuppositions.

naker argues. Some also reject the view that presuppositions impose constraints on the context and instead take presuppositions to be implications that are in some other way backgrounded or not-at-issue.[27] And not all think that the Stalnakerian Bridge principle is well motivated.[28] Here, I want to put such worries aside and focus on a different issue: on the role of possible worlds in the account.

2.3 Assertions and Situations

2.3.1 Situations

On Stalnaker's view, the context is a set of possible worlds. Possible worlds are ways the world could have been. I could have been drinking tea, and so there are possible worlds where I am drinking tea. It could also have been raining in Oxford, and so there are possible worlds where I am drinking tea and it is raining in Oxford. And so on. What exactly possible worlds are is notoriously controversial. But for many purposes in semantics and pragmatics, we can abstract away from this issue, at least to a certain extent. Situation semanticists contrast possible *worlds* with possible *situations*. The rough idea is that possible worlds are big situations, and in addition to these big situations, there are also smaller situations that are part of bigger ones. If a situation s is part of a possible world w, then some of the things that are true at w are also true at s, but not everything that is true at w needs to be true at s as well. If w is a possible world where I'm drinking tea and it is raining in Oxford, w may have a situation s as part where I'm drinking tea but it's not the case at s that it is raining in Oxford, even though this is the case at w. This rough idea of situations can be made more precise in different ways.[29] As in the case of possible worlds, there is no agreement on the

[27] See e.g. Mandelkern 2016

[28] See e.g. Soames 2008a for some critical discussion of the connection between truth-value gaps and presuppositions.

[29] It may be worth pointing out situation semanticists need not accept that there are worlds, in the sense of situations that are not part of any bigger situation. In what follows, I assume

nature of situations. And just like in the case of possible worlds, we can abstract away from this issue when we put situations to use in the study of language, but only to a certain extent.[30]

According to situation semanticists, possible situations are the things propositions are true at. Accordingly, they take propositions to be (possibly partial) functions from possible situations to truth values.[31] Since these situations may be smaller than whole worlds, propositions may be true at one part of a world without being true at some other part of the same world. Consider for example the following proposition:

(12) $\lambda s.\exists x \textsc{cat}(x)(s)$

This is a function from situations to truth values; it assigns to a situation s the value *true* just in case there is an individual that is a cat at s, and it assigns the value *false* otherwise.[32] This proposition is true at some actual situations (e.g. a situation that contains all inhabitants of St. Hugh's College Oxford) but false at

that there are worlds, following Kratzer 1989. In early writings, Stalnaker sometimes says that contexts contain possible situations (e.g. Stalnaker 1978, p. 323). But this should not be understood as a commitment to possible situations as something distinct from possible worlds. When discussing differences between possible worlds and possible situations, Stalnaker writes: "In the days before situation semantics, some of us who wished to take a little of the metaphysical wind out of the sails of possible worlds semantics took to referring to possible worlds as 'possible situations.' Now that the term 'situation' has been pre-empted [...] I suppose those who still like possible worlds ought to find a new label." (Stalnaker 1986, p. 109) It should be noted that Stalnaker is in principle open to the possibility that making use of something like situations is useful for certain purposes: "Possible worlds semantics could benefit, in some applications at least, from an account of the internal structure of the relevant possibilities" (Stalnaker 1986, p. 119).

[30]For an early approach to situation semantics, see Barwise and Perry 1983; for an approach that has been more influential in recent years, see Kratzer 1989. By and large, I won't discuss in detail Barwise and Perry's approach to situation semantics and how it differs from more recent installments. The view presented here is roughly Kratzer's.

[31]Whether one thinks that propositions *are* such functions or whether one merely thinks propositions can be *modelled* as such functions makes no crucial difference for present purposes. In principle, situation semanticists may hold that, in addition to situations, there are other parameters (such as moments of time) at which propositions are evaluated for truth or falsity; such parameters will not play a role in what follows, and so I won't discuss this possibility.

[32]I say more about the metalanguage in sections 4.2.2 and 4.2.3. Briefly, '$\textsc{cat}$' denotes a function from individuals to functions from situations to truth values; $\textsc{cat}$ applied to an individual x and a situation s is 1 (true) iff x is a cat at s; and a term $\ulcorner\lambda s.\phi(s)\urcorner$ denotes a function from situations to truth values; applied to a situation s, $\lambda s.\phi(s)$ delivers the output 1 iff ϕ applied to s is 1. I assume that $s, s', ..., s_1, s_2, ...$ are variables for situations, and that $x, y, ..., x_1, x_2, ...$ are variables for individuals. Accordingly, a function $\ulcorner\lambda s.\phi(s)\urcorner$ is only defined for situations and not for individuals.

others (e.g. a situation that only contains the inhabitants of my apartment).

Important for situation semantics is the assumption that situations are part of other situations. For example, some situations in which there is no cat are part of larger situations in which there is a cat. All situations are ordered by a parthood relation. For any situations s and s', I will use ⌜$s \leq s'$⌝ to say that the situation s is part of the situation s'. The parthood relation is generally taken to be a partial order: it is reflexive (each situation is part of itself); it is transitive (if s is part of s', and s' is part of s'', then s is also part of s''); it is, moreover, antisymmetric (if s and s' are distinct situations, and s is part of s', then s' isn't part of s).[33] If a situation s is part of a situation s', and s is not identical with s', then s is a proper part of s', which we may express with ⌜$s < s'$⌝. If a situation s is a proper part of another situation s', I will sometimes say that s is smaller than s', and that s' is bigger than, or extends, s.

As already mentioned, situation semanticists don't eschew possible worlds altogether. They assume that possible worlds are situations, namely those situations that are not parts of some bigger situation: those situations that are not proper parts of any situation.[34] Kratzer (1989, pp. 614–15) assumes that there are possible worlds; more precisely, she assumes that each situation is part of exactly one possible world. No situation is part of more than one world; in that sense, each situation is *bound* to its world:

(13) *Maximal Situations.* $\forall s \exists ! s'(s \leq s' \land \neg \exists s'' s' < s'')$

On Kratzer's view, individuals can also be part of situations, and so the parthood relation $\leq$ is defined over situations as well as individuals. But situations cannot be part of individuals, on her view. Following D. Lewis (1986), Kratzer assumes that individuals are world-bound as well: No individual is part of more than one possible world, but individuals may have counterparts at other worlds. Not all

[33] See e.g. Kratzer 1989, pp. 614–15

[34] But see Barwise (1989, pp. 261–2), who considers rejecting that worlds are situations.

situation semanticists make the same assumptions as Kratzer. For instance, F. Schwarz (2009) and Elbourne (2013) follow Kratzer in assuming that situations are world-bound, but Elbourne allows that individuals are parts of more than one world. One could also reject the view that each situation is part of exactly one world, either by rejecting the view that there are worlds, or by allowing that situations may be part of more than one world.[35] For present purposes, I will assume that situations but not individuals are world-bound, but I think that what I say could be adapted to a framework that makes different assumptions.

If we consider the situations at which propositions are true, we may find certain patterns that are useful for classifying propositions. One pattern is known as *persistence*. A proposition is persistent just in case, if it is true at some situation s, it is also true at all situations of which s is a part.[36] Consider again the following proposition:

(14) $\lambda s.\exists x \textsc{cat}(x)(s)$

This proposition is arguably persistent; if there is a cat at some situation s, there is also a cat at any situation of which s is a part. (I'm assuming that an individual that is a cat at a situation s remains a cat at any larger situation, which seems reasonable.) Other propositions aren't persistent. Consider the following negation of (14):

(15) $\lambda s.\neg\exists x \textsc{cat}(x)(s)$

This proposition is true at a situation s just in case s contains no individual that is a cat at s. It isn't persistent because some situations at which there is no cat are

[35]Barwise (1989, pp. 260, 262–3) briefly considers the latter option. This would make situations more similar to the possibilities of Humberstone (1981); these possibilities are not "fully specified" (p. 315), like situations, and the same possibility may be "refined" (p. 335) in different ways: if a possibility A doesn't settle whether p, then there are distinct possibilities B and C that both refine A s.t. p is true at B and false at C (p. 318); B and C are incompatible even though they are refinements of the same possibility. This corresponds to a case where a situation s_1 is part of two incompatible situations s_2 and s_3, which are not parts of the same possible world, and so s_1 itself would have to be part of two distinct possible worlds.

[36]See Barwise and Perry 1983, p. 62, Kratzer 1989, p. 616

part of larger situations in which there is a cat.[37]

Sometimes, we might be interested in whether a proposition is persistent up to a certain point. Let's say that a proposition p is persistent with respect to a situation s just in case, if p is true at some part s' of s, it is also true at all situations that have s' as a part and are part of s, that is, just in case, if p is true at some s' such that $s' \leq s$, p is also true at all situations s'' such that $s' \leq s''$ and $s'' \leq s$. For example, if there are no cats in some situation s, then (15) is persistent with respect to s, even though it isn't persistent.[38]

If we consider small situations, situations that are proper parts of possible worlds, we might be interested not just in what is true at them but also in what is false at them. Consider a possible world w in which John is drinking tea and Mary is drinking coffee, and a proper part s of w where it's true that John is drinking tea but it's not true that Mary is drinking coffee. Is it false at s that Mary is drinking coffee? Different versions of situation semantics could give different answers. One could hold that s would be a situation where it is indeed false that Mary is drinking coffee.[39] Perhaps one is thinking, heuristically, of the situation s as a spatiotemporal region that doesn't contain Mary. Mary is not drinking coffee at that region, and so it is false at that region that Mary is drinking coffee, one might think. On this view, the claim that Mary is drinking coffee is false at s but true at w, and so the issue of whether Mary is drinking coffee is settled differently by the two situations, even though one is part of the other; there are thus propositions p that are false at some situation s but true at some situation s' of which s is a part. But one could also have the view that it is neither true nor false at s that

[37] Cf. Kratzer 1989, pp. 643–4

[38] For why a more local notion of persistence may be useful, see Zweig 2006; see also the discussion of negation and indefinites in section 6.2.3.

[39] It may seem that Kratzer (1989) takes this stance; she takes propositions to be sets of situations, and she assumes what she calls a "classical" notion of truth that has no explicit provision for propositions that may fail to be true or false: a proposition p is said to be true at a situation s just in case s is an element of p (p. 615) (see also the semantics she suggests for the sentence 'Paula is sleeping' (p. 619), which only specifies conditions for truth); though note that Kratzer rarely speaks about propositions being false, and see p. 644, where Kratzer hesitates to use 'false' and 'not true' interchangeably.

Mary is drinking coffee. Perhaps the situation s is somehow too small to settle the question of whether Mary is drinking coffee, and so the claim that Mary is drinking coffee is neither true nor false at s.[40]

Situation semanticists usually assume that some situations are very small, so small that individuals have some but not all of their properties: that there is, for example, a situation s in which I'm drinking tea but in which it's not true that I have brown hair, even though that situation is part of a larger situation in which I am drinking tea and I do have brown hair. Again, one might ask whether it is therefore false at s that I have brown hair, or neither true nor false. Similarly, situation semanticists might assume that there are situations of which I'm a part but where it's not true that I am human, even though being human may well be one of my necessary properties: a property that I have at every possible world (where I exist). Here, too, one might wonder whether it is false at these situations that I am human or whether it is rather neither true nor false. I won't take a stance on this issue here, since for most of what follows, this choice point doesn't matter too much. But the issue does come up every now and then, and so it is good to be aware of it.

Situation semanticists frequently appeal to so-called *minimal situations*. A situation in which I'm drinking tea and which does not have a proper part where I'm also drinking tea would be a minimal situation where I'm drinking tea. More generally, for any proposition p, s is a minimal situation at which p is true if and only if p is true at s but not true at any proper part of s:

(16) *Minimal Situations.* For any proposition p and situation s, s is a minimal situation at which p is true iff $p(s) = 1$ and $\forall s'(s' < s \rightarrow \neg p(s') = 1)$.

It is not entirely clear which propositions have minimal situations where they are true. Are there minimal situations where I'm drinking tea? Are there minimal

[40] This would, again, bring possible situations closer to the possibilities of Humberstone (1981); a possibility may fail to settle whether p, in which case p is neither true nor false at that possibility.

situations in which snow falls? That is at least not obviously the case.[41] At least some propositions don't have minimal situations where they are true. Consider for example the proposition that is true at s just in case all parts of s have proper parts. This proposition is true at a situation only if that situation has a proper part at which the proposition is true as well and therefore isn't a minimal situation where the proposition is true.[42] Relatedly, it is not entirely clear which sets of situations have minimal members. For a set of situations a, let $\downarrow a$ be the set containing only those members of a that have no proper part that is also in a, that is, the smallest members of a:[43]

(17) For any set of situations a, $\downarrow a = \{s : s \in a \wedge \neg\exists s'(s' \in a \wedge s' < s)\}$

Just as in the case of propositions, it's not clear that the set of all situations in which I'm drinking tea has smallest members.

Some propositions which don't have minimal situations where they are true may have situations that *exemplify* them, which Kratzer has suggested spelling out as follows:

> A situation s exemplifies a proposition p if whenever there is a part of s in which p is not true, then s is a minimal situation in which p is true.
>
> Intuitively, a situation that exemplifies a proposition p is one that does not contain anything that does not contribute to the truth of p. [...] Either p is true in all subsituations of s or s is a minimal situation in which p is true. (Kratzer 2019, section 7)

Even if there are no minimal situations where I'm drinking tea, there may be

[41] See Kratzer 2019, sections 6 and 7, on minimality in situation semantics.

[42] More formally, consider the proposition $\lambda s.\forall s'(s' \leq s \rightarrow \exists s''\, s'' < s')$, which I'll call p. Suppose that p is true at some situation s. Since s is a part of itself, p is true at s only if s has at least one proper part; let's call that part s_1; since s_1 is part of s, s_1 also needs to have a proper part in order for p to be true at s; any such proper part s_2 of s_1 is itself part of s, since the parthood relation is transitive, and thus any s_2 also needs to have at least one proper part in order for p to be true at s. And so on. Accordingly, p is also true at s_1 if p is true at s. Therefore, p either isn't true at s or it is but s has a proper part where p is true as well. Consequently, p is either true at no situation or, if it is true at some situation, that situation has a proper part where p is true. Either way, there is no smallest situation where p is true. For some discussion of minimality and whether it should be replaced by a different notion, such as Kratzer's notion of exemplification, see Kratzer 2019.

[43] See definition of 'min' in Heim 1990a, p. 146

situations that exemplify the claim that I'm drinking tea. And even though the proposition that is true at *s* just in case all parts of *s* have proper parts certainly has no minimal situations where it is true, it might have situations that exemplify it. For some applications in situation semantics, the notion of minimality works well, but for other applications, the notion of minimality may have to be replaced by the notion of exemplification or something like it. In what follows, I won't discuss this issue in any detail, and I will generally make use of the notion of minimality rather than exemplification. This is a simplification, but as far as I can tell, minimality could be replaced by a notion such as exemplification without undermining the main ideas I want to pursue.[44]

2.3.2 Topic Situations

In the previous section, we've seen that situation semanticists take propositions to be things that are true or false at situations, which are parts of worlds. Now I want to turn to the issue of what we do with these propositions. If we assert propositions, propositions are true or false at situations, and an assertion is true just in case the asserted proposition is true, there has to be some particular situation the asserted proposition is supposed to be true at. Depending on which stuation that is, the assertion is true or false. Barwise and Etchemendy (1989) give the following example:

> We might imagine, for example, that there are two card games going on, one across town from the other: Max is playing cards with Emily and Sophie, and Claire is playing with Dana. Suppose someone watching the former game mistakes Emily for Claire, and claims that Claire has the three of clubs. She would be wrong, on the Austinian account, even if Claire had the three of clubs across town. (Barwise and Etchemendy 1989, p. 221)

The assertion that Claire has the three of clubs is false, since the proposition that Claire has the three of clubs is asserted of the situation where Max, Emily,

[44]For some helpful discussion of these notions, see Kratzer 2019, sections 6 and 7.

and Sophie are playing cards, and the proposition is false at that situation, even though the same proposition is true at the situation where Claire and Emily are playing cards. If the speaker had asserted the same proposition of the situation where Claire and Emily are playing cards, the assertion would have been true, or so is the idea.[45]

The situation an assertion aims to describe—the situation the assertion "is about" (Kratzer 2019)—is sometimes called the *Austinian topic situation*, or for short, *topic situation*.[46] This topic situation is then assumed to be the situation where an asserted proposition has to be true in order for the assertion to be true:

(18) *Austinian Assertion.* An assertion that *p* is true if and only if *p* is true at the assertion's topic situation.

How exactly the topic situation of an assertion is supposed to be determined is somewhat unclear. Austin (1950) assumed that the topic situation of an assertion (or statement) is determined by "demonstrative conventions" (p. 116). Unfortunately, Austin doesn't say much about these conventions. Austin assumes that there are both verbal and non-verbal means of indicating what the topic situation of a statement is. Austin mentions two examples of non-verbal means for indicating the topic situation: pointing gestures, and secondly, in the case of signs, the location of the sign. What Austin says about verbal means is not particularly illuminating either.[47]

[45]See also Kratzer 2019, section 3.

[46]The label 'topic situation' is not Austin's, as far as I know, but he is often credited with the idea.

[47]See Austin 1950, p. 116, fn. 10: "[...] sentences contain words or verbal devices to serve both descriptive and demonstrative purposes (not to mention other purposes), often both at once. [...] A sentence as normally distinguished from a mere word or phrase is characterised by its containing a minimum of verbal demonstrative devices (Aristotle's 'reference to time'); but many demonstrative conventions are non-verbal (pointing, etc.), and using these we can make a statement in a single word which is not a 'sentence'. Thus, 'languages' like that of (traffic, etc.) *signs* use quite distinct media for their descriptive and demonstrative elements (the sign on the post, the site of the post). And however many verbal demonstrative devices we use as auxiliaries, there must *always* be a non-verbal *origin* for these coordinates, which is the point of utterance of the statement." For Austin, descriptive conventions assign to sentences "*types* of situation, thing, event, etc., to be found in the world" (p. 116); they are conventions that assign propositions to sentences, we might say in the present framework.

Barwise and Perry (1983, pp. 160–61) write that when a speaker makes a statement, the speaker (or the statement) "is referring to" some actual situation, and they assume that the statement is true if the situation referred to is as described by the statement.[48] It seems plausible that what a speaker refers to is a matter of the speaker's intentions. In that case, it would be the speaker's mental states that determine what the topic situation is. It is in general controversial what aspects of the conversational setting determine parameters that can vary from utterance to utterance. That the speaker's intentions play a crucial role is a widespread view.[49] For now, I will therefore assume that it is also the speaker's intentions that determine the topic situation of that speaker's assertions: roughly, a situation *s* is the topic situation of an assertion if the speaker intends that the assertion describes *s*. Later, I will briefly revisit the issue of whether each assertion has one particular topic situation.[50]

An issue I will try to leave aside in the following discussion is vagueness. It may well often be vague what the topic situation of an assertion is, as Barwise and Etchemendy (1989) point out:

> On the Austinian view, whenever we make a claim, it is a claim about some situation or other. But obviously, even Austin himself would admit that it is seldom clear exactly what situation a person is referring to. And indeed, the exact boundaries of the situation usually don't matter. (Barwise and Etchemendy 1989, p. 176; on p. 177, they call this unclarity "vagueness")

It may be vague which situation demonstrative conventions associate with an assertion, and speakers may not always have a precise situation in mind when making an assertion. What one should say about such cases is not obvious, but I won't discuss this issue in more detail here. Whatever one thinks about vagueness

[48]See similarly Elbourne 2013, p. 18, describing Kratzer's view.

[49]A much-discussed example is the issue of how the referents of demonstrative pronouns are determined by the context; for discussion of the role that e.g. pointing gestures and the speaker's intentions play in the case of demonstratives, see e.g. Kaplan 1989; Reimer 1992; Gauker 2008; Stokke 2010; King 2014; Gauker 2019; Viebahn 2020.

[50]See section 5.6

in general presumably also applies to the vagueness of topic situations, and I won't defend or assume a particular view about vagueness in what follows.

In this section, we have seen that according to the Austinian view, an assertion is true just in case the asserted proposition is true at the topic situation of the assertion. How exactly the topic situation of an assertion is determined is not entirely clear. There may also be cases where speakers do not have a particular situation in mind when they make an assertion. Whether this always makes the assertion inappropriate is not obvious.

2.4 Schwarzian Update of Stalnakerian Contexts

In this section, I want to explore how one could combine the Stalnakerian view according to which assertions aim to change a context set with the Austinian view according to which assertions are meant to describe a topic situation, which may be smaller than the entire world and which may also vary from assertion to assertion.

Recall that on Stalnaker's view, the context is a set of possible worlds; it is the set of those possible worlds that are candidates for being the actual world, given what has been accepted in the conversation. On the Austinian view, an assertion does not always describe directly what the entire actual world is like; first and foremost, it describes what the topic situation is like. Since the topic situation is a part of the actual world, an assertion also describes what the actual world is like, by describing what some part of it is like.

F. Schwarz (2009) suggests a way to combine these two perspectives. If an assertion aims to describe a topic situation s_t, there is normally uncertainty in the conversation about what the topic situation is like. After all, if it is already settled what the topic situation is like, then there is no need to describe it any further; any additional claim about what the topic situation is like would merely state again what has already been accepted in the conversation. How is uncertainty about what the topic situation is like reflected in the context? Following Kratzer (1989), Schwarz assumes that every situation is part of only one possible world. But situations have counterparts at other worlds, Schwarz assumes. Let's say that $\gamma_{s,w}$ is the counterpart of s at w.[51] The context set is a set of worlds, and each world has some counterpart of the topic situation as a part. If there is uncertainty about what the topic situation is like, the counterparts of the topic situation that are part of the worlds of the context differ from each other in certain ways. For instance, if it is not yet settled whether Mary is tired at the topic situation s_t, then the context contains a world w where Mary is tired at $\gamma_{s_t,w}$ but also a world w' where it's not the case that Mary is tired at $\gamma_{s_t,w'}$. If the speaker asserts some claim p, about the topic situation s_t, we can rule out worlds from the context based on what the counterpart of s_t at that world is like:

> In uttering a sentence about a certain topic situation [...] we might simply reduce the context set in such a way that we exclude all those worlds in which the counterpart of the topic situation does not have the property attributed to it by the expressed proposition. (F. Schwarz 2009, p. 170)

As the 'might' suggests, Schwarz is less than fully committed to this idea, and he doesn't spell it out in great detail. But it seems to me to be the most straightforward way to combine Stalnaker's view and the Austinian perspective. Here is how this way of updating the context could be formalized:

(19) *Schwarzian Update.* $c[p] = c \cap \{w : p(\gamma_{s_t,w}) = 1\}$

This rule says that to update a context c with a proposition p, aimed at describing a topic situation s_t, we exclude from c all those worlds w where p is not true at $\gamma_{s_t,w}$, the counterpart of s_t at w.

[51] Does every situation have exactly one counterpart at every world? Schwarz seems to assume that this is the case, but doesn't argue for this, as far as I know. For now, I adopt Schwarz's assumption.

This update rule leaves open how presuppositions should be treated. Recall that on Stalnaker's view, presuppositions of an assertion have to be true at all worlds of the context that the assertion aims to update. According to Schwarz, presuppositions also have to be satisfied by the context that one tries to update, but they don't have to be true at the entire worlds that are in the context; instead, they merely have to be true at all counterparts of the topic situation that are in the context.[52] If we assume that presuppositions are modelled as truth-value gaps, we can express the constraint more formally as follows:

(20) *Presuppositional Constraint (Schwarz).* If p is true or false at a situation s only if q is true at s, then $c[p]$ is defined only if $\forall s'(\exists w(w \in c \wedge s' = \gamma_{s_t,w}) \rightarrow q(s') = 1)$

The Schwarzian view retains much of Stalnaker's account of the context. The context is still simply a set of possible worlds. As before, the context only keeps track of which worlds are candidates for being the actual world. What is different is the way in which worlds are ruled out as candidates: not directly on the basis of what is true or false at these worlds but on the basis of what is true or false at some part of them.

That the view is so similar to Stalnaker's means that the context does not directly keep track of what has been accepted about the topic situations discussed in the conversation. Suppose that a speaker has asserted that p, describing a topic situation s_t, and that nothing else has been accepted in the conversation yet. Then the context c would be the set of all worlds w so that p is true at $\gamma_{s_t,w}$. But we can't reconstruct from this set of worlds what has been accepted about s_t. What has been accepted about s_t is that it is one of the situations in the set c_{s_t}:

(21) $c_{s_t} = \{s : \exists w(s = \gamma_{s_t,w} \wedge p(s) = 1)\}$

This is the set of all candidates for being s_t. Given what has been accepted in

[52]See F. Schwarz 2009, p. 171. Schwarz assumes that there is an alternative, namely that the presupposition is true at all counterparts in the context of some "contextually supplied situation" (F. Schwarz 2009, p. 171); this alternative isn't relevant for present purposes and so I ignore it here.

the conversation so far, any situation in c_{s_t} might be the situation s_t, and any situation not in c_{s_t} has been ruled out. For any set of situations a, let $\uparrow_W a$ be the set of worlds that have some part in a. If W is the set of all worlds (i.e. all maximal situations), we can define $\uparrow_W a$ as follows:

(22) $\uparrow_W a = \{w : w \in W \wedge \exists s(s \in a \wedge s \leq w)\}$

Since in our example, s_t is the only topic situation that has been discussed, the Stalnakerian context c can be derived from c_{s_t}: c is the set of all worlds that have some part in s_t, that is, it is $\uparrow_W c_{s_t}$. But the reverse does not hold. We cannot in general derive c_{s_t} from c; that is, we cannot in general derive a unique set of candidates for being the topic situation from a set of worlds. Suppose for instance that c contains only one world, w_1. Any set c_i that contains only situations that are part of w_1 would generate c: for any such set c_i, c would be the set of worlds that have some part in c_i, that is, $\uparrow_W c_i = c$. This is just a consequence of the fact that sets of situations are generally more fine-grained than sets of worlds.

We can't directly derive c_{s_t} from c, but one might think that this isn't a problem. Two different reasons for why one might think that come to my mind. Firstly, one might think that c_{s_t} is of no particular interest, as we're really only interested in what the world as a whole is like, and so it is unproblematic that we can't derive c_{s_t} from c. Secondly, one might think that c_{s_t} can be derived from c after all, albeit in a somewhat more complicated way.

First, a brief comment on the first reason. We can separate two ideas of the Stalnakerian view. The first idea is that an assertion aims to reduce joint uncertainty about what the thing the assertion describes is like. The second idea is that the thing an assertion describes is the actual world. Taken together, we arrive at the view that an assertion aims to reduce joint uncertainty about what the actual world is like. From an Austinian point of view, we may agree with the first idea, but we should reject the second idea, I think. According to the Austinian view, an assertion describes first of all a topic situation, and this topic situation may not be the whole actual world. To be sure, by describing the topic situation, one also describes what the actual world is like if (as is usually the case) the topic situation is part of the actual world; but this is a derivative consequence, on the Austinian view. If we combine the view that an assertion describes a topic situation with the first of the two Stalnakerian ideas, we arrive at the view that an assertion aims to reduce joint uncertainty about what the topic situation is like. The set c_{s_t} is the set of all candidates for being the topic situation s_t. It captures the interlocutors' joint uncertainty about what the topic situation is like. Reducing uncertainty about what s_t is like translates into excluding certain candidates from c_{s_t}: we reduce the uncertainty by excluding candidates for being s_t from our set of candidates. This is why the set of candidates for being the topic situation plays an important role if we want to combine the Austinian view that assertions describe topic situations with a broadly speaking Stalnakerian perspective on context and assertion. This consideration is fairly abstract. More concrete considerations for why the set of candidates for being the topic situation matters may come from looking at the role it may play in explaining particular linguistic phenomena. This is what I will turn to in the following chapters.

Now let me consider the second issue mentioned above: the claim that c_{s_t} can after all be derived from the Stalnakerian context, albeit in a somewhat more complicated way. As Stalnaker emphasizes, the context does not just contain information asserted by the interlocutors; other things may become common ground, too. For example, it may be common ground in a conversation that it is raining, and therefore true at all worlds of the context, simply because the interlocutors are standing in the rain and not because someone has said so. Claims about the conversation itself may also be common ground even if not asserted by anyone.[53] One might therefore assume that if some situation s_t is the topic

[53]See e.g. Stalnaker 1998, p. 5: "the information presumed to be common will also include facts about the discourse that is currently taking place, since when one is engaged in a conversation, one can normally take for granted that speakers and hearers are aware that the conversation is taking place, that speakers are saying what they are saying in the way they are saying it. And

situation of an assertion, it is at least generally also common ground that s_t is the topic situation. And though we can't infer c_{s_t} directly from the set of worlds c, we can derive c_{s_t} from c together with the assumption that s_t is the topic situation, as follows:

(23) $c_{s_t} = \{s : \exists w(w \in c \wedge s = \gamma_{s_t,w})\}$

That is, the set of candidates for being s_t is the set of all those situations s that are the counterpart of s_t in some world of the context c. Given any topic situation and context c, we can derive from c the set of all situations that are, according to c, candidates for being that topic situation. If it is common ground that the topic situation of the conversation is currently s_t, then every world in c is a world where s_t is the current topic situation of the conversation. Since then c itself tells us that s_t is the topic situation, we can derive from c the set c_{s_t}, the set of candidates for being the topic situation.

If this is on the right track, it would show that the Stalnakerian context suffices to derive a representation of what is accepted about the topic situation. Some doubts may remain. For example, if there are cases where it is not common ground what the topic situation is, the common ground can't be used so easily to derive the set of candidates for being the topic situation. But perhaps we are willing to make the assumption that it is also common ground what the topic situation is, at least as a useful idealization.

Even if on some fundamental level, a Stalnakerian context is all one needs, having a direct representation of what the interlocutors have accepted about the topic situation may be useful. That a description on some level is more fundamental than a description on some other level does not mean that it is also more perspicuous, in which case the less fundamental level of description may well

one can take for granted that everyone is taking these things for granted." See also section 4 (pp. 10-12), on Kamp's argument that the Stalnakerian context has not enough structure to account for certain differences in felicity of pronominal anaphora.

earn its keep.[54] Moreover, it may not be entirely clear that the Stalnakerian context really is more fundamental and that we should rely on it as basis to derive sets of situations that are candidates for particular topic situations. Perhaps accepting claims about particular situations is somehow more fundamental, and what interlocutors accept the world as a whole to be like can be derived from what they accept about particular situations. It is not very clear to me what depends on this issue. Be that as it may, I now want to pursue the idea that sets of situations that may be smaller than whole possible worlds could play a useful role in characterizing the dynamics of conversations. In the next sections, I will try to develop this idea in some more detail, pointing out some of the available choice points.

[54]This would, I think, be by and large in the spirit of Stalnaker's work, as he does think that "derived contexts" that are derived from the main context are of interest for some issues; see e.g. Stalnaker 2014, section 4.2, where Stalnaker also seems open to the possibility that derived contexts play a role in interpreting embedded sentences (an issue that will become relevant in chapter 6).

Chapter 3

Contexts as Sets of Situations

Suppose that a context is a set of situations, rather than a set of worlds, and suppose that such a set somehow captures what has been accepted about some situation. This rough idea could be developed in different ways. In this chapter, I want to sketch some of the available options that I think are promising, not least because I think they are fairly simple and natural. In this chapter, my focus is on laying out these options rather than on arguing for or against a particular one of them. The main aim is to show some of the choices we have when building contexts out of situations. In later chapters, such contexts will be put to use.[55]

[55]There are a number of predecessors of the conceptions of context that I discuss in this chapter. Apart from Schwarz's view discussed in the foregoing chapter, another important predecessor is Klinedinst and Rothschild (2012, pp. 162–65); to give a semantics for adverbs of quantification, they suggest that a context is a set of pairs $\langle w, s\rangle$ of a world w and a situation s that is part of w, where s "represent[s] something more like the topic of conversation, rather than simply the speech-act situation" (p. 164, fn. 38); on their view, at least some updates exclude pairs from a context depending on whether a proposition is true at the situation of the pair; interestingly, they suggest in a footnote (p. 164, fn. 37) that the set of pairs of a world and a situation could be replaced simply with a set of situations, but don't elaborate on that idea; as far as I can tell, the situations in their contexts are not minimal in the way I suggest below for what I call minimal contexts. As I briefly discuss in fn. 118 in section 4.3.1, Portner (1992) also has situations in the context. As far as I can tell, the situations in the context are also generally not minimal in the way I suggest for minimal contexts (see p. 57 for Portner's notion of context and pp. 68-9 for Portner's context update rules). There are also dynamic semantic theories that use "discourse events" (Partee 1984, p. 243; see also Hinrichs 1986) in their discourse representations (which one could think of as a kind of context), in order to model temporal anaphora; comparing those interesting views in detail to the view suggested here would go beyond the limits of this thesis, but see fn. 198 in section 5.6. Another interesting predecessor of the view I have developed in this thesis is Milward (1996), who suggests a dynamic semantics for definite terms, with situations, to explain some of the same data; as far as I can tell, his contexts and the way they are updated

One choice concerns whether a context is about a particular situation. Take for example a Stalnakerian context. There's a sense in which a Stalnakerian context is about a particular world, usually the actual world: the worlds in a Stalnakerian context are the worlds that are treated as candidates for being the actual world, and by excluding candidates from the set, the interlocutors narrow down what they take the actual world to be like. If the actual world is among the candidates, the context is accurate; if the actual world is not among the candidates, the interlocutors have made some false assumption about what the world is like, and the context is inaccurate. A context that is a set of situations could similarly be about a particular situation, which we could call the *topic situation* of the context. Usually, the topic situation would be an actual situation: some part of the actual world. The set would represent what this situation is like according to what the interlocutors have accepted. If the topic situation is as the context represents it to be, the context is accurate; otherwise, the context is inaccurate. I will call such a context *definite*.

Contexts don't have to be definite; they could also be *indefinite*. An indefinite context would be a context that does not represent any particular situation as being (taken to be) a certain way. An indefinite context is accurate if some actual situation or other is as the context represents it to be, and it is inaccurate if no actual situation is as represented by the context. An indefinite context does not have a topic situation, as there is no particular situation it is supposed to describe.

On the Austinian view of assertions that we encountered above, each asser-

are very similar to the way (definite, I think) minimal contexts on my view are updated: contexts are situations that are expanded via update (where what Milward calls a situation is (or is more like) a set of situations). A detailed comparison with the account I have developed here would be interesting; their predictions may turn out to be very similar; let me just briefly mention two differences: (i) Milward's semantics is thoroughly dynamic in the sense that the meaning of a sentence is taken to be a function from contexts to contexts, (ii) Milward treats definite descriptions as quantifiers (entailing uniqueness). A more recent dynamic semantic account of definites, also using situations to build contexts, has been suggested in very interesting unpublished work by Kirkpatrick (2019); this account is also similar to the one I have developed here, and it will be interesting to compare the two in future research.

tion describes a particular situation, the assertion's topic situation. By asserting something, the speaker describes the topic situation as being a certain way. This view of assertion seems to match the view of contexts as definite. An assertion describes what its topic situation is like and, if accepted, makes a contribution to the context with the very same topic situation, which captures what has been accepted about that situation. But we have already seen in section 2.3.2 that it's not entirely clear how the topic situation of an assertion is determined, and one might doubt whether there is always a particular situation an assertion aims to describe. If some assertions describe not a particular situation but some situation or other, what they contribute to the conversation may be better captured by indefinite contexts, which is why I think indefinite contexts are worth exploring as well.

Here is a slightly different way to think of the distinction between definite and indefinite contexts. We could think of contexts as properties of situations that are supposed to hold of some situation. A Stalnakerian context is supposed to hold of the actual world. If the actual world has the property, the context is accurate.[56] A definite context is supposed to hold of a particular actual situation, its topic situation. If the topic situation has the property, the context is accurate. An indefinite context is supposed to hold of some actual situation, but there is no particular situation it is supposed to hold of. If some actual situation or other has the property, the context is accurate. In the case of Stalnakerian contexts, it makes little difference if we think of them as definite or indefinite, as there is only one actual situation that could verify the context, namely the actual world; there is only one actual situation the context could hold of. But if contexts characterise situations that may be smaller parts of the actual world, there is room for a substantial difference between thinking of contexts as definite or indefinite, as there could be more than one actual situation a context holds of.

[56] The property is then modelled as or identified with a set of worlds, and the actual world has the property just in case it is in the set.

In what follows, I want to explore different types of definite and indefinite contexts in some more detail. First, I will consider two types of indefinite contexts, before I move on to different kinds of definite contexts.

3.1 Indefinite Contexts

3.1.1 Non-Minimal Contexts

An indefinite context doesn't describe a particular situation. A context is a set of situations, and I assume that an indefinite context is accurate just in case some situation it contains is actual:

(24) *Accuracy of Indefinite Contexts.* A context c is accurate just in case some $s \in c$ is actual.

If the context of a conversation is c, the interlocutors accept that at least some situation in c is actual. For instance, if the context contains only situations in which there is a cat, the interlocutors accept that there is some actual situation in which there is a cat. This basic idea still leaves some room for which situations should be in a context. I'll sketch one option in this section, and another one in the next section.

For each option, I will say (1) which set of situations is the empty context, and (2) how a context changes if a proposition is accepted in that context. An empty context is a context representing a conversation where nothing yet has been accepted, and which is therefore guaranteed to be accurate. On the Stalnakerian view, the empty context is the set of all worlds. In this context, no world is ruled out as candidate for being the actual world; the actual world is guaranteed to be in the context, and so the context is guaranteed to be accurate. For the situation-based view, a similar option is to assume that the empty context $c_\circ$ is the set of all situations S:

(25) *Empty Context.* $c_\circ = S$

If the context is the set of all situations, the context is accurate just in case any situation is actual. Some situations are actual, and so the empty context is guaranteed to be accurate. In addition to saying what the empty context is, we have to specify how the context changes if some claim is accepted in the context. That is, we have to specify how the context is updated. On Stalnaker's view, a context is updated with a claim p by excluding all worlds from the context in which p is not true. Here is an analogous update rule we could adopt for indefinite contexts:

(26) *Intersective Update.* $c[p] = c \cap \{s : p(s) = 1\}$

According to this rule, if a proposition p is accepted, we exclude from the old context c all those situations in which p is not true. Only situations where p is true remain in the context. Let's call indefinite contexts that are construed in the way just sketched *non-minimal (indefinite) contexts*.

Let's consider an example. Suppose we begin with the empty context c_0 and then accept that there is a cat. To update c_0, we exclude all those situations from c_0 where it's not the case that there is a cat. The situations which remain are all situations in which there is a cat. Therefore, the updated context is accurate just in case some situation in which there is a cat is actual. Some situations in the updated context contain exactly one cat, others contain more than one cat, but all contain at least one.

On Stalnaker's view, if a world is excluded from the context, that world is ruled out as candidate for being actual. On the present view, if some situation is not in the context, it doesn't follow that this situation has been ruled out as being part of the actual world. The situations in the context are candidates for being actual, but the situations that are not in a context have not in general been ruled out as candidates for being actual. A situation that is not in the context may be actual as long as it is part of the same world as another situation that is in the context. A situation s is ruled out as actual if no situation in the context is part of a world of which s is also a part. Any world that contains a situation that is in the context may be the actual world, and so any part of such a world may be actual, even if that part is not itself in the context. But if a situation is not part of any world that may be the actual one, it has been ruled out as actual.

3.1.2 Minimal Contexts

The second option for building indefinite contexts that I want to discuss also assumes that a context is accurate just in case some situation it contains is actual, and it also assumes that the empty context is the set of all situations:

(27) *Empty Context.* $c_{\circ} = S$

As before, the empty context is guaranteed to be accurate, as it surely contains at least some actual situation. The view differs with regards to how contexts are updated. The rough idea is that these contexts should contain situations that are just big enough so that what has been accepted is true but are not bigger than that. Whenever new information is accepted, the situations in the context have to be expanded in such a way that the newly accepted information becomes true at the situations of the context.

Here is how I suggest such contexts are updated. Recall that for any set a, $\downarrow a$ was defined as the set containing all the smallest members of a:

(28) $\downarrow a = \{s : s \in a \wedge \neg\exists s'(s' \in a \wedge s' < s)\}$

Now consider the following update rule:

(29) *Minimal Update.* $c[p] = \downarrow \{s : \exists s'(s' \in c \wedge s' \leq s \wedge p(s))\}$

If a context c is updated with a proposition p, the updated context $c[p]$ is the set of all the smallest situations s that expand some situation s' of c in such a way that p is true at s. Let's call indefinite contexts construed in the way just sketched *minimal (indefinite) contexts*.

We can reformulate the update rule for minimal contexts more briefly by introducing some new notation. For any set of situations c, let $\uparrow c$ be the set of all those situations that have some situation as part that is in c:

(30) $\uparrow c = \{s : \exists s'(s' \in c \wedge s' \leq s)\}$

In other words, $\uparrow c$ is the set of all expansions of some situation in c. The update rule (29) can be reformulated as follows:

(31) $c[p] = \downarrow \{s : s \in \uparrow c \wedge p(s)\}$

That is, c updated with p is the set of all the smallest expansions of some situation in c where p is true. Or suppose we identify a proposition p with the set of situations in which p is true; then we can reformulate the rule even more briefly as:

(32) $c[p] = \downarrow (\uparrow c \cap p)$

That is, $c[p]$ is the set of the smallest situations that are in the intersection of $\uparrow c$ and p.

Let's look again at the example that we also considered for non-minimal contexts. Suppose once again that we begin with the empty context, $c_\circ$, and update it with the claim that there is a cat. The updated context contains the smallest of those situations that expand some situation of $c_\circ$ in such a way that there is a cat in the expanded situation. The situations that expand some situation of $c_\circ$ in such a way that there is a cat at the expanded situation are simply the situations in which there is a cat.[57] The smallest of those situations are the minimal situations in which there is a cat. Thus, the updated context is the set of all minimal situations in which there is a cat.

Compare this minimal context with its corresponding non-minimal context, which we encountered in the last section. The non-minimal context contains *all* situations in which there is a cat, not just the minimal ones. Minimal

[57] Any situation that expands some situation in such a way that there is a cat at the expanded situation is a situation in which there is a cat. And any situation in which there is a cat is a situation that expands some situation in such a way that there is a cat at the expanded situation, since any situation is a (trivial) expansion of itself.

situations in which there is a cat each contain just one cat and nothing else; non-minimal situations in which there is a cat may also contain other things. The minimal context is accurate just in case some minimal situation in which there is a cat is actual. Some minimal situation in which there is a cat is actual just in case some situation in which there is a cat is actual.[58] Therefore, in this particular example, the minimal context is accurate just in case its corresponding non-minimal context is accurate. If a minimal context were always accurate just in case its corresponding non-minimal context is accurate, the choice between the two ways of construing contexts would not seem to matter much. But, as I discuss in the next section, there are cases where the two approaches could come apart.

3.1.3 On Persistence and Presuppositions

Recall from section 2.3.1 that one can distinguish between propositions that are persistent and propositions that aren't:

(33) *Persistence.* A proposition p is persistent iff for all situations s, if p is true at s, p is true at all situations s' s.t. $s \leq s'$.[59]

According to this definition, a persistent proposition that is true at some situation s is also true at any expansion of s. By contrast, a non-persistent proposition is true at some situation s but not true at some expansion of s. As long as all the propositions that a context is updated with are persistent, the minimal context is accurate just in case the corresponding non-minimal context is accurate.[60]

[58] A minimal situation in which there is a cat is a situation in which there is a cat. And if a non-minimal situation in which there is a cat is actual, then some minimal situation in which there is a cat is also actual, since the non-minimal situation with a cat has a minimal situation with a cat as proper part, and any part of an actual situation is also actual.

[59] See e.g. Barwise and Perry 1983, Kratzer 1989.

[60] As before, I'm also assuming that the propositions we're dealing with have minimal situations at which they are true. I also assume that the propositions have no truth-value gaps; I discuss the role of such gaps further below. Let $c[p]_m$ be c updated with p by Minimal Update, and let $c[p]_i$ be c updated with p by Intersective Update. Then $c_\circ[p_1]_m...[p_n]_m$ is accurate just in case $c_i[p_1]_i...[p_n]_i$ is accurate, given that p_1, ..., p_n are persistent. The context $c_i[p_1]_i...[p_n]_i$ is the set of all situations in which p_1, ..., p_n are all true. Since p_1, ..., p_n are persistent, p_1, ..., p_n are

But if some of the accepted propositions are not persistent, minimal and non-minimal contexts may diverge: one may be accurate even though the other one isn't. To illustrate this, consider the following toy example. Suppose that there are only two situations s_1 and s_2, and that s_1 is a proper part of s_2, and consider two propositions p and q with the following truth values:

$$p(s_1) = 1,\ p(s_2) = 0,\ q(s_1) = 0,\ q(s_2) = 1$$

The proposition p is not persistent, as it is true at s_1 but false at s_2, of which s_1 is a part. Assume that the conversation begins with the context $c = \{s_1, s_2\}$.[61] Now consider what happens if we update c first with p and then with q. The update for non-minimal contexts proceeds by intersection: $c[p] = \{s_1\}$, since p is true at s_1 but not at s_2; $c[p][q] = \emptyset$, since q is not true at s_1. The minimal update, however, proceeds differently. As before, $c[p] = \{s_1\}$, but now the reason is that s_1 is the only situation that expands some situation in c (namely, s_1 itself) in such a way that p is true at the expanded situation. But $c[p][q] = \{s_2\}$, since s_2 is the only situation expanding s_1 (which is the only situation in $c[p]$) in such a way that q is true. Whereas $c[p][q]$ is the empty set if update is intersective, it is $\{s_2\}$ if update is minimal. The context that is the empty set is guaranteed to be inaccurate. (Only contexts that contain situations contain actual situations.) The context that is $\{s_2\}$ is accurate just in case s_2 is an actual situation. Thus, the two ways of construing contexts, minimal and non-minimal, can lead to different results if some of the propositions involved are not persistent.

A second difference may arise if we consider presuppositions. Recall the

true at all s in $c_\circ[p_1]_m...[p_n]_m$, and so the situations in $c_\circ[p_1]_m...[p_n]_m$ are a subset of the situations in $c_\circ[p_1]_i...[p_n]_i$. Therefore, if $c_\circ[p_1]_m...[p_n]_m$ contains an actual situation and is thus accurate, $c_\circ[p_1]_i...[p_n]_i$ also contains an actual situation and is thus accurate as well. And if $c_\circ[p_1]_i...[p_n]_i$ is accurate and so some situation s in $c_\circ[p_1]_i...[p_n]_i$ is actual, s has a situation s' as a part that is in $c_\circ[p_1]_m...[p_n]_m$, which is therefore also accurate.

[61] Since s_1 and s_2 are assumed to be the only situations, this would be the empty context. If one is worried that this set-up violates Supplementation (see fn. 67 below), one may add that there is another situation, s_3, that is also a proper part of s_2, but s_3 is not part of s_1 and s_1 isn't part of s_3, and $p(s_3) = q(s_3) = 0$.

Stalnakerian view that presuppositions of an assertion impose constraints on the context the assertion aims to change. In particular, consider the view that truth-value gaps impose such constraints. For Stalnaker's contexts, which are sets of worlds, the suggestion is that if p is true or false at a world w only if q is true at w, $c[p]$ is defined only if q is true at all worlds of c.[62] For contexts built out of situations, we could similarly assume that presuppositions have to be true at all situations in the context that we're trying to update:

(34) *Presuppositional Bridge.* If a proposition p is true or false only if q is true, $c[p]$ is defined only if $\forall s(s \in c \rightarrow q(s) = 1)$

Consider again a toy example in which there are two situations s_1 and s_2, with s_1 being a proper part of s_2, and consider again two propositions p and q, now with the following truth values:

$$p(s_1) = p(s_2) = 1,\ q(s_1) = 1,\ q(s_2) \neq 1,\ q(s_2) \neq 0$$

Consider the context $c = \{s_1, s_2\}$. If c is updated with p, the resulting context is either $c_{non-min} = \{s_1, s_2\}$ (by Intersective Update) or $c_{min} = \{s_1\}$ (by Minimal Update).[63] Assuming the Presuppositional Bridge, $c_{non-min}$ cannot be updated with q, since q is not true or false at s_2 and so not true or false at all situations in $c_{non-min}$; the context does not satisfy the presupposition of q. By contrast, c_{min} can be updated with q, since it doesn't contain s_2, and q is true or false at s_1.

The divergence is again due to a failure of persistence, one might think; q is not persistent, as it is true at s_1 but not true at a situation of which s_1 is a part. But a small variation of the example shows that non-persistence isn't essential. Suppose that the example is as before, except that q is false at s_1 rather than true. This change has no effect on the first step, the update with p. And as before,

[62] See the Stalnakerian Bridge (11) in section 2.2

[63] In the case of Minimal Update, s_2 does not remain in the context, since p is also true at s_1, and s_1 is a proper part of s_2; we only keep the smallest expansions in which p is true, and so s_2 is excluded from the context.

$c_{non-min}$ can't be updated with q, since it contains s_2, but c_{min} can be updated with q, since it doesn't contain s_2.[64] But in this case, q may be persistent for all we've assumed. Since q isn't true at s_1, q's failure to be true at s_2 doesn't make it non-persistent. What is crucial is that q is neither true nor false at a situation that has a part where q is true or false. That is, q fails to be what we could call T-or-F-persistent:

(35) *T-or-F-Persistence.* A proposition p is T-or-F-persistent iff for all situations s, if p is true or false at s, p is true or false at all situations s' s.t. $s \leq s'$.

That a proposition is not persistent is neither necessary nor sufficient for its not being T-or-F-persistent. If we update contexts with propositions that are not T-or-F-persistent, non-minimal and minimal contexts can come apart, since a context updated minimally may satisfy presuppositions that are not satisfied if updated intersectively. If the propositions involved are all T-or-F-persistent, such cases don't arise.[65]

Minimal and non-minimal indefinite contexts both contain situations that are candidates for being actual, and they are both accurate just in case some situation they contain is actual. But they are updated in different ways. A non-minimal context is updated with a proposition by excluding all those situations from the context in which the proposition is not true. A minimal contexts is updated with a proposition by first expanding the situations in the context in such a way that the proposition is true at the expanded situations, and then taking the smallest of the expanded situations. If the propositions involved are persistent and T-or-F-persistent, minimal contexts are accurate just in case their corresponding non-minimal contexts are. But if the propositions involved are not

[64] The result of updating c_{min} with q is the empty set, but this is not an essential feature of the case.

[65] Assume that all propositions involved are T-or-F-persistent. All situations in a non-minimal context $c_\circ[p_1]_i ... [p_n]_i$ have some situation in the corresponding minimal context $c_\circ[p_1]_m ... [p_n]_m$ as a part. If q is true or false at all situations in the minimal context $c_\circ[p_1]_m ... [p_n]_m$, and q is T-or-F-persistent, then q is also true or false at all situations of which the situations in the minimal context are part; thus, a is true or false at all situations in the corresponding non-minimal context.

persistent or not T-or-F-persistent, minimal and non-minimal contexts may diverge, as we've seen in this section.

3.1.4 The Empty Minimal Context

Before I move on to discuss definite contexts, I want to say a little bit about the empty minimal context. Above, I assumed that the empty context is the set of all situations, for both minimal and non-minimal contexts. In the case of non-minimal contexts, this is a natural choice, since context update proceeds by intersection. For any context c, the interlocutors assume that some situation in c is actual, and the context is updated by excluding situations from c: fewer and fewer situations remain in the context, and so the range of situations at least one of which is assumed to be actual is narrowed down. Minimal update works differently. Here the idea is that the situations in the context are just big enough so that what has been accepted is true at them. When some claim p is accepted in a context c, we expand the situations in c in such a way that p is true at the expanded situations, and only the smallest situations expanded in that way form the new context. In general, the situations in the context become bigger and bigger. One might therefore expect that, when nothing has been accepted yet, the context should not contain all situations whatsoever. Sure, if nothing has been accepted, then trivially everything that has been accepted is true at any situation. But the set of all situations contains not just the smallest such situations, and so the assumption that the set of all situations is the empty context is not in the spirit of minimal updates. Note also that if we update the set of all situations minimally with some proposition p, and p is not only true at entire worlds but also true at some smaller situations, then some situations in the empty context are bigger than the situations in the updated context: some situations in $c_\circ[p]$ are proper parts of some situations in $c_\circ$. This never happens for subsequent updates, where the situations remain the same or grow.

To avoid this, we could assume that the empty minimal context is not the set S of all situations but instead the set of all the smallest situations, that is, the set of all situations that have no proper part:

(36) *Empty Minimal Context.* $c_\circ = \downarrow S$

If every situation has some smallest situation as a part, then so does every actual situation, and so $\downarrow S$ contains actual situations; the empty minimal context would therefore be guaranteed to be accurate. And if every situation has a smallest situation as a part, then every situation either is a smallest situation or is an expansion of a smallest situation. Accordingly, the situations in any context would never shrink when we update the context minimally; the situations would always either remain the same or become bigger.

One might wonder whether every situation really has a smallest situation as a part and if so, what all these smallest situations are like. Kratzer (1989), for example, suggests that possible situations are "made up of possible states of affairs" (p. 614), where "a state of affairs is a particular's having a 'property' ('property' in the sense of monadic universal), or two or more particulars standing in some 'relation' ('relation' in the sense of a polyadic universal)" (p. 613).[66] On this view, all situations contain individuals; even the smallest situations would contain at least one individual having at least one property.

Alternatively, we could assume that situations have empty situations as parts: parts that don't contain any individuals. Perhaps each non-empty situation has an empty situation as proper part, and perhaps empty situations themselves don't have proper parts. On this view, the smallest situations would be the empty situations, and so the empty minimal context $\downarrow S$ would be the set of all empty situations. If every situation has an empty situation as a part, then so does every actual situation. Since parts of actual situations are also actual, some empty

[66]See, similarly, Elbourne 2013, p. 23. As far as I can tell, the claim that all situations contain individuals doesn't follow from Kratzer's formal constraints on the ontology of situations (see Kratzer 1989, pp. 614–15).

situations are actual, and so the empty context would again be guaranteed to be accurate.

The assumption of such empty situations raises some tricky issues. One might wonder how many of them there are. One could hold that there is only one empty situation in each possible world. If we assume that every situation has an empty part, and there is only one empty situation in each world, the empty situation that is part of some world would then be part of every situation that is part of this world. This would mean that all situations that are part of the same world would overlap, that is, any two situations that are part of the same world would have some part in common.[67] Alternatively, we could assume that worlds may have more than one empty situation as part, and that an empty situation is in general not part of every situation of the world to which it belongs. That way, we could avoid the conclusion that all situations that belong to the same world overlap. But considering such a view, one might wonder what distinguishes two empty situations that are part of the same world.[68]

[67]If one assumes that in each world, there is a situation that is part of every situation of that world, one has to be careful which other principles one assumes govern the structure of situations. This is well-known from standard mereology. Consider the following principle, often called *Supplementation*: $\forall s \forall s'(s < s' \rightarrow \exists s''(s'' \leq s' \wedge \neg s'' \circ s))$, where for any situations s and s', $s \circ s'$ iff $\exists s''(s'' \leq s \wedge s'' \leq s')$, that is, iff s and s' overlap. If in every world, some situation is part of every situation of that world, then all situations that are part of the same world overlap. Given Supplementation, it follows that no situation has proper parts. (See e.g. Varzi 2016 and Niebergall 2011, p. 275, for discussion in the context of standard mereology. Standard mereology accepts Supplementation but rejects the claim that there is a null object, that is, an object that is part of every other object.) But situation semanticists generally seem to think that some situations have proper parts, and so they would have to reject Supplementation if they accept that in every world, some situation is part of every other situation of that world. Note that in his truthmaker semantics, Fine assumes that there is ‘a *null* state [...], which is the fusion of no states and which is therefore part of every state” (Fine 2017, p. 628).

[68]We could, for example, assume that (i) every non-empty situation has some empty situation as proper part, (ii) that empty situations have no proper parts, and (iii) that two situations overlap only if they have some non-empty part in common. Then for any two non-empty situations s and s' that have no non-empty common part, there have to be distinct empty situations s'' and s''' s.t. s'' is part of s but not s' and s''' is part of s' but not s. Suppose that there is a non-empty situation s that has no non-empty proper parts. Then s has some empty situation s' as a part. Unless there is a second empty situation s'' that is also part of s but doesn't overlap with s'', we again would have to reject Supplementation, since Supplementation requires that, if s' is a proper part of s, s has some other situation s'' as part that doesn't overlap with s'; if s' were the only proper part of s, this requirement would be violated. But the assumption that every such situation s has at least two distinct empty situations as part seems odd at the very least. Therefore, even the view that accepts that there is an abundance of empty situations seems to be somewhat in tension with

Though interesting, I won't pursue the issue of whether there are empty situations and what they are like any further here. For the applications that I will consider later, I think it makes little difference whether we take the empty minimal context to be the set of all situations or the set of all the smallest situations, and it also makes little difference whether the smallest situations are empty or non-empty. Therefore, I won't try to settle this issue here. For the sake of concreteness, I will assume that there is a suitable (non-empty) set of all the smallest situations that can serve as the empty minimal context. In the next section, I move on to discuss definite contexts.

3.2 Definite Contexts

Just like an indefinite context, a definite context is a set of situations. A definite context differs from an indefinite context in that a definite context captures information about a particular situation, its topic situation. As in the case of indefinite contexts, we can distinguish between non-minimal and minimal definite contexts.

3.2.1 Non-Minimal Contexts

A definite non-minimal context is a set of situations that contains all candidates for being the topic situation: Any situation in the context is a candidate for being the topic situation, and any situation not in the context has been ruled out as candidate. Accordingly, a definite non-minimal context is accurate just in case the topic situation is in the context:

(37) *Accuracy of Definite Non-Minimal Contexts.* A context c with topic situation s_t is accurate just in case $s_t \in c$.

As in the case of indefinite non-minimal contexts, update of definite non-minimal

Supplementation.

contexts proceeds by intersection, and so the update rule is the same, repeated here from (26):

(38) *Intersective Update.* $c[p] = c \cap \{s : p(s) = 1\}$

When we update a context c with a proposition p, we exclude all those candidates for being s_t from c where p is not true. As for the empty context, we could again assume that the empty context is the set of all situations:

(39) *Empty Definite Non-Minimal Context.* $c_\circ = S$

This would mean that any situation is a candidate for being the topic situation s_t if we haven't accepted anything about what s_t is like. Perhaps one might think that not all situations are candidates for being s_t and that only those situations that are counterparts of s_t are true candidates for being s_t. For any two situations s and s', let $\ulcorner sCs' \urcorner$ express that s' is a counterpart of s. Then the empty context could be as follows:

(40) *Restricted Empty Definite Non-Minimal Context.* $c_\circ^r = \{s : s_t C s\}$

If every situation has at most one counterpart at each world, a context would then contain at most one situation of each world. If the empty context were the set of all situations, this would not generally be so. I'm not entirely sure if the restriction to counterparts of the topic situation is desirable, in part because it's not clear to me which situations would count as counterparts of the topic situation. Counterpart relations are, after all, often assumed to be highly context-sensitive.[69] Note that we can always restrict a context to those situations that are counterparts of the topic situation by updating the context with the claim that the situation is a counterpart of the topic situation. That way, the restricted

[69]For example, by David Lewis, who made use of counterpart relations between individuals; for an overview, see e.g. Hall, Rabern, and W. Schwarz 2021. Lewis did not take events (which many think are similar to situations, and perhaps are a kind of situation; see e.g. Kratzer 2019) to be world-bound and instead took them to be properties of spacetime regions. For a critical discussion of Lewis' view of events, see e.g. Kaiserman (2017), who argues that Lewis should have adopted the view that events are world-bound states of affairs, related to events at other worlds by context-dependent counterpart relations.

empty context could be derived from the unrestricted empty context:

(41) $c_{\circ}[\lambda s.s_t Cs] = S \cap \{s : s_t Cs\} = \{s : s_t Cs\} = c_{\circ}^{r}$

Since we could always restrict contexts in this way if this turned out to be preferable, beginning with the set of all situations as the empty context does at least not seem like a serious disadvantage.

If definite non-minimal contexts only contain counterparts of the topic situation, and the only counterpart of the topic situation at the actual world is the topic situation itself, then some actual situation is in the context just in case the topic situation itself is in the context. In that case, it makes little difference whether we take the context to be definite or indefinite, as the context would be accurate under the same conditions, whether taken to be definite or indefinite. However, if the situations in a definite context are not restricted to counterparts of the topic situation or if more than one actual situation counts as counterpart of the topic situation, then it does make a differerence whether we think of the context as definite or indefinite, since the same set of situations may be accurate if taken to be an indefinite context but inaccurate if taken to be a definite context. Whereas the indefinite non-minimal context is accurate just in case some actual situation is in the context, the definite non-minimal context is accurate just in case the topic situation is in the context.

3.2.2 Minimal Contexts

As with indefinite minimal contexts, the idea of definite minimal contexts is that the situations in them are just big enough so that what has been accepted is true at them, but not bigger. Therefore, the topic situation of the context may be bigger than the situations in the context, since the interlocutors may not have described the topic situation in its entirety. This has consequences for how we should define the conditions under which the context is accurate. What the interlocutors have accepted may accurately describe the topic situation even if more could be said about that situation. An accurate description may be incomplete. Therefore, we should not say that a definite minimal context is accurate just in case it contains the topic situation. A better proposal is the following:

(42) *Accuracy of Definite Minimal Contexts.* A context c with topic situation s_t is accurate just in case $\exists s(s \in c \wedge s \leq s_t)$.

That is, a definite minimal context is accurate just in case some situation in the context is part of the topic situation. In other words, the topic situation has to extend some situation of the context. Or, put differently, the situations in the context are candidates for being part of the topic situation, rather than for being the topic situation.

As in the case of indefinite minimal contexts, we may assume that the empty context is the set of all the smallest situations, and that update proceeds by extending the situations in the context just enough so that what has been accepted is true:

(43) *Empty Definite Minimal Context.* $c_\circ = \downarrow S$

(44) *Minimal Update.* $c[p] = \downarrow \{s : p(s) \wedge \exists s'(s' \in c \wedge s' \leq s)\}$

We begin with very small situations, the smallest ones, and then extend them so that what we accept is true at the extended situations; we then take the smallest of these extended situations, which gives us the updated context.

As in the case of definite non-minimal contexts, one might object that this procedure would include too many candidates in the context, on the grounds that all candidates for being part of the topic situation should at the very least be part of a counterpart of the topic situation. If we wanted to accommodate this concern, we could as a first step restrict the empty context. For any situations s and s', let's say that $s \lesssim s'$ just in case s is part of some counterpart of s', that is, just in case $\exists s''(s'Cs'' \wedge s \leq s'')$.[70]

[70]Cf. F. Schwarz 2009, p. 182, referring to a manuscript by Kratzer in footnote 29.

(45) *Restricted Empty Definite Minimal Context.* $c^r_\circ = \downarrow \{s : s \lesssim s_t\}$

This restricted empty context contains the smallest situations that are part of some counterpart of the topic situation s_t. Only restricting the empty set isn't enough: when we update minimal contexts, the situations in the context grow, and so choosing $c^r_\circ$ as empty context doesn't by itself ensure that the situations in the context remain part of some counterpart of the topic situation once we update the context. Update with some propositions may expand the situations so much that even the smallest among the expanded situations are bigger than the counterparts of the topic situation. The situations in the context would in that case outgrow the (counterparts of the) topic situation.

If we want to make sure that the situations in the context remain parts of counterparts of the topic situation even after update, we either have to restrict what propositions we update the context with or we have to change how we update the contexts. There are different ways we could do this. Here is a suggestion for how we could change the update rule:

(46) *Restricted Minimal Update.* $c[p] = \downarrow \{s : s \lesssim s_t \wedge p(s) \wedge \exists s'(s' \in c \wedge s' \leq s)\}$

This is just like Minimal Update, except for the added requirement that the expanded situations are part of some counterpart of the topic situation. An alternative would be to update the context only with propositions that are true only at parts of counterparts of the topic situation. For any topic situation s_t, we could convert a proposition p into an appropriately restricted proposition $p_{res(s_t)}$ as follows:

(47) $p_{res(s_t)} = \lambda s.s \lesssim s_t \wedge p(s)$

The restricted proposition $p_{res(s_t)}$ is true at s just in case p is true at s and s is part of a counterpart of s_t.[71] Since such restricted propositions are only true

[71] This restriction could also be implemented in the semantics of the language, for example by assuming that there is a topic operator *topic*, interpreted as $[\![topic]\!] = \lambda s'.\lambda p_{\langle s,t \rangle}.\lambda s.s \lesssim s' \wedge p(s)$. It takes a situation s' and proposition p as input and gives the restricted proposition $p_{res(s')}$ as

at parts of counterparts of the topic situation, minimal update of the restricted empty context leads to contexts that only contain situations that are also parts of counterparts of the topic situation. That way, we would not have to change Minimal Update into Restricted Minimal Updated.

As in the case of non-minimal contexts, I'm not sure whether such restrictions to parts of counterparts are really desirable, since, again, I'm not entirely sure what this restriction achieves if we don't know more about what the relevant counterpart relation looks like. Therefore, I will by and large ignore these restrictions in what follows. Since they could easily be added if desired, I don't think this simplification is problematic.

How are indefinite minimal and definite minimal contexts related? An indefinite minimal context is accurate just in case it contains some actual situation. By contrast, a definite minimal context is accurate just in case it contains some part of the topic situation. If definite minimal contexts only contain parts of counterparts of the topic situation, and the only actual counterpart of the topic situation is the topic situation itself, then some actual situation is in the context just in case the context contains some part of the topic situation. In that case, it makes little difference whether we think of the context as definite or indefinite, as their accuracy and inaccuracy coincide. The way the context is updated may, however, differ, at least if definite minimal contexts are updated via Restricted Minimal Update rather than Minimal Update, which is the update rule for indefinite minimal contexts. If the situations in definite minimal contexts are not restricted to parts of counterparts of the topic situation, or if the topic situation isn't its only actual counterpart, the two notions of accuracy for definite and in-

output. We could then assume that the structure of an unembedded sentence is always $[[topic\ s_i]\ S]$, where s_i is assigned the topic situation s_t by the variable assignment, and S is an expression of propositional type $\langle s,t\rangle$. If S denotes the proposition p, then $[[topic\ s_i]\ S]$ denotes, relative to an assignment g, the restricted proposition $p_{res(g(s_i))}$, restricted to parts of counterparts of the situation g assigns to s_i. This topic operator is very similar to Schwarz's topic operator, see F. Schwarz 2009, p. 93, adopted with modifications from a manuscript by Kratzer, except that Schwarz's operator restricts the proposition to counterparts of the topic situation rather than to parts of counterparts.

definite contexts can come apart. Definite minimal contexts could then contain actual situations that are not part of the topic situation, in which case the context would count as accurate if taken to be indefinite but inaccurate if taken to be definite. This is the same result we already encountered in the case of definite and indefinite non-minimal contexts.[72]

How are definite non-minimal and definite minimal contexts related? Again, this is similar to the case of indefinite non-minimal and indefinite minimal contexts. If the propositions involved are persistent and T-or-F-persistent, the choice between non-minimal and minimal contexts does not seem to matter much. The non-minimal context is accurate just in case its corresponding minimal context is. Differences arise when some of the propositions we update with are not persistent. Moreover, if we adopt again the idea that truth-value gaps impose constraints on update along the lines of (34) (repeated below as (48)), differences between non-minimal and minimal contexts arise if propositions are not T-or-F-persistent; that is, if propositions that are true or false at some situation s are neither true nor false at some larger situation of which s is a part.

(48) *Presuppositional Bridge.* If p is true or false only if q is true, then $c[p]$ is defined only if $\forall s(s \in c \rightarrow q(s) = 1)$

The reasons are parallel to those in the case of indefinite contexts, due to the update rules, which are the same for indefinite and definite contexts (or at least almost the same if one adopts the Restricted Minimal Update rule for definite minimal contexts). As in the case of indefinite contexts, definite non-minimal contexts are updated by intersection whereas definite minimal contexts are updated by minimally expanding the situations in the context. As a result, the non-minimal contexts may contain situations that are not contained in the corresponding minimal context (namely, situations that have some proper part that is also contained in the non-minimal context). This is why a non-minimal context

[72] See above section 3.2.1.

may fail to satisfy the constraint imposed by the Presuppositional Bridge even when its corresponding minimal context does not satisfy it, at least if the propositions involved are not T-or-F-persistent. In addition, update with non-persistent propositions may lead to different results. If a context has been updated intersectively with some claim p, there is no way a situation where p isn't true may find its way into the context through subsequent updates. But if a context is updated with a non-persistent claim p via (Restricted) Minimal Update, situations where p is not true may find their way into the context at some later stage, as long as these situations have some part where p is true. Accordingly, if p isn't true at the topic situation but true at some part of the topic situation, a non-minimal context is inaccurate if updated with p, but a minimal context may still be accurate. This is why, with non-persistent propositions, non-minimal and minimal definite contexts may diverge, just like in the case of indefinite contexts.[73]

3.3 Conclusion

According to Stalnaker, an assertion aims to change the conversational context; such a context is a set of worlds, and the worlds in the set are the interlocutors' candidates for being the actual world. According to the Austinian view, an assertion describes a situation which may be smaller than the entire world. In this chapter, I have explored different ways to combine these two perspectives. I suggested taking contexts to be sets of situations that capture what has been accepted about some situation.

	topic situation: yes	topic situation: no
Intersective Update	def. non-minimal context	indef. non-minimal context
Minimal Update	def. minimal context	indef. minimal context

[73] See above section 3.1.3, on indefinite contexts.

A definite context captures what has been accepted about a particular situation, its topic situation. Definite non-minimal contexts are accurate just in case the topic situation is in the context, and they are updated with a claim p by intersection: by excluding all those situations from the context in which p is not true. Definite minimal contexts are accurate just in case the topic situation has some situation as part that is in the context; they are updated with a claim p by expanding the situations in the context just enough so that p becomes true. Indefinite contexts, by contrast, have no topic situation. An indefinite non-minimal context is accurate just in case some actual situation is in the context; just like definite non-minimal contexts, indefinite non-minimal contexts are updated by intersection. An indefinite minimal context is also accurate just in case some actual situation is in the context; just like the corresponding indefinite contexts, they are updated by expanding the situations in the context minimally.

Definite contexts may serve to describe conversations in which there is a particular situation the interlocutors aim to describe. Therefore, they fit well together with the Austinian view of assertion, according to which an assertion aims to describe a particular situation. But there may not always be a particular situation the interlocutors aim to describe. Perhaps sometimes they describe some situation or other without aiming to describe a particular situation. If there are such cases, indefinite contexts could be used to describe what the interlocutors accept.

Over the course of the following chapters, I want to put contexts built out of situations to use. I will try to show that these contexts can be a useful pragmatic addition to the toolbox of situation semantics. Along the way, I will also discuss some of the challenges that arise when employing these contexts. A particular focus will be on the use of minimal contexts.

Chapter 4

Definite Descriptions and Intersentential Anaphora

4.1 Static v. Dynamic Semantics

There is, as far as I can tell, no uncontroversial criterion for what makes a semantics static or dynamic. One way of describing the difference goes as follows. According to static semantic theories, the semantic content of a declarative sentence is a proposition, something that can be true or false. According to dynamic semantic theories, the semantic content of a declarative sentence is a so-called context change potential, a recipe for how to change a context.[74] Whereas a proposition may be modelled as a function from certain parameters to truth values (e.g. functions from possible worlds or situations to truth values), a context change potential may be modelled as a function from contexts to contexts.[75]

One important way to make progress deciding which type of semantics is better is to consider particular linguistic phenomena and ask which theory pro-

[74] See e.g. K. Lewis (2014) for this way of drawing the distinction.

[75] There are many different semantic theories that have been called dynamic. A classic dynamic semantic account is Heim 1982. Other dynamic theories are Discourse Representation Theory (e.g. Kamp 2002, first published 1981) and Dynamic Predicate Logic (Groenendijk and Stokhof 1991), among many others. For a helpful introduction to Discourse Representation Theory and Heim's dynamic semantics, see e.g. Kadmon 2001, chapter 2.

vides the better explanation—some kind of static semantic theory or some kind of dynamic semantic theory. Indefinite and definite terms have been a crucial test case. Indefinite terms are expressions such as ‘a cat’. Definite terms include pronouns such as ‘she’ or ‘it’ and definite descriptions such as ‘the cat’ or ‘the cats’. The complex behaviour of these terms has been an important motivation for dynamic semantic theories, including for Heim’s (1982) dynamic semantics. Heim provides a semantics for both indefinite and definite terms, with a particular focus on the ways in which these terms interact.

Situation semantics, understood broadly as any semantic theory that uses situations in its ontology, could be either static or dynamic. However, an influential idea has been to use situations to provide a static account of indefinites and definites, as a competitor to dynamic semantic theories.[76] How successful this situation semantic endeavour is remains a matter of debate. In what follows, I will first provide some background on how situation semanticists have suggested the semantics of definites works, focusing on definite descriptions. Then, I will look at a particular kind of data that has motivated dynamic semantics but that has not received a lot of attention by situation semanticists: intersentential anaphora—anaphora that cross sentential boundaries, as in the following example:

(49) There is a cat. The cat is hungry.

After explaining why these anaphora are challenging for (static) situation semantics, I will explore whether contexts built out of situations could help situation semantics deal with the challenge.

Before I move on to discuss definite descriptions in more detail, I want to point out that most of the issues I will consider do not only arise for definite descriptions but also for other definite terms, such as pronouns and demonstratives. Prima facie, the definite description ‘the cat’ in (49) could be replaced with

[76] See e.g. Heim 1990a, Büring 2004, Elbourne 2005, 2013, 2016.

the pronoun ‘it’ without changing the meaning substantially:

(50) There is a cat. It is hungry.

There are interesting and subtle differences between these different kinds of definite terms. Sometimes, replacing a definite description with a pronoun would make an example sound better, perhaps at least in part because pronouns are shorter. Sometimes, replacing a definite that includes an overt noun with a pronoun makes the utterance worse, as in the following cases:

(51) a. John is married. His wife is nice.
b. John is married. She is nice.
(Heim 1982, section 5.3, formatting changed)

(52) a. John is a car owner. The car was very expensive.
b. John is a car owner. It was very expensive.

(53) a. Mary is married. Her wife is nice.
b. Mary is married. She is nice.

In both (51) and (52), the second example arguably sounds somewhat worse than the first. And whereas ‘her wife’ in (53a) is easily understood as referring to Mary’s wife, the pronoun ‘she’ in (53b) is more difficult to interpret, since it may refer to Mary or to Mary’s wife. I only mention these comparisons to set them aside. Exploring the differences between different types of definite terms won’t be one of my topics, as doing so in detail would go beyond the limits of this thesis.

In spite of the differences, it is common to assume that the semantics of pronouns and definite descriptions is similar, among both dynamic semanticists and static situation semanticists.[77] If this is on the right track, there is hope that what one says about definite descriptions could also be said, with appropriate changes, about other definite terms.

[77]See e.g. Elbourne 2013, chapter 10, for a situation semantic perspective, and Heim 1982, chapter II, section 6, and chapter III, section 5, for a dynamic semantic view.

4.2 On the Semantics of Definite Descriptions

4.2.1 Existence and Uniqueness

In this section, I will sketch a situation semantic approach to definite descriptions. According to this approach, definite descriptions come with an existence and uniqueness presupposition: 'the cat' triggers the presupposition that there is exactly one cat, 'the table' triggers the presupposition that there is exactly one table, and so on.[78] This presupposition is often divided into two components: an existence presupposition (e.g. the presupposition that there is a cat) and a uniqueness presupposition (e.g. that there is at most one cat). There are good reasons for this view. Imagine that there are two cats on a mat in front of a speaker and her audience, and the speaker says:

(54) The cat is hungry.

Unless the speaker explains which of the two cats she wants to talk about, her assertion is rather odd. One way to explain this is to assume that (54) presupposes that there is exactly one cat. Since it's presumably common ground between speaker and audience that there are two cats, the presupposition isn't satisfied, and so the utterance is infelicitous.

An important problem for the view that definite descriptions presuppose uniqueness is that we all know that our world contains more than one cat. Nonetheless, many utterances of (54) seem perfectly fine. If the presupposition of (54) were that there is exactly one cat in the entire world, that presupposition would be obviously false, and it would be surprising that many utterances of (54) nevertheless seem fine. This challenge is sometimes called the problem of incomplete descriptions.[79]

[78] The view that definite descriptions require existence and uniqueness has a long history going back at least to Mill (1843) and later Frege (1884; 1892).

[79] See e.g. Ludlow 2018, section 5.3. An early discussion of the problem can be found in Strawson 1950, pp. 332–33, as a critique of Russell's account of definite descriptions. Strawson suggests that a definite description such as 'the table' requires that there is "one table and no

A popular response to this challenge is to assume that definite descriptions are somehow implicitly restricted. An *explicit* restriction is a restriction that is pronounced. For example, 'the cat' could be explicitly restricted by adding the modifier 'brown', as in 'the brown cat'. If there were only two cats, one brown and the other one black, 'the cat' would have a false presupposition; this could be avoided by using 'the brown cat' instead—by explicitly restricting the description. Now the idea is that, in addition to such explicit restrictions, there are *implicit*, unpronounced, restrictions that may also affect whether the presuppositions of definite descriptions are true. This general idea has beeen made more precise in different ways, with various suggestions for how implicit restriction works. One suggestion is that the definite description is implicitly restricted to a situation. In the case of (54), the idea would be that the sentence doesn't presuppose that there is exactly one cat in the entire world but rather that there is exactly one cat in some relevant situation. This situation may be significantly smaller than the entire world. Therefore, that there is exactly one cat at this situation may be true even if it isn't true that there is exactly one cat in the world of which s is a part. Consequently, the presupposition that is restricted to a situation may be true even if there are millions of cats.[80]

4.2.2 Implementation

The idea that definite descriptions trigger an existence and uniqueness presupposition that is implicitly restricted to a situation can be implemented in different

more *which is being referred to*" (p. 332). Even Mill (1843) seems to be aware of the challenge when he writes: "'The king who succeeded William the Conqueror' is also an individual name [that is, a 'name that can be truly affirmed [...] of only one thing'], because the meaning of the words in it imply that there can't be more than one person of whom it can be truly affirmed. Even 'the king', *when the occasion or the context picks out the person of whom it is to be understood*, can fairly be regarded as an individual name" (Book I, Chapter 2, §3, emphasis mine).

[80]For the idea that definite descriptions are restricted to a situation, see e.g. Barwise and Perry 1983. Mechanisms for implicit restriction are also employed in the semantics of other expressions, in particular of quantifiers such as 'every'. For a more recent discussion of domain restriction in situation semantics, see e.g. F. Schwarz 2012. There are other approaches to domain restriction; see e.g. Stanley and Szabó 2000 for an influential alternative.

ways. A first choice concerns the semantic type of definite descriptions: definite descriptions could be quantifiers or referential terms, which denote individuals.[81] A second choice concerns the presupposition. As mentioned earlier, one view is that semantic presuppositions of a sentence are conditions under which the sentence is true or false.[82] A different view is that the semantic content of a sentence has multiple dimensions: the main, non-presuppositional content, and a separate presuppositional content. This kind of view allows for the possibility that the main content is true or false even if the presuppositional content is false.[83]

In his situation semantic account of definite descriptions, Elbourne (2013) assumes that definite descriptions are referential and that their presuppositions lead to truth-value gaps. In what follows, I adopt Elbourne's view of definite descriptions as basis for my account, not because I think that pursuing a quantificational semantics for definite descriptions is hopeless nor because I'm convinced that truth-value gaps are unavoidable for developing an account of semantic presuppositions. Elbourne's account is to my knowledge the most detailed situation semantic account of definite descriptions, and so it provides a promising starting point when examining the prospects of using sets of situations as contexts to complement a situation semantics of definite terms.

To implement the idea that definite descriptions are implicitly restricted to a situation, Elbourne (2013, pp. 46–7) assumes that definite descriptions contain an unpronounced situation variable—a variable that stands for a situation:

(55) [[The cat] s_i]

Here the 's_i' is the unpronounced situation variable with index i.[84] All expres-

[81] Quantificational accounts of definite descriptions go back to Russell; see e.g. Russell 1905 and Russell 1919. An early view according to which definite descriptions denote individuals is Frege 1892.

[82] See section 2.2

[83] For such multi-dimensional approaches, see e.g. Karttunen and Peters 1979 and Sudo 2012.

[84] On the assumption that natural languages contain situation variables, see also Kratzer 2019, section 5. Elbourne's semantics for definite descriptions is based on a suggestion from Barwise

sions are interpreted relative to an assignment function, and the assignment function assigns situations to the situation variables:

(56) $[\![\text{s}_i]\!]^g = g(i)$[85]

The definite article 'the' introduces an existence and uniqueness presupposition, which has to be satisfied at the situation that is assigned to the situation variable. Following Heim and Kratzer (1998), Elbourne implements truth-value gaps with the help of restrictions on the domains of the functions that serve as denotations. The definite article receives the following denotation:

(57) $[\![\text{the}]\!]^g = \lambda f_{\langle e,st\rangle}.\lambda s : \exists! x f(x)(s).\iota x f(x)(s)$[86]

This denotation is a function with two arguments. It first combines with a function f to provide a function from situations to individuals:

(58) $\lambda s : \exists! x f(x)(s).\iota x f(x)(s)$

This function has as domain only those situations s that contain exactly one individual x that is f at s. If a situation s is in its domain, and so there is exactly one individual that is f at s, then (58), applied to s, is the unique individual x that is f at s, that is, $\iota x f(x)(s)$.[87]

At this point, a word on the metalanguage may be in order. The ι-terms of the metalanguage are assumed to denote individuals.[88] A term of the form

and Perry 1983. For related accounts, see for example Heim 1990a; Percus 2000; Büring 2004; Elbourne 2005.

[85]It is not clear to me whether on Elbourne's view, assignment functions are partial or have to be defined for all variables. I assume that they are partial functions from indices to individuals or situations.

[86]See Elbourne 2013, p. 47, with minor changes. I assume that the metalanguage variables s, s_i, ... range over situations; variables x, x_1, ..., y, y_1, ... etc. range over individuals. Cf. Heim and Kratzer 1998, pp. 75, 81 for a similar semantics, which, however, doesn't use situations to restrict definite descriptions implicitly. The expression '$\exists! x f(x)(s)$' is used as abbreviation of '$\exists x(f(x)(s) \wedge \forall y(f(y)(s) \rightarrow y = x))$'.

[87]The assumption that definite descriptions are referring terms that denote individuals (as suggested by Frege) rather than quantificational expressions (as Bertrand Russell argued) isn't essential to the idea that definite descriptions are implicitly restricted with a situation variable. One could also develop a quantificational semantics on which '[[the cat] s_i]' is a quantifier that is restricted to a situation. (One option would be to claim that definite descriptions are essentially existential quantifiers with a uniqueness presupposition; cf. e.g. the view developed in Hawthorne and Manley 2012.)

[88]The use of the ι-operator to form expressions of referential type (denoting individuals) thus

$\ulcorner \iota x\phi(x)\urcorner$ has a denotation if and only if there is exactly one individual x that satisfies the condition ϕ, that is, if and only if $\ulcorner \exists! x\phi(x)\urcorner$; otherwise the term fails to denote. If there is exactly one individual that satisfies the condition, $\ulcorner \iota x\phi(x)\urcorner$ denotes that individual.[89] The metalanguage therefore contains expressions that are undefined under certain conditions. As long as the domains of the denotations of the object language are appropriately restricted, the ι-terms of the metalanguage are defined throughout the relevant domain. For example, the term $\ulcorner \iota x f(x)(s)\urcorner$ is defined for every situation s that is in the domain of (58). If we assume that the metalanguage term $\ulcorner \iota x f(x)(s)\urcorner$ is interpreted relative to that domain rather than relative to a larger domain, the term is guaranteed to be defined. If, however, the domain were larger, the term would be undefined for some situations in the domain.

Nouns such as 'cat' or 'table' are assumed to denote functions of type $\langle e, st\rangle$, that is, functions from individuals to functions from situations to truth values:[90]

(59) $[\![\text{cat}]\!]^g = \lambda x.\lambda s.\textsc{cat}(x)(s)$

The denoted function, applied to an individual x and a situation s, delivers the truth value 1 (true) just in case x is a cat at s, and the value 0 (false) otherwise.

Complex expressions are assumed to have a syntactic structure that guides the interpretation, which we might call its *logical form*. I assume that the syntactic structures are binary-branching; every complex expression has (at most) two immediate parts, also called its *daughters*, which may themselves be complex expressions with further parts.[91] For example, the complex expression '[[the cat] s_i]' has 'the cat' and 's_i' as its two daughters, and its daughter 'the cat' also has

differs from Russell's use of the ι-terms. For a brief discussion, see e.g. Elbourne 2013, p. 48.

[89] We could say, if it has a denotation, $\ulcorner \iota x\phi(x)\urcorner$ denotes x if and only if $\phi(x)$.

[90] Following Heim and Kratzer 1998, p. 75, the semantic types are understood as follows: in order for a function to be of some type $\langle x, t\rangle$, the domain of the function has to be a (proper or improper) *subset* of the domain D_x. We can therefore think of the function in two different ways: (a) as a total function with a domain D, where $D \subseteq D_x$, and co-domain D_t, or (b) as a partial function with domain D_x and co-domain D_t, defined only for those $x \in D_x$ that are in D. Sometimes, it makes no difference which perspective we assume.

[91] Binary branching structures are also assumed by Heim and Kratzer 1998 and Elbourne 2013.

two daughters, the determiner 'the' and the noun 'cat'. Generally, the interpretation of a complex expression is determined by its logical form, the interpretation of its parts, and composition rules, which specify how the interpretation of certain complex expressions is determined by the interpretation of their parts. One such composition rule is Functional Application:

(60) *Functional Application (FA).* If α is a branching node and $\{\beta, \gamma\}$ the set of its daughters, then, for any assignment a, α is in the domain of $[\![\ ]\!]^a$ if both β and γ are, and $[\![\beta]\!]^a$ is a function whose domain contains $[\![\gamma]\!]^a$. In this case, $[\![\alpha]\!]^a = [\![\beta]\!]^a([\![\gamma]\!]^a)$. (Heim and Kratzer 1998, p. 105)

If an expression is not in the domain of the interpretation function $[\![\ ]\!]^a$, it has no denotation (relative to the assignment a). If FA is the only composition rule, and FA does not apply to a complex expression α, then there is no other rule that could determine a denotation for α, and so α has no denotation. This could happen if either daughter has no denotation or if the denotation of neither daughter is in the domain of the denotation of the other daughter.

If an expression is not in the domain of the interpretation function, it has no denotation. In addition, an implicit assumption seems to be that if an expression α is in the domain of $[\![\ ]\!]^a$, then $[\![\alpha]\!]^a$ is in fact defined and so α does have a denotation, relative to a. Applied to the case of FA, if there is a branching node α with two daughters, and the two daughters β and γ satisfy the conditions in order for FA to apply, relative to some assignment a, then α is in the domain of $[\![\ ]\!]^a$, and so it does have a denotation. For this to work, the conditions FA imposes on β and γ have to guarantee that $[\![\beta]\!]^a([\![\gamma]\!]^a)$ is defined. Otherwise, there could be a case where β and γ satisfy the conditions relative to some assignment a, and so α is (according to FA) in the domain of $[\![\ ]\!]^a$, but $[\![\beta]\!]^a([\![\gamma]\!]^a)$ is undefined, and so α also fails to have a denotation relative to a. To avoid this, the following needs to hold:

(61) If, for some assignment a,

1. β is in the domain of $[\![\ ]\!]^a$,

2. γ is in the domain of $[\![\ ]\!]^a$, and
3. $[\![\gamma]\!]^a$ is in the domain of $[\![\beta]\!]^a$,

then $[\![\beta]\!]^a([\![\gamma]\!]^a)$ is defined.

For this to be guaranteed, $[\![\beta]\!]^a$ has to be a total function, defined for everything in its domain. If it were merely partial, $[\![\gamma]\!]^a$ could be in the domain of $[\![\beta]\!]^a$ even if the function $[\![\beta]\!]^a$ isn't defined for $[\![\gamma]\!]^a$. To avoid such cases, all denotations that are functions have to be total functions:

(62) *Totality of Denotations (ToD).* All denotations that are functions are total functions.

If all denoted functions are total, then we may apply them to something in their domain without having to fear that the function is not defined for it, and so we have a guarantee that, if FA can be applied to interpret some complex expression α, α has a denotation.[92]

Let's consider how FA and the assumptions about 'the', 'cat', and situation variables conspire to deliver an interpretation for the definite description '[[the cat] s$_i$]'.[93] The definite article 'the' combines with the noun 'cat', by FA:

(63) $[\![\text{the cat}]\!]^g = \lambda s : \exists! x\textsc{cat}(x)(s).\iota x\textsc{cat}(x)(s)$

The denotation takes a situation s as input to deliver an individual as output. The denotation of s_i is $g(i)$, the situation the assignment g assigns to the index i. Since the denotation of 'the cat' is defined only for situations in which there is exactly one cat, 'the cat' and 's$_i$' can combine by FA only if there is exactly one cat at $g(i)$. If that is indeed the case, the whole definite description denotes the individual that is a cat at $g(i)$.

(64) $[\![\text{[the cat] s}_i]\!]^g = \iota x\textsc{cat}(x)(g(i))$

[92]If there were expressions that denote functions but these functions never had to compose by FA in the process of interpreting the language (e.g. because these expressions are never part of a more complex expression), then these denotations could be exempt. But it's questionable whether there are such expressions.

[93]See Elbourne 2013, p. 49

If there is not exactly one cat at $g(i)$, $g(i)$ isn't in the domain of the function denoted by 'the cat', and so FA doesn't apply. Since we have no other composition rule that we could use to interpret the definite description, the definite description fails to have a denotation in this case.

As a second step, let's consider how definite descriptions combine with other expressions to form sentences. For now, I will only look at a very simple sentence, 'The cat is hungry'. I will also simplify the discussion, for example by glossing over the complicated semantics of tense. Important for present purposes is that on Elbourne's view, situation variables can be bound or free.[94] In (65), the situation variable is not bound by any variable binder and is therefore free.

(65) [[[The cat] s_i] is hungry]

The sentence has a denotation, relative to an assignment g, only if 'the cat s_i' has a denotation relative to g. If 'the cat s_i' has no denotation relative to g, then FA can't apply, and so the sentence as a whole can't be interpreted.

(66) $[\![\text{is hungry}]\!]^g = \lambda x.\lambda s.\textsc{hungry}(x)(s)$

If the definite description does have a denotation, the sentence as a whole is interpreted as (67), assuming the interpretation (66) for 'is hungry':

(67) $[\![(65)]\!]^g = \lambda s.\textsc{hungry}(\iota x \textsc{cat}(x)(g(i)))(s)$

The denotation is a function from situations to truth values. It is true at a situation s just in case the cat in $g(i)$ is hungry at s, and it is false otherwise. The proposition denoted is true or false at any situation s, and so has no truth-value gap. Nonetheless, the *sentence* (65) has a truth-value gap, since it doesn't always denote a proposition. If there is not exactly one cat at $g(i)$, the definite description in (65) fails to denote and so the sentence as a whole fails to express a proposition. Conditions under which sentences express propositions are sometimes called *expressive* presuppositions.[95]

[94] For the following, see Elbourne 2013, pp. 49–51

[95] See e.g. Soames 2008a, p. 75, citing Strawson 1950 and Strawson 1952.

The situation where the existence and uniqueness presupposition has to be satisfied in order for the sentence to be true or false is provided by the assignment function. The idea seems to be that the assignment relative to which a sentence is evaluated is somehow determined by the context in which the sentence is used. Since the situation assigned to the situation variable may be much smaller than the world the sentence is used to describe, the uniqueness presupposition of the definite description may be true at that situation even if the world as a whole contains millions of cats.

Note also that the situation provided by the assignment could in principle differ from the situation at which the proposition is evaluated for truth. Let's call the situation at which a proposition is evaluated the *situation of evaluation*. If the situation of evaluation differs from the situation assigned to the definite description's situation variable, the situation of evaluation need not be one where there is exactly one cat, in order for the proposition to be true.[96] The proposition therefore doesn't entail that there is exactly one cat.

This is different in the case where the situation variable is bound. At least if it is bound as follows. Elbourne suggests that there is an unpronounced variable binder ς_i. This binder may for example be prefixed to a sentence as in (68), binding the situation variable contained in the definite description.

(68) $[\varsigma_i$ [[The cat s_i] is hungry]]

An expression prefixed by this binder is evaluated as follows:

(69) $[\![\varsigma_i \alpha]\!]^g = \lambda s.[\![\alpha]\!]^{g[s/i]}(s)$
where the assignment $g[s/i]$ is just like g except that it assigns s to i
(see Elbourne 2013, p. 33)

If, for some expression α, there is a situation s such that $[\![\alpha]\!]^{g[s/i]}(s)$ is undefined, then $\lambda s.[\![\alpha]\!]^{g[s/i]}(s)$ would not be a total function, since the domain of this function is the set of all situations. This would be in conflict with our requirement that all

[96]Unless the situation of evaluation is part of the situation assigned to the situation variable.

denotations that are functions are total functions. If we interpret (68), we run into exactly this issue. With the help of (69), we arrive at the following interpretation for (68).[97]

(70) $[\![(68)]\!]^{g} = \lambda s.[[\lambda x.\lambda s'.\textsc{hungry}(x)(s')](\underline{[\lambda s'' : \exists!x\textsc{cat}(x)(s'').\iota x\textsc{cat}(x)(s'')](s)})](s)$

This somewhat lengthy denotation is a function from situations to truth values: a proposition. Note the embedded function $\lambda s'' : \exists!x\textsc{cat}(x)(s'').\iota x\textsc{cat}(x)(s'')$ (underlined), which takes a situation s as input and delivers the individual (if any) denoted by the definite description 'the cat' as output. The situation s that it takes as argument is the situation where the denoted proposition is evaluated. The embedded function is only defined for situations that contain exactly one cat, but the denoted proposition has as its domain the set of all situations, which includes situations with more than one cat. Consequently, the proposition has in its domain situations for which the embedded function is not defined, and so the proposition isn't defined for all situations in its domain: it is not a total fuction, violating our demand that all denoted functions be total functions.

There are different ways to try to deal with this situation. Elbourne assumes a special rule for the metalanguage, which he calls λ-Conversion II:

> $\lambda u_{\tau} : f(u) = 1.[...[\lambda v_{\tau} : g(v) = 1.M](u)...]$
> $= \lambda u_{\tau} : f(u) = 1 \& g(u) = 1.[...[u/v]M...]$
> (Elbourne 2013, p. 34)

The rule allows us to delete the domain condition of an embedded function $\lambda v_{\tau} : g(v) = 1.M$ (which takes u as input) and add the condition as domain condition to the embedding function that provides the argument u. Elbourne (2013, pp. 50–1) applies this rule in cases such as (70), converting the lengthy denotation (71a) from (70) into the simpler denotation (71b):

(71) a. $\lambda s.[[\lambda x.\lambda s'.\textsc{hungry}(x)(s')]([\lambda s'' : \exists!x\textsc{cat}(x)(s'').\iota x\textsc{cat}(x)(s'')](s))](s)$

[97] Cf. Elbourne 2013, pp. 50–1

b. $\lambda s : \exists! x\textsc{cat}(x)(s).\textsc{hungry}(\iota x.\textsc{cat}(x)(s))(s)$

The domain restriction of the embedded function $\lambda s'' : \exists! x\textsc{cat}(x)(s'').\iota x\textsc{cat}(x)(s'')$ is deleted and added as domain restriction on the domain of the outermost function; the resulting expression can then be further simplified, so that we end up with the interpretation (71b). The final denotation is a function from situations to truth values, with a domain that is restricted to those situations that contain exactly one cat.

However, the conversion rule seems dubious to me. Let's distinguish two views. On the first view, the λ-terms of the metalanguage only denote total functions if they denote anything at all. On the second view, the λ-terms may also denote partial functions. Let's consider the first view first. Assume also that not all situations contain exactly one cat. In that case, the domain of the function $\lambda s'' : \exists! x\textsc{cat}(x)(s'').\iota x\textsc{cat}(x)(s'')$ is a proper subset of the domain of all situations. Applied to a situation that contains more than one cat, the function is undefined. As a result, the whole λ-term (71a) doesn't denote a total function, and so, by hypothesis, doesn't denote anything at all. After all, the domain of the whole term is the domain of all situations, which includes situations for which the embedded function isn't defined. By contrast, the λ-term (71b) does denote a total function, even if there are situations in which there is more than one cat, since its domain is restricted to those situations in which there is exactly one cat. Therefore, if the λ-terms only denote total functions, the two terms (71a) and (71b) don't describe the same function. But the conversion rules of the lambda calculus, as I think it makes most sense to understand them, don't change the denotation of the terms to which they are applied. They merely allow us to rewrite λ-terms without changing their denotation.[98] Similarly, consider the second view, according to which the λ–terms may denote partial functions. On that view, the term (71a)

[98]For example, when an expression (i) $[\lambda x.P(x)](a)$ (with P of type $\langle e,t\rangle$ and a of type e) has been converted, using β-conversion, to (ii) $P(a)$, it holds that (i) is true just in case (ii) is. For more on lambda-calculus and conversion rules, see e.g. Alama and Korbmacher 2018 and Benzmüller and Andrews 2019.

does denote a function, namely a partial function with the set of all situations as its domain. But, again, if there are situations in which there is more than one cat, the term (71b) doesn't denote the same function; as before, (71b) denotes a total function with the set of only those situations in which there is exactly one cat as its domain. If there are situations with multiple cats, these two functions are distinct. Therefore, even on the second view, λ-Conversion II allows us to change a term into another term that denotes a different function, something that usual conversion rules for λ-terms don't allow. This is why I'm skeptical about Elbourne's rule.[99]

There are other ways to ensure that expressions with a binder of the form $\ulcorner \varsigma_i \alpha \urcorner$ denote total functions. One way would be to try to restrict the domain of the denotation from the beginning, along the following lines:

(72) $[\![\varsigma_i \alpha]\!]^g = \lambda s : s \in dom([\![\alpha]\!]^{g[s/i]}).[\![\alpha]\!]^{g[s/i]}(s)$[100]

Here, I use $\ulcorner dom(f) \urcorner$ to denote the domain of a function f. Thus, $\ulcorner \varsigma_i \alpha \urcorner$ denotes, relative to an assignment g, a function with a domain that contains only those situations that are in the domain of the function that α expresses relative to $g[s/i]$. This would ensure that the function expressed by $\ulcorner \varsigma_i \alpha \urcorner$ is total.

A different strategy is to model truth-value gaps with a third truth value, #, in addition to true and false, rather than with the help of explicit domain restrictions. This is the view that I'll adopt here. On this view, propositions are

[99]For a slightly different (but, I think, related) critique of Elbourne's rule, see Coppock 2014. Coppock writes more generally that the validity of a conversion rule "should follow from the semantics of the language in question" (p. 116) and objects that Elbourne simply stipulates his rule. If I'm right, Elbourne's rule should in fact be invalid on the intended interpretation. (Since I'm not sure whether the intended interpretation of the λ-terms is so as to denote partial or total functions, I distinguish the two views.) Coppock suggests that instead of using domain conditions (as in Heim and Kratzer 1998), we should adopt a metalanguage with an explicit three-valued semantics; below, I also adopt this idea. Perhaps an alternative would be to reconceptualize Elbourne's rule not as a conversion rule for the metalanguage but rather as a rule of the semantics of the object language, which allows us to turn one denotation into a different (but related) one, akin to type-shifting rules. I won't pursue this idea here.

[100]Cf. the similar domain restriction in the "pedantic" version of Heim and Kratzer's rule for Predicate Abstraction (Heim and Kratzer 1998, p. 125), which (I think) serves the same purpose: ensuring that the denotation is a total function.

taken to be total functions from situations to the three values 1 (true), 0 (false), and # (neither true nor false) rather than partial functions from situations to 1 or 0. These two ways of modelling truth-value gaps are very closely related.[101] To model how definite descriptions lead to such truth-value gaps, I assume that there is an "extraneous object" (Blamey 2002, p. 269), which we may call $\#_e$, of which 'everything' is neither true nor false.[102] This extraneous object is used in the interpretation of ι-terms: the term $\ulcorner \iota x \phi(x) \urcorner$, rather than being undefined if there is not exactly one x that is ϕ, is assumed to denote $\#_e$. As before, if there is exactly one x that is ϕ, $\ulcorner \iota x \phi(x) \urcorner$ denotes that thing.[103]

Definite descriptions are interpreted as before, except that we no longer need the domain restriction. The binder ς is interpreted as before, also without domain restriction.

(73) $[\![\text{the}]\!]^g = \lambda f_{\langle e,st \rangle}.\lambda s.\iota x f(x)(s)$

(74) $[\![\varsigma_i \alpha]\!]^g = \lambda s.[\![\alpha]\!]^{g[s/i]}(s)$

On this view, the definite 'the cat' always receives the following interpretation, relative to any assignment function g:

(75) $[\![[\text{the cat}]\ s_i]\!]^g = \iota x \textsc{cat}(x)(g(i))$

If g assigns to i a situation in which there is more than one cat, then the definite description 'the cat' denotes the extraneous object $\#_e$; if the situation contains exactly one cat, then the definite description denotes that one cat. Accordingly, the sentence (76a) is now interpreted as in (76b):

(76) a. The cat s_i is hungry.
b. $[\![(76a)]\!]^g = \lambda s.\textsc{hungry}(\iota x \textsc{cat}(x)(g(s)))(s)$

Let's assume that a sentence $\ulcorner \textsc{hungry}(t)(s) \urcorner$ is #, that is, neither true nor false, if the term t denotes the extraneous object $\#_e$. Then we predict that if there is not

[101] See e.g. Blamey 2002 for discussion.

[102] The 'everything' has to be taken with a pinch of salt. The idea is that e.g. any metalanguage expression $\ulcorner Pt \urcorner$ is # (neither true nor false) if P is of type $\langle e,t \rangle$ and the term t denotes $\#_e$, and so on, for other expressions of a type that ends in t.

[103] See Coppock 2014, pp. 117–8, also for further references.

exactly one cat at the situation $g(i)$, the proposition denoted by (76a) is neither true nor false at any situation.

This is very similar to, but not entirely the same as Elbourne's prediction. Above we saw that Elbourne predicts that if there is not exactly one cat at $g(i)$, the sentence doesn't even denote a proposition, since the definite description fails to have a denotation. On both views, the sentence is neither true or false in such a case. It's not clear to me whether the remaining difference between the two views matters much, and so I won't dwell on it here.[104]

If the definite description's situation variable is bound as in (77), the sentence is now interpreted as in (78):

(77) $[\varsigma_i$ [[The cat s_i] is hungry]]

(78) $[\![(77)]\!]^g = \lambda s.\textsc{hungry}(\iota x\textsc{cat}(x)(s))(s)$

The denoted proposition is a total function from situations to truth values. The proposition is neither true nor false (i.e. #) at s just in case there is not exactly one cat in s, since in this case, the term '$\iota x\textsc{cat}(x)(s)$' denotes the extraneous object $\#_e$; if there is exactly one cat in s, the proposition is true at s just in case the cat in s is hungry at s, and it is false otherwise. Thus, we arrive at the same prediction that Elbourne makes for this sentence, but without relying on Elbourne's λ-conversion rule.

Whether the situation variable is free or bound, the existence and uniqueness presupposition of the definite description leads to a truth-value gap. When the situation variable is free, the presupposition has to be satisfied at a situation provided by the assignment function. When the situation variable is bound, the presupposition has to be satisfied at the situation where the proposition is evaluated. Either way, that situation may be smaller then the whole world, and so the

[104] If one wants to draw a distinction between different kinds of truth-value gaps, expressive gaps (where no proposition is expressed) and non-expressive gaps (where a proposition is expressed, albeit one that is not always true or false), the difference between the two views becomes relevant. But note that on Elbourne's view, there are gaps of either kind, and so if one were open to the possibility of expressive gaps but rejected the possibility of non-expressive gaps, Elbourne's view would not obviously be preferable.

presupposition may be true even if the world as a whole contains millions of cats. This concludes my initial sketch of how one can implement the idea that definite descriptions are implicitly restricted to a situation. The view follows Elbourne (2013) in assuming that definite descriptions denote individuals, that they contain an unpronounced situation variable, and come with an existence and uniqueness presupposition that has to be true at the situation assigned to the situation variable. It differs from Elbourne's view in that truth-value gaps are modelled with a trivalent metalanguage rather than with domain restrictions. By using a trivalent metalanguage, we can avoid the need for Elbourne's λ-conversion rule or a similar mechanism.[105]

4.2.3 Interlude on the Metalanguage

In this section, I provide a somewhat more comprehensive description of the metalanguage that I assume.

The following is based on Beaver and Krahmer (2001, pp. 156–7), with some modifications. The main differences are (i) the addition of ι-terms, as suggested by Coppock (2014, pp. 117–8), (ii) the addition of what I call a restricted quantifier, and (iii) that the semantics is based on the so-called weak Kleene logic rather than the strong Kleene logic. Roughly speaking, in a weak Kleene logic, truth-value gaps always project: If any sentence embedded in a complex sentence is neither true nor false, then the whole sentence is neither true nor false.[106] In comparison with unrestricted quantifiers, restricted quantifiers have a restricted domain throughout which the scope of the quantifier has to be true or false in order for the quantified statement to be true or false.[107]

[105]See Coppock 2014, p. 118

[106]See Kleene 1952 on the trivalent strong and weak Kleene logics; as Beaver and Krahmer (2001, p. 155) point out, the weak Kleene connectives could be defined in terms of strong Kleene connectives.

[107]A restricted existential quantifier will be used later in the interpretation of an unpronounced quantifier that is assumed to be part of the object language and which helps remove truth-value gaps under certain conditions; it is, so to speak, a "*presupposition wipe-out device*" (Beaver and

It may be worth noting that Beaver and Krahmer (2001) suggest interpreting English expressions by translating them into the formal language, which is in turn interpreted. On the view sketched above, English expressions are not translated into a formal language; they are interpreted directly, and the interpretation is given in the formal metalanguage.

Types. (see Beaver and Krahmer 2001, p. 156) The expressions of the metalanguage have semantic types. The types are defined as follows.

1. e, s, and t are primitive types.
2. If a and b are types, then $\langle a, b\rangle$ is a type.
3. Nothing else is a type.

Vocabulary. (see Beaver and Krahmer 2001, p. 156) For every type a, there is a set Con_a of constants of type a and a set Var_a of variables of type a.[108]

Syntax. (see Beaver and Krahmer 2001, p. 156)

1. If ϕ and ψ are expressions of type t, then $\ulcorner(\phi \wedge \psi)\urcorner$ and $\ulcorner\neg\phi\urcorner$ are expressions of type t.
2. If ϕ is an expression of type t, x is a variable of type e or s, then $\ulcorner\forall x\phi\urcorner$ is an expression of type t.
3. If α is an expression of type $\langle a, b\rangle$ and β is an expression of type a, then $\ulcorner(\alpha\beta)\urcorner$ is an expression of type b.[109]

Krahmer 2001, p. 167). The theory I suggest is therefore structurally somewhat similar to Beaver and Krahmer's Floating A Theory of presupposition projection, which is also based on a weak Kleene logic and uses a (different) presupposition wipe-out device that allows the removal of truth-value gaps under certain conditions (Beaver and Krahmer 2001, pp. 166–71).

[108] As variables of type e, I usually use 'x', 'y', 'z', 'x_1', etc. As variables of type s, I usually use 's', 's_1', etc. The expression 'HUNGRY' is a constant of type $\langle e, \langle s, t\rangle\rangle$, and so on.

[109] I sometimes omit brackets or use them differently (e.g. I write 'HUNGRY(x)(s)' instead of '((HUNGRY x) s)').

4. If α is an expression of type b and x is a variable of type a, then $\ulcorner \lambda x.\alpha \urcorner$ is an expression of type $\langle a, b\rangle$.
5. If α and β are of type e, then $\ulcorner \alpha = \beta \urcorner$ is an expression of type t, and if α and β are of type s, then $\ulcorner \alpha = \beta \urcorner$ is an expression of type t.
6. If ϕ is an expression of type t, and x a variable of type e, then $\ulcorner \iota x \phi \urcorner$ is an expression of type e.
7. Nothing else is an expression.

Semantics. (see Beaver and Krahmer 2001, pp. 156–7; but whereas the semantics provided there "follows the strong Kleene pattern" (p. 157), the one provided below follows the weak Kleene pattern; moreover, their language does not have ι-terms or an extraneous object.)

A model $M = \langle D, I\rangle$ consists of a sequence D of domains, with a domain D_a for every type a. The domain D_e is a non-empty set of individuals, including an extraneous object $\#_e$. The domain D_s is a non-empty set of situations. The domain D_t of truth values is $\{1, 0, \#\}$. For all types a and b, the domain $D_{\langle a,b\rangle}$ is the set of all functions from D_a to D_b. The interpretation function I assigns to each constant c of type a an element of D_a. The interpretation function has to ensure that 'nothing is true or false of $\#_e$'. For example, for any constant P of type $\langle e, \langle s, t\rangle\rangle$, and $d \in D_s$, $I(P)(\#_e)(d) = \#$. More generally, the interpretation of any constant c of a type which 'includes' type e and 'ends in' type t, is always # if $\#_e$ serves as argument of an e-position: $I(c)(\#_e) = \#$ if c is of type $\langle e, t\rangle$; if c is of type $\langle e, \langle s, \langle s, t\rangle\rangle\rangle$, then $I(c)(\#_e)(d_1)(d_2) = \#$, for any $d_1 \in D_s$ and $d_2 \in D_s$; and so on. A variable assignment is a function that assigns to every variable of type a an element of D_a. If g is a variable assignment, x is a variable of type a and d is an element of D_a, then $g[d/x]$ is like g except that it assigns d to x.

The interpretation of an expression α relative to a model $M = \langle D, I\rangle$ and assignment function g, $|\alpha|^{M,g}$, is then defined as follows:

1. If $\alpha \in \mathrm{Con}_a$, $|\alpha|^{M,g} = I(\alpha)$.

2. If $\alpha \in \mathrm{Var}_a$, $|\alpha|^{M,g} = g(\alpha)$.

3. If α is an expression of type t, $|\ulcorner\neg\alpha\urcorner|^{M,g} = \#$ iff $|\alpha|^{M,g} = \#$, $|\ulcorner\neg\alpha\urcorner|^{M,g} = 1$ iff $|\alpha|^{M,g} = 0$, and $|\neg\alpha|^{M,g} = 0$ iff $|\alpha|^{M,g} = 1$.

4. If α and β are expressions of type t, $|\ulcorner(\alpha \wedge \beta)\urcorner|^{M,g} = \#$ iff $|\alpha^{M,g}| = \#$ or $|\beta|^{M,g} = \#$, $|\ulcorner(\alpha \wedge \beta)\urcorner|^{M,g} = 1$ iff $|\alpha|^{M,g} = 1$ and $|\beta|^{M,g} = 1$, and $|\ulcorner(\alpha \wedge \beta)\urcorner|^{M,g} = 0$ iff $|\alpha|^{M,g} = 0$ or $|\beta|^{M,g} = 0$.

5. If α is an expression of type t, and x a variable of a type a (either type e or type s), $|\ulcorner\forall x\alpha\urcorner|^{M,g} = \#$ iff $|\alpha|^{M,g[d/x]} = \#$ for some $d \in D_a$, $|\ulcorner\forall x\alpha\urcorner|^{M,g} = 1$ iff $|\alpha|^{M,g[d/x]} = 1$ for all $d \in D_a$, and $|\ulcorner\forall x\alpha\urcorner|^{M,g} = 0$ otherwise.

6. If α is an expression of some type $\langle a, b\rangle$ and β is an expression of type a, then $|\ulcorner(\alpha\beta)\urcorner|^{M,g} = |\alpha|^{M,g}(|\beta|^{M,g})$.

7. For any expression α of some type b and variable x of type a, $|\ulcorner\lambda x.\alpha\urcorner|^{M,g} =$ the function f with domain D_a which assigns $|\alpha|^{M,g[d/x]}$ to any $d \in D_a$.

8. If α and β are expressions of type e, $|\ulcorner\alpha = \beta\urcorner|^{M,g} = \#$ iff $|\alpha|^{M,g} = \#_e$ or $|\beta|^{M,g} = \#_e$; if $|\ulcorner\alpha = \beta\urcorner|^{M,g} \neq \#$, then $|\ulcorner\alpha = \beta\urcorner|^{M,g} = 1$ iff $|\alpha|^{M,g} = |\beta|^{M,g}$, and $|\ulcorner\alpha = \beta\urcorner|^{M,g} = 0$ otherwise.

9. If α is an expression of type t and x a variable of type e, $|\ulcorner\iota x\alpha\urcorner|^{M,g} = \#_e$ iff there is not exactly one $d \in D_e$ such that $|\alpha|^{M,g[d/x]} = 1$, and if $|\ulcorner\iota x\alpha\urcorner|^{M,g} \neq \#_e$, then $|\ulcorner\iota x\alpha\urcorner|^{M,g} = d$ iff $|\alpha|^{M,g[d/x]} = 1$. (see Coppock 2014, p. 118)

Further expressions may be introduced by definition. In particular, for any expressions α and β of type t, $\ulcorner(\alpha \vee \beta)\urcorner$ is defined as $\ulcorner\neg(\neg\alpha \wedge \neg\beta)\urcorner$; $\ulcorner(\alpha \to \beta)\urcorner$ is defined as $\ulcorner(\neg\alpha \vee \beta)\urcorner$. For any expression ϕ of type t and variable x of type a, $\ulcorner\exists x\phi\urcorner$ is defined as $\ulcorner\neg\forall x\neg\phi\urcorner$. It follows that $|\ulcorner(\alpha \vee \beta)\urcorner|^{M,g} = \#$ and $|\ulcorner(\alpha \to$

$\beta)^\urcorner|^{M,g} = \#$ iff $|\alpha|^{M,g} = \#$ or $|\beta|^{M,g} = \#$, and that $|^\ulcorner\exists x\alpha^\urcorner|^{M,g} = \#$ iff $|\alpha|^{M,g[d/x]} = \#$ for some $d \in D_a$.

In addition, I will introduce a *restricted existential quantifier*, since this will be useful later. For any expressions α and β of type t and variable x of type a, let $^\ulcorner\exists x : \alpha.\beta^\urcorner$ be an expression of type t, interpreted as follows: $|^\ulcorner\exists x : \alpha.\beta^\urcorner|^{M,g} = \#$ iff $|\beta|^{M,g[d/x]} = \#$ for some $d \in D_a$ such that $|\alpha|^{M,g[d/x]} = 1$; if $|^\ulcorner\exists x : \alpha.\beta^\urcorner|^{M,g} \neq \#$, then $|^\ulcorner\exists x : \alpha.\beta^\urcorner|^{M,g} = 1$ iff $|\beta|^{M,g[d/x]} = 1$ for some $d \in D_a$ such that $|\alpha|^{M,g[d/x]} = 1$, and $|^\ulcorner\exists x : \alpha.\beta^\urcorner|^{M,g} = 0$ otherwise. For any expressions α and β of type t and variable x of type a, $^\ulcorner\forall x : \alpha.\beta^\urcorner$ may be defined as $^\ulcorner\neg\exists x : \alpha.\neg\beta^\urcorner$. It follows that $|^\ulcorner\forall x : \alpha.\beta^\urcorner|^{M,g} = \#$ iff $|\beta|^{M,g[d/x]} = \#$ for some $d \in D_a$ such that $|\alpha|^{M,g[d/x]} = 1$.[110]

This concludes the interlude on the metalanguage.[111]

4.3 Indefinite-Definite Sequences

4.3.1 Introduction

On the view just sketched, definite descriptions contain an unpronounced situation variable and trigger an existence and uniqueness presupposition that has to be true at the situation assigned to this variable. The idea is that the implicit restriction to a situation helps explain why in various cases, the presupposition can be true even though there is more than one individual that satisfies the definite description's explicit restriction.

(79) The cat is hungry.

There may be millions of cats in our world, but as long as the situation assigned

[110] Restricted quantifiers could also be defined in terms of non-restricted quantifiers, for example as follows. For any expression α of type t, let $|^\ulcorner A\alpha^\urcorner|^{M,g} = 1$ iff $|\alpha|^{M,g} = 1$, and $|^\ulcorner A\alpha^\urcorner|^{M,g} = 0$ otherwise (see Beaver and Krahmer 2001, 152, definition 8), and let $|^\ulcorner U\alpha^\urcorner|^{M,g} = 1$ iff $|\alpha|^{M,g} = \#$, and $|^\ulcorner U\alpha^\urcorner|^{M,g} = 0$ otherwise. Moreover, for any expression α of type t, let $^\ulcorner\delta\alpha^\urcorner$ also be an expression of type t, which is true just in case α is true, and is # otherwise (see the presupposition operator of Beaver and Krahmer 2001, p. 151, see also section 6.2.3 below). Then a restricted quantifier $^\ulcorner\exists x : \alpha.\beta^\urcorner$ could be defined as $^\ulcorner\exists x(A\alpha \wedge A\beta) \wedge \delta\neg\exists x(A\alpha \wedge U\alpha)^\urcorner$.

[111] Many thanks to James Kirkpatrick for help with this section.

to the definite description 'the cat' contains only one cat, the presupposition of (79) is nonetheless true, and the sentence is predicted to be true or false. If, on the other hand, the speaker aims to describe a situation with no cats or more than one, the presupposition of (79) is false at that situation, and the sentence is predicted to be neither true nor false, which could explain why such a use of the sentence is inappropriate.

One challenge the view faces is to provide an account of more complicated sentences in which definite descriptions are used. This includes so-called *donkey sentences* such as the following:

(80) a. Every child who sees a cat runs away from the cat.
b. If a child sees a cat, the child feeds the cat.[112]

(80a) doesn't suggest that there is only one cat nor that every child who sees a a cat sees only one cat; similarly, (80b) doesn't suggest that if a child sees a cat, the child sees only one cat. To explain why there is no uniqueness implication in cases like these, situation semanticists like Elbourne (2013) appeal to minimal situations. In the case of (80a), for example, the idea is that the sentence involves not just quantification over individuals but also over minimal situations; roughly, (80a) is argued to be true just in case every individual x is such that every minimal situation s in which x is a child who sees a cat is part of a larger situation where x runs away from the cat in s. Minimal situations in which a child sees a cat contain only one cat, and so the presupposition of 'the cat' is true at all the situations quantified over, even if some of these minimal situations are part of larger situations in which the child sees more than one cat. This explains why (80a) as a whole does not imply that there is only one cat or that every child sees at most one cat.[113]

Here, I don't want to discuss how successful this strategy for examples like

[112]For examples like these, involving donkeys, see e.g. Geach 1962, chapter 5.

[113]For strategies along these lines, see e.g. Heim 1990a; Büring 2004; Elbourne 2005; Elbourne 2013; see also Berman 1987, Percus 2000. For discussion of some complications, see e.g. Zweig 2006.

(80a) and (80b) is. Instead, I want to consider a different type of example where, it has been argued, there is also no obvious uniqueness presupposition, namely *indefinite-definite sequences* such as (81):

(81) There is a cat. The cat is hungry.[114]

Here, the definite description 'the cat' in the second sentence is an anaphor, with the indefinite 'a cat' in the first sentence as its antecedent. There are good reasons to think that the sequence as a whole doesn't entail, let alone presuppose, that there is exactly one cat, in spite of the definite description in the second sentence. Instead, the sequence appears to be true more or less just in case there is some cat that is hungry.[115]

This is a serious challenge for the situation semantic account of definites. The view as laid out predicts that the second sentence of (81) has a uniqueness presupposition. It is unclear why that uniqueness presupposition should disappear in a case like (81) and how the situation semanticist should account for this. In a donkey sentence such as (80a), the definite description 'the cat' is in the scope of a quantifier ('every'), and 'a cat' is in the restrictor of that same quantifier. This constellation is the basis for the situation semantic explanation of why the uniqueness presupposition seems to disapppear in such cases. But in the sequential case (81), the definite description is not even in the same sentence as the indefinite 'a cat', and so it is not clear how the situation semanticist could explain how the uniqueness presupposition triggered in the second sentence can

[114]Geach (1962, pp. 152–54) already discusses a similar sequence (with a pronoun), suggesting that the definite in that sequence does not refer; arguments in the same direction are made in Heim 1982, pp. 24–28; I will discuss some more recent literature further below.

[115]More cautiously, one might say that there are good reasons to think that this sequence has a reading on which it doesn't entail that there is exactly one cat. If there is also a reading on which it entails that there is exactly one cat, a theory of definites should account for both readings. The semantics sketched above in section 4.2.2 would have no obvious problem predicting a reading that entails uniqueness. To the contrary, if there were no uniqueness-entailing reading, this could turn out to be a problem if such a reading is predicted to exist. I put this issue aside, since my focus here is on the issue of how the view could predict a reading that doesn't entail or presuppose uniqueness.

disappear because of an indefinite in another sentence.[116]

Compared with anaphora in donkey sentences, anaphora in intersentential sequences have so far been rather neglected by situation semantic theories that try to provide an alternative to dynamic semantic accounts such as Heim's (1982).[117] Portner (1992) discusses intersentential anaphora in a situation semantic framework, but his account of these anaphora is essentially a situation semantic version of Heim's (1982) theory and thus a dynamic semantic account.[118] Barwise and Perry (1983) briefly discuss anaphoric pronouns in conjunctions such as 'Joe admires Sarah and she admires him' (p. 137), which are similar to intersentential cases, but their account of these conjunctions, to the extent that I understand it, also seems to me to be a kind of dynamic semantics.[119]

[116]The challenge such sequences therefore present for situation semantic accounts of definites has been highlighted recently by Mandelkern and Rothschild (2020) and K. Lewis (2021). A critical remark along these lines can also be found in Hawthorne and Manley 2012, 169–70, footnote 44.

[117]As e.g. K. Lewis (2021) points out. See e.g. Heim 1990a, Büring 2004, Elbourne 2013; Elbourne (2005) briefly mentions sequences with pronouns (pp. 15, 25) and definite descriptions (p. 81) but doesn't discuss them in detail; Heim (1990a, p. 139) provides one sequence of two sentences as an example (with an indefinite in the first sentence and a pronoun in the second, both indefinite and pronoun being in the scope of a quantifier), but does not discuss it in detail.

[118]See Portner 1992, pp. 66–73. On Portner's view, a conversational context is a set of tuples of an assignment function and a situation (p. 68). That there are situations in the context set is a feature that the view I develop shares; but context sets, on my view, do not contain assignment functions (though see sections 5.5 and 5.6, where I suggest and discuss the use of assignment functions to model shifts of the topic situation).

[119]On their view, the denotation of a pronoun is an individual (p. 133), provided by a parameter that they call the "speaker connections" (p. 127, see also p. 125). The semantics of conjunction shifts the speaker connections in such a way that expressions in the first conjunct can act as antecedent of a pronoun in the second conjunct (but not the other way around); see pp. 137-38, 315-16. It is not entirely clear to me whether Barwise and Perry 1983 acknowledge fully the problem intersentential anaphora raise; when discussing the conjunction 'Jonny owns a dog and he loves it' (p. 140), they write: "[...] such *NP*'s [as 'a dog' in the example, acting as antecedent for 'it'] show how hopeless it would be to try in general to divide a statement involving conjoined sentences apart into two separate statements involving the individual conjuncts. For any utterance of the sentence 'he loves it' must have the speaker referring to some particular individual with 'it'." (ibid., formattting changed) Though I agree that there is a sense in which the second conjunct, as used in the conjunction, can only be understood correctly if one takes into account the first conjunct, I think that the same is true for the sequence 'Jonny owns a dog. He loves it.' Here, too, 'it' may be anaphorically related to 'a dog,' rather than referring to some particular individual. Perhaps it's worth noting that, on pp. 281-84, Barwise and Perry connect anaphoric relationships to what they call 'formal individuals' (also 'indeterminates' (p. 72) or 'roles' (ibid.)). These are abstract objects that can be 'anchored' to non-abstract objects (see pp. 71-2). Barwise and Perry write that there may be a connection to Kamp's discourse representation theory, which is another kind of dynamic theory. (Perhaps their formal individuals are akin to discourse referents.) It is not entirely clear to me how these remarks are related to what Barwise and Perry say

F. Schwarz (2009), in his theory of definites in German, discusses indefinite-definite sequences in German, and suggests accounting for them by supplementing the situation semantics of definites with a dynamic semantics.[120] These approaches therefore don't really help those who want to defend static semantics against dynamic semantics and want to do so by making use of situations. One of the strengths of dynamic semantics is accounting for discourse phenomena that reach beyond the limits of the sentence. It is therefore important to explore how situation semantics could deal with intersentential phenomena, in order to get a better grasp of whether situation semantics can remain non-dynamic in the face of such sequences, or whether only a dynamic version of situation semantics (such as Portner's) has a chance of success.

In the following sections, I discuss some reasons for thinking that a sequence like (81) as a whole does not inherit the presupposition of the definite description. I also consider some strategies situation semanticists might appeal to in order to explain (away) this phenomenon and I argue against these strategies. In section 4.4, I turn to the role contexts built out of situations could play to account for intersentential anaphora.

4.3.2 Presupposition Filtering Across Sentences

Whether uniqueness implications disappear in indefinite-definite sequences has been a matter of some controversy. I won't try to provide a comprehensive discussion of the literature, but I want to look at some arguments in order to motivate the view that an indefinite claim can indeed 'filter' a uniqueness presupposition of a definite description in a subsequent sentence.

As pointed out in section 2.2, one feature of presuppositions is their prag-

about pronouns in conjunctions.

[120] Roughly, Schwarz suggests that what he calls the strong definite article has an additional slot for an individual variable that is interpreted like definites are interpreted in dynamic semantics, as picking up a familiar discourse referent that was introduced e.g. by an indefinite (see F. Schwarz 2009, chapter 6; see also sections 5.6 and 7 further below on discourse referents).

matic status. Asserting something that presupposes p is often strange if p hasn't already been accepted in the conversation. This provides an indicator for what indefinite-definite sequences (don't) presuppose. Compare utterances of (82) and (83):

(82) The cat is hungry.
(83) There is a cat. The cat is hungry.

Suppose that the speaker aims to describe a situation that contains exactly one cat, but assume that the audience isn't yet aware that there is exactly one cat in that situation. In this case, an utterance of (82) is rather odd, but an utterance of (83) is perfectly fine. That (82) is odd can be explained with the assumption that presuppositions normally need to be already accepted in a conversation. (82) presupposes that there is exactly one cat, but the audience isn't yet aware of that, and so the utterance is infelicitous. If (83) also presupposed that there is exactly or at most one cat, we would expect the utterance to be infelicitous as well. However, it isn't infelicitous. At least one explanation is that (83) simply doesn't presuppose that there is a cat and that there is at most one cat. The first sentence seems to filter the existence and uniqueness presupposition triggered by the definite description in the second sentence.[121]

Sometimes, indefinite-definite sequences do seem to suggest uniqueness. Consider for example the following dialogue:

[121] This test is related to the so-called *Hey, wait a minute*-test for presuppositions (von Fintel 2004). In response to (82), a member of the audience could felicitously respond with something like: 'Hey, wait a minute. I didn't know there was a cat there.', which would be a strange response to (83). This is some evidence that (82) presupposes that there is a cat, but (83) doesn't. What about the uniqueness presupposition? My impression is that the presence of a uniqueness presupposition is more difficult to test with the *Hey, wait a minute*-test, perhaps because uniqueness presuppositions are often more readily accommodated than existence presuppositions. But consider the following example. Imagine that the speaker went to a cat café earlier that day and now describes the experience to a friend: (a) 'I went to a cat café today. The cat was really cute.' or (b) 'I went to a cat café today. There was a cat. The cat was really cute.' It seems to me that in response to (a), the friend could ask 'Hey, wait a minute. There was only one cat at the café?', whereas to me this reaction seems less felicitous as a response to (b), which would provide some evidence that (a) does and (b) doesn't presuppose that there was at most one cat at the cat café. Since (I assume) there are usually many cats at cat cafés, the presence of a cat isn't surprising, but if there had been only one cat at the café, that would be surprising.

(84) A: Do any of your friends have a cat?
B: John has a cat. The cat has blue eyes.

It is quite natural to take B to imply that John has exactly one cat.[122] But B can quite easily avoid giving this impression, for instance as follows:

(85) A: Do any of your friends have a cat?
B: John has a cat. The cat has blue eyes. John may even have more than one cat, but I'm not sure.

In this case, B no longer suggests that John has exactly one cat. The implication that John has only one cat has disappeared, but the use of the definite description 'the cat' is still felicitous.

Relatedly, it seems that an indefinite-definite sequence like (86) can be used to describe a situation in which there is more than one cat.

(86) There's a cat. The cat is hungry.

This is suggested by continuations such as the following:

(87) There's a cat. The cat is hungry. The cat is playing with another cat.[123]

The continuation is felicitous and it seems that an utterance of the sequence could be true. But if the sequence describes one situation, that situation has to contain at least two cats in order for the description to be true. Continuations like this also suggest that the sequence (86) can truly describe a situation with more than one cat, in spite of the definite description's uniqueness presupposition.

Before I move on, I want to say a word about the terminology I used. Above,

[122] Similar judgements can be found e.g. in Evans (1977, pp. 507–9) and Kadmon (2001, p. 87). Evans discusses anaphoric pronouns in conjunctions such as 'Socrates owned a dog and it bit Socrates' rather than anaphoric definite descriptions in sequences, but these are very similar. Heim (1982, pp. 24–8) critically discusses Evan's view and concludes that there isn't "any systematic validity [...] to Evan's predictions concerning uniqueness implications" (p. 27). Ludlow (1994, pp. 174–75), who defends an event semantic account of definites, briefly discusses an indefinite-definite sequence and also agrees with Kadmon's judgment.

[123] See this example by Szabó (2000, p. 46): 'A dog was limping in the park. The dog was limping because it got in a fight with another dog. They apparently bit each other: the other dog was also limping in the park.' See also K. Lewis 2021, section 2.2.1, on continuations of indefinite-definite sequences: 'a. A student came to Fred's office hours. b. She/the student asked some questions about the upcoming assignment. [...] c. In fact, she/the student was one of many students to come to Fred's office hours today with questions about the assignment.'

I said that in a sequence such as (88), the first sentence 'filters' the presupposition of the second sentence.

(88) There's a cat. The cat is hungry.

Presupposition projection and filtering concern how the presuppositions of a complex expression depend on the presuppositions of its parts.[124] If a sentence that presupposes p is embedded in a more complex sentence, and the complex sentence also presupposes p, then the presupposition is said to project; if the complex sentence doesn't inherit the presupposition of the embedded sentence, the presupposition is filtered.

(89) a. It was Jane who bought ice cream.
b. If it was Jane who bought ice cream, John should buy biscuits.
c. If someone bought ice cream, it was Jane who bought it.

For example, (89a) presupposes that someone bought ice cream, and this presupposition projects when (89a) serves as antecedent of a conditional, as in (89b); the presupposition does not project (or, is filtered) if (89a) is embedded in a conditional whose antecedent entails what is presupposed by the consequent, as in (89c). This pattern is typical for presuppositions and helps distinguish them from non-presuppositional implications:

(90) a. Jane bought ice cream.
b. If Jane bought ice cream, John should buy biscuits.
c. If someone bought ice cream, Jane should buy ice cream.

(90a) entails that someone bought ice cream but doesn't presuppose it. If (90a) serves as antecedent of the conditional (90b), the conditional as a whole does not suggest that someone bought ice cream: the non-presuppositional entailment does not project onto the conditional. Providing an account of the peculiar projection pattern of presuppositions is known as the *projection problem* for pre-

[124]For examples of various expressions that trigger presuppositions and a brief overview of the phenomenon of presupposition projection, see e.g. Potts 2015, pp. 170–73; see also Beaver, Geurts, and Denlinger 2021 and Heim 2002.

suppositions, and looking at projection patterns often serves as test for whether something a sentence implicates is a presupposition or not.

In this connection, projection and filtering are often understood as a sentence-internal affair. For example, Langendoen and Savin (1971), who coined the term 'projection problem for presuppositions', wrote: "We are concerned [...] with the question of how the presupposition and assertion of a complex sentence are related to the presuppositions and assertions of the clauses it contains." (p. 55) Since a sequence of sentences is not a complex sentence, the issue of what a sequence of sentences presupposses falls outside the scope of their investigation.[125] And Karttunen (1973), who introduced the notion of a presupposition filter, took filters to be "predicates which, under certain conditions, cancel some of the presuppositions of the complement" (p. 174). For Karttunen, predicates in this context include e.g. connectives such as 'and', 'if __, then __', and 'or': expressions which have sentential complements.[126] In a sequence of two sentences, the second sentence is not a syntactic complement of the first sentence, and so the first sentence is not in Karttunen's sense a filter for presuppositions of the second sentence.

But the notions of projection and filtering could also be understood more

[125]Katz and Fodor (1963) introduce the term 'projection problem' in connection with the problem of providing a compositional semantics: "Since a fluent speaker is able to use and understand any sentence drawn from the INFINITE set of sentences of his language, and since, at any time, he has only encountered a FINITE set of sentences, it follows that the speaker's knowledge of his language takes the form of rules which project the finite set of sentences he has fortuitously encountered to the infinite set of sentences of the language. [...] The problem of formulating these rules we shall refer to as the projection problem. [...] we can expect that a system of rules which solves the projection problem must reflect the compositional character of the speaker's linguistic knowledge." (p. 171-72) They also introduce the notion of 'projection rules', as follows: "[...] rules which take account of semantic relations between morphemes and of the interaction between meaning and syntactic relations between morphemes and of the interaction between meaning and syntactic structure in determining the correct semantic interpretation for any of the infinitely many sentences which the grammar generates [...] (which we shall call 'projection rules') [...]. [...] the doctrine that the meaning of a sentence is a function of the meanings of its parts. The system of projection rules is just this function." (p. 183). Projection rules are thus rules which provide the meaning of a complex expression, given the meanings of its parts. Langendoen and Savin (1971) mention Katz and Fodor's paper, and so their use of the term 'projection' is plausibly based on Katz and Fodor's. (For an earlier, very similar use of the term 'projection', see also Fodor 1961.)

[126]See Karttunen 1973, p. 176

broadly, so as to include sequences. We can ask under what conditions a sequence of sentences inherits a presupposition triggered somewhere in the sequence. Somewhat loosely speaking, we could say that in a sequence of sentences, a sentence that is part of the sequence is a complement of the remainder of the sequence: in a sequence $S_1, \ldots, S_{n-1}, S_n, S_{n+1}, \ldots, S_m$, the sentence S_n is a complement of the remainder $S_1, \ldots, S_{n-1}, \_\_, S_{n+1}, \ldots, S_m$. And we could say that a presupposition p of S_n projects onto the sequence $S_1, \ldots, S_{n-1}, S_n, S_{n+1}, \ldots, S_m$ if the whole sequence presupposes p, and that $S_1, \ldots, S_{n-1}, \_\_, S_{n+1}, \ldots, S_m$ filters the presupposition p of S_n if the whole sequence $S_1, \ldots, S_{n-1}, S_n, S_{n+1}, \ldots, S_m$ does not presuppose p.[127] Understood along these lines, we can say that in a case like (91), the presupposition of the second sentence, that there is exactly one cat, does not project onto the whole sequence.

(91) There's a cat. The cat is hungry.

Projection patterns serve as test for presuppositions, but this projection test cannot easily be extended to the case of sequences. A sequence consisting of more than one sentence can't really be embedded in a more complex sentence, and so it is difficult to use the projection test to determine what a whole sequence does or doesn't presuppose. But there are ways to embed sequences in non-assertoric environments, which provides a useful heuristic. Here is an example:

(92) a. Let's imagine this: It was Jane who bought ice cream. In that case, John should buy biscuits.
b. It was Jane who bought ice cream.

It seems to me that (92a), just like (92b), implicates that someone did buy ice cream, even though as part of (92a), (92b) isn't asserted. Presuppositions thus seem to project out of the 'Let's imagine this: __' environment. If this is right, we could try to use it as test for other sequences:

[127]To be more precise, we might want to exclude for example cases where the whole sequence presupposes p however not because S_n presupposes p but because some other sentence in the sequence presupposes p. In such a case, the presupposition of S_n doesn't really project.

(93) a. Let's imagine this: John has a cat. The cat is hungry.
b. John has a cat. The cat is hungry.

To me it seems that (93a) doesn't suggest that John does in fact have a cat nor that John has at most one cat. (And it seems to me that with (93a), we're not asked to imagine that John has exactly one cat either.) If that's right, it is further evidence that (93b) does not presuppose that John has exactly one cat.

That presuppositions of a sentence can be filtered if the sentence is used as part of the right sequence is not specific to the presuppositions of definite descriptions.

(94) a. Saul quit smoking.
b. Saul used to smoke. He quit.
c. Saul wants to take up running. He quit smoking.

(95) a. Let's imagine this: Saul quit smoking.
b. Let's imagine this: Saul used to smoke. He quit.
c. Let's imagine this: Saul wants to take up running. He quit smoking.

Whereas (94a) in isolation presupposes that Saul used to smoke, the sequence (94b) as a whole doesn't. When embedded as in (95), (95a) still suggests that Saul used to smoke, whereas (95b) doesn't. The first sentence of (94b) entails what the second sentence presupposes. This is different in the case of (94c); here, the first sentence does not entail what the second presupposes, and the whole sequence inherits that presupposition. And when embedded as in (95c), the implication that Saul used to smoke survives. This is not an isolated case but appears to be a general pattern for presuppositions: the presupposition of a later sentence is filtered if an earlier sentence entails the presupposition; otherwise, the presupposition projects.[128]

[128]This is also the projection pattern often reported for conjunctions and for conditionals. For example, in the case of conditionals, a presupposition of the consequent is filtered just in case it is entailed by the antecedent. It should be noted that this generalisation is sometimes disputed in the following respect. On many accounts of presupposition projection, a conditional of the form *If* A, B_p (where p is what B presupposes) presupposes the material conditional $A \to p$. This is so whether or not A entails p. (If A entails p, then $A \to p$ is necessarily true. If the entailment is trivial, then *If* A, B_p only has a trivial presupposition.) But in many cases (e.g. 'If Saul wants to take up running, he will quit smoking') the conditional appears to have an unconditional

Now consider again the indefinite-definite sequence (96):

(96) There's a cat. The cat is hungry.

If this sequence as a whole does indeed not presuppose that there is exactly one cat, this is prima facie surprising. After all, the first sentence does not entail that there is exactly one cat; it merely entails that there is a cat, which is compatible with there being more than one. Therefore, one crucial challenge for an account of why the uniqueness presupposition can be filtered in such a sequence is to explain how this can be so even though the first sentence doesn't entail the uniqueness presupposition.[129]

In this section, we've seen some evidence that the presupposition triggered by a definite description in sequences like (93b) is filtered by the preceding indefinite statement. In the next sections, I consider some ways to explain (away) the evidence, and I provide some reasons why I don't find them convincing.

4.3.3 Against Conversational Implicatures

It's plausible to think that sometimes conversational implicatures contribute to the felicity of an utterance that has a presupposition.[130] Consider for instance the following example:

(97) A: Excuse me, do you know where I can get a pint around here this late?
B: There is a pub down the road. It'll stop serving drinks in half an hour.

B's utterance is felicitous, even though B's second sentence presupposes that the

presupposition (in this case, that Saul smokes). Explaining this discrepancy between prediction and intuition is the so-called *proviso problem*. Other theories of projection hold that if A doesn't entail p, then *If* A, B_p presupposes p (rather than $A \to p$); see e.g. Mandelkern 2016; Winter 2019 for some discussion. Similar issues arise for presuppositions in conjunctions and disjunctions. And in the case of sequences, one might wonder whether they, too, have conditional rather than unconditional presuppositions. For example, perhaps (94c) doesn't presuppose that Saul used to smoke but rather a weaker, conditional presupposition that if Saul wants to take up running, he used to smoke. I set this issue aside here, since I don't think that it is crucial for present purposes.

[129]That the filtering of the uniqueness presupposition is for this reason surprising from a more general point of view of how presupposition projection seems to work has been pointed out e.g. by Mandelkern and Rothschild 2020. I return to this point further below.

[130]The locus classicus on implicatures is Grice 1989.

pub is serving drinks. Part of what might explain the felicity is that with the first sentence, B conversationally implicates that the pub is serving drinks. This implicature may well contribute to the felicity of asserting that the pub will stop serving drinks soon.

If conversational implicatures sometimes contribute to the felicity of a subsequent assertion that has a presupposition, one might wonder whether the same is happening in cases such as (98):

(98) There is a cat. The cat is hungry.

The idea would be that by asserting the first sentence, the speaker conversationally implicates that there is only one cat, and that this implicature helps explain why asserting the second sentence sounds fine as well, in spite of its presupposition that there is exactly one cat.[131] It does seem true that often, a speaker who asserts that there is a cat thereby implicates that there is only one cat. However, I don't think that this observation is enough to explain what is going on in cases like (98). As was already noted in section 4.3.2, sequences such as (99) are felicitous, even though the speaker asserts that there is more than one cat:

(99) There is a cat. The cat is hungry. The cat is playing with another cat.

Overall, the speaker does not implicate that there is only one cat in such a case. Perhaps some might argue that the speaker, when asserting the first sentence, does implicate that there is only one cat and then cancels this implicature later on. But consider the following example:

(100) I'm not sure exactly how many cats there are here. But there *is* a cat. The cat is hungry.

To me, this sequence sounds fine. But in this case, the speaker first asserts that they don't know how many cats there are. It seems implausible to me to hold that the speaker then goes on to implicate that there is only one cat, when assert-

[131] Many thanks to Paul Elbourne for discussion of this point.

ing that there is a cat. I therefore don't think that this appeal to conversational implicatures, to explain why the use of the definite 'the cat' is felicitous in such sequences, is promising.[132]

4.3.4 Against Intentions

Some have suggested that in sequences such as (101), the speaker's intention could play an important role. Imagine that the speaker is describing a room in which there are two cats—let's call them Lucy and Toby—and imagine that both of them are hungry.

(101) There's a cat. The cat is hungry.

Perhaps the speaker has one of the two cats in mind when uttering (101), let's say Lucy, and intends to make a claim about Lucy. Perhaps this somehow explains why the speaker can use the definite description 'the cat' even though there are two cats.[133]

This suggestion could be implemented on the basis of the semantics for definite descriptions that was sketched in section 4.2.2. On that view, the definite description 'the cat' contains a situation variable, and (102) presupposes that

[132] A similar worry applies, I think, to the suggestion that the audience accommodates that there is only one cat, when the speaker utters (99). When a speaker makes an utterance that presupposes some claim *p* which wasn't already accepted in the conversation, the audience may decide to accept the presupposition; this process is known as (presupposition) accommodation. (The term goes back to D. Lewis 1979.) The audience may indeed sometimes accommodate the presupposition that there is only one cat if a speaker asserts something like (99), but this seems implausible to me in cases such as (100). If the speaker asserts that she isn't sure how many cats there are, why should the audience then be willing to accommodate that there is only one cat? Relatedly, I think that, generally, one should presuppose only what one knows. So if the speaker admits that she doesn't know how many cats there are and then goes on to presuppose that there is exactly one, that should generally strike us as odd. Consider e.g. the oddness of 'I don't know whether someone bought ice cream. It was Jane who bought ice cream.' or 'I don't know whether John used to smoke. John quit smoking last year.' The sequence (100) doesn't strike me as odd in a similar fashion. (The issue may be complicated by the fact that e.g. 'John quit smoking last year' entails that John used to smoke. If one were to argue that 'The cat is hungry' presupposes that there is exactly one cat but doesn't entail it, and if there were only a knowledge norm on assertion but not on presupposition, this could perhaps explain why 'I don't know whether John used to smoke. John quit smoking last year.' is stranger than (100). For reasons of space, I won't pursue this issue any further here.) Many thanks to Christian Nimtz for discussion.

[133] For a view that goes in this direction, see e.g. Stalnaker 1998.

there is exactly one cat at the situation assigned to this variable.

(102) The cat is hungry.

If the situation variable is free, the variable assignment has to assign a situation to it. Suppose that what situation is assigned depends on the mental state of the speaker: if the speaker of (102) has Lucy in mind, then a situation containing just Lucy is assigned to the variable. Since that situation contains just one cat, the presupposition of the sentence is true, and the sentence is true at a situation s just in case Lucy is hungry at s. So if the speaker is describing a situation s_r that contains the room with its inhabitants, including Lucy and Toby, the sentence (102) is true just in case Lucy is hungry at s_r.

K. Lewis (2013) has argued at length against appealing to the speaker's mental states to account for indefinite-definite sequences like (101).[134] First of all, Lewis argues that such sequences do not have the kind of readings the intentionalist approach predicts. Suppose that in the above example, only Toby is hungry, but Lucy isn't. On the intentionalist approach, the sentence (102), as uttered by the speaker, would in this case be false, since the sentence was predicted to be true just in case Lucy is hungry. However, intuitively, the speaker's assertion of the sequence (101) would be true rather than false, contrary to the prediction. There is after all a cat and the cat is hungry, it's just not the cat the speaker had in mind.[135] Secondly, Lewis argues that even though speakers may well sometimes have particular individuals in mind when they assert indefinite-definite sequences, they don't always do, and having someone in particular in mind doesn't seem to be required either. To illustrate this, consider the following case:

(103) *Context.* A knows that there are two cats in C's room, and she knows that both cats have blue eyes. She doesn't know anything else about the two

[134] See also K. Lewis (2021), section 2.1.3

[135] Lewis doesn't discuss this very example, but similar examples. See also Geach 1962, p. 154, for a similar argument against the idea that who the speaker has in mind determines the referent of the definite in an indefinite-definite sequence.

cats, she has never met them and she has never been in C's room. Asked to describe C's room, A says: *There's a cat in C's room. The cat has blue eyes. In fact, there are two cats in C's room and both have blue eyes.*

It seems to me that A's assertion is true and felicitous. But it's implausible to assume that A has a particular cat in mind when she makes her assertion. She has no way to distinguish between the two cats, since she has never met them and she merely knows that they both have blue eyes. Therefore, appealing to what A has in mind doesn't help singling out one of the two cats as referent for the definite description 'the cat'.[136]

In short, it is unclear whether the intentionalist strategy makes the right predictions about those cases where the speaker does have a particular individual in mind, and it also fails to account for those cases in which speakers don't have a particular individual in mind. Therefore, the intentionalist strategy doesn't seem promising.

4.3.5 Against Super- and Subvaluations

Consider again the case (103), in which A knows that there are two blue-eyed cats in C's room, and on this basis asserts:

(104) There is a cat in C's room. The cat has blue eyes.

Let's again call the two cats Lucy and Toby. One idea one might have is that A's utterance is felicitous in the scenario at hand because it makes no difference to

[136]For similar examples, see e.g. K. Lewis (2021), section 2.1.1. Lewis argues that even purely statistical evidence can be enough for a speaker to assert an indefinite-definite sequence and that the speaker has no particular individual in mind in such cases. (Some might worry though that purely statistical evidence doesn't put the speaker in a position to know the asserted content and so the speaker would at least violate a knowledge norm of assertion.) Szabó (2000, pp. 46–7) similarly argues that indefinite-definite sequences can be asserted "by someone who deduced" the relevant information "from circumstantial evidence" and has therefore no particular individual in mind. Even Hawthorne and Manley (2012), who argue that there is no substantial acquaintance constraint on singular reference or belief, accept that in cases such as the one discussed by Szabó (2000), the speaker has no way to distinguish between the relevant individuals under consideration and so doesn't plausibly have a particular one in mind; see Hawthorne and Manley 2012, p. 169. See also Neale (1990, p. 179), on non-referential uses of definites in indefinite-definite sequences.

the truth of the sequence whether 'the cat' refers to Lucy or to Toby. Since both cats are hungry, the second sentence will come out as true either way. This is why the speaker doesn't need to make up their mind which candidate referent they want to refer to, and so no intention to refer to Toby or intention to refer to Lucy is required—or so the thought might go.

A strategy along such lines has been suggested by Nirit Kadmon. Kadmon thinks that definites require uniqueness even when used in indefinite-definite sequences such as (104). But sometimes, the "generality" of the uniqueness implication can be "obscured" (Kadmon 2001, p. 85) by other factors, Kadmon thinks.[137] The idea is that, strictly speaking, the definite description in an indefinite-definite sequence requires uniqueness, but at least some speakers can use a definite even when there is more than one individual of the described kind as long as the "choice" of the individual "doesn't make a difference to the truth value" of the sentence under consideration. In that case, "the choice [...] is allowed to remain undetermined" (ibid.). Applied to (104), the idea would be that, even though the sequence strictly speaking has a false presupposition, some speakers nonetheless judge the sequence to be true, since the sequence would be true if we chose one of the two cats as referent, no matter which one.[138]

There are different ways in which one could develop this idea. One way would be to think of it as a supervaluationist strategy. Suppose that the topic situation s_t that the speaker of (104) aims to describe contains C's room with all its inhabitants, and nothing else. The topic situation thus contains both Lucy and Toby, and Lucy and Toby both have blue eyes at the topic situation. The situation s_t has smaller parts that only include one of the two cats. Let's call two such parts s_1 and s_2. The supervaluationist approach could then hold that even though 'The

[137] Kadmon's main examples in this passage use pronouns rather than definite descriptions but the discussion is meant to apply to other definite noun phrases as well.

[138] Kadmon (1987) also invokes this type of strategy to deal with so-called sage-plant sentences such as 'Every woman who bought a sage plant here bought eight others along with it'; see Heim 1990b, pp. 159–61, for discussion and criticism of this application; Heim attributes to Mats Rooth the observation that Kadmon's approach is "a kind of supervaluation treatment" (p. 160, fn. 11)

cat is hungry' expresses a proposition that is true or false of a situation s only if there is exactly one cat at s, the sentence 'The cat is hungry', used to make a claim about the topic situation s_t, is true just in case the proposition expressed is true at each of the relevant parts of s_t, in particular: at s_1 and at s_2. Since s_1 and s_2 each contain exactly one cat, they satisfy the uniqueness presupposition of the sentence; since both cats are hungry, the sentence is true if used to describe s_t.[139]

One challenge for the supervaluationist strategy is to spell out more precisely what the relevant parts of the topic situation are. One idea would be that we look for the largest parts of the topic situation that satisfy the presupposition of the sentence. In the case of Lucy and Toby, this would mean that we look for the largest situations that are part of C's room and contain one of the two cats but not the other. By design, those situations satisfy the definite's presupposition that there is exactly one cat.

As I see it, there are at least two problems with such a supervaluationist strategy. The first concerns cases where there are several candidate referents for a definite but the choice could make a difference to the truth or falsity of the sentence. Imagine again that A is describing C's room and knows that there is at least one cat in it, and perhaps more than one cat, and that at least one cat in the room has blue eyes. In fact, there are three cats in C's room, two with blue and one with green eyes. As before, A has never met the cats and doesn't know anything else about them; A asserts:

(105) There is a cat in C's room. The cat has blue eyes.

It seems to me that the utterance is true and felicitous even though A plausibly doesn't have a particular cat in mind. But now there are three candidate referents

[139]Thanks to Ofra Magidor for suggesting this way of developing the supervaluationist idea. Here I'm assuming that the situation variable of the definite 'the cat' is bound, but we could just as well assume that it is free and that the sentence 'The cat is hungry' is true just in case every proposition it expresses relative to one available assignment function is true at s_t, where one available assignment function assigns s_1 to the definite's situation variable and another available assignment assigns s_2 to the variable.

for the definite description ‘the cat’. If ‘the cat’ referred to one of the two blue-eyed cats, the second sentence of (105) would be true, but it would be false if ‘the cat’ referred to the green-eyed cat. Therefore, the choice of a referent would make a difference to the truth value, and so the supervaluationist evaluation strategy would not predict that the sentence, as uttered by A, may be judged true.[140]

Perhaps there is some way to argue that in this case, the green-eyed cat is in fact not a candidate referent for ‘the cat’, but I don’t see why it shouldn’t be. A different response would be to abandon the supervaluationist for a *subvaluationist* strategy. Instead of saying that the second sentence of (105) is true at a topic situation s_t if the proposition it expresses is true at *all* relevant parts of s_t, we could hold that it is true if the proposition expressed is true at *some* relevant part of s_t. Applied to the case of (105), we would have a better chance of predicting that the second sentence is true after all, since the topic situation does have parts in which there is exactly one cat and in which that cat has blue eyes, even though there are also parts in which there is exactly one cat and in which that cat doesn’t have blue eyes.[141]

The subvaluationist approach may be better than its supervaluationist cousin. However, there is a second worry that applies to both of them equally. The worry concerns contrasts like the one between the self-standing (106) and the sequence (107).

(106) The cat has blue eyes.
(107) Mary has a cat. The cat has blue eyes.

Assume that Margaret knows that Mary has exactly two cats, both blue-eyed. Asked to tell us something about Mary’s pets, Margaret could answer (107). If instead she just said (106), that would be strange. If we wanted to adopt the supervaluationist strategy, we would owe an explanation of why (107) sounds

[140] See K. Lewis 2021, section 2.1.1, fn. 10, for a very similar argument. And for a similar argument against Kadmon’s related proposal for dealing with sage-plant sentences, see Heim 1990a, pp. 159–61.

[141] Thanks to Julia Zakkou for discussion.

much better than the self-standing (106) in such a case. According to the supervaluationist approach, both (106) and (107) would be counted as true. The first sentence of (107) is true, and the second sentence of (107) just is (106). According to the supervaluationist strategy, the second sentence of (107) may be judged true because both candidates for being the referent of 'the cat' have blue eyes. But the same would apply to Margaret's assertion of the self-standing (106). It seems that the first sentence of (107) plays an important role in making the sequence sound better than the self-standing (106), and the supervaluationist strategy is silent on why that's the case. The same goes for the subvaluationist view; this view, too, doesn't by itself explain why there is a difference between utterances of e.g. (106) and (107). There is, therefore, something important left unexplained by these strategies. This doesn't show that these strategies couldn't somehow be amended to provide a more complete explanation of the data, but it does show that they are not satisfying as they stand.[142]

4.4 Sequences and Context Update

In the foregoing sections, I looked at some strategies the situation semanticist could appeal to to explain why sequences such as (108) can be used to describe situations in which there is more than one cat, in spite of the uniqueness presupposition of the definite 'the cat'. I argued that these strategies are not satisfying. Now I want to try to develop a better account of what is going on in such se-

[142]To be clear, I'm not claiming that this last point is a problem for Kadmon's view; I merely think that it is a problem for a (static) situation semanticist who tried to adopt Kadmon's suggestion. Kadmon defends a dynamic semantics for definites on which the indefinite in a sequence like (107) introduces a discourse referent that the definite can then pick up; since in (106), there is no indefinite, no discourse referent is introduced, which could explain the contrast. (Kadmon's dynamic semantics differs e.g. from the semantics developed in Heim 1982; on Kadmon's view, definites also come with a uniqueness requirement, which is absent from Heim's account, which is why Kadmon is concerned with explaining away judgements that there is no uniqueness implication in indefinite-definite sequences.) Since the situation semanticist I am considering does not assume that indefinites introduce discourse referents that are picked up by definites, the situation semanticist cannot rely on this machinery to explain the contrast between cases like (106) and (107).

quences.

(108) There's a cat. The cat is hungry.

The minimal situations in which the first sentence of (108) are true are situations that contain exactly one cat. Based on this observation, one might suggest that the definite 'the cat' in the second sentence is somehow evaluated at minimal situations at which the first sentence is true.[143] This idea seems promising, but it needs to be spelled out in more detail to see how exactly it might work. This is the task I want to take up now.

The first issue I want to address is why the minimal situations in which the first sentence of (108) is true may be the ones where we evaluate the subsequent definite description 'the cat' with its uniqueness presupposition. On the Stalnakerian view of assertion and presuppositions, assertions serve to change the context of the conversation, and the presuppositions of an assertion have to be already accepted in the old context.[144] To figure out whether a presupposition

[143]Something along these lines is briefly suggested (and argued against) in Mandelkern and Rothschild 2020, p. 85. I discuss some of their objections further below. K. Lewis (2021) suggests that, given some appropriate semantics for conjunction, the situation semanticist could perhaps assume that the sentences in a sequence are all "connected by conjunction", but Lewis objects that this would be "tantamount to giving up the static [semantic] game". Even putting this worry aside, I think that the view that the sentences in indefinite-definite sequences are always connected by an unpronounced conjunction faces serious challenges. One challenge has to do with non-declarative sentences. Consider the following examples:

(109) a. John has a cat. The cat has blue eyes.
b. John has a cat. Would you take care of the cat while John is on holiday?
c. John has a cat. Please take care of the cat while John is on holiday!

(110) a. John has a cat and the cat has blue eyes.
b. John has a cat and would you take care of the cat while John is on holiday?
c. John has a cat and please take care of the cat while John is on holiday!

The sequences (109a), (109b) and (109c) are grammatical and felicitous, and so is (110a), but inserting an overt conjunction in (109b) and (109c), as in (110b) and (110c), makes them very odd and perhaps ungrammatical. To account for the anaphoric relationship in sequences such as (109b) and (109c), one would therefore have to assume that the covert conjunction that connects the two sentences is different from the overt conjunction 'and'. This strikes me as a serious disadvantage, and so this is not a view I will pursue. The better strategy, I think, is to give an account of indefinite-definite sequences that does not presuppose a semantics for conjunction, and then to explain why (some) conjunctions are similar to the sequence of their conjuncts. I turn to conjunctions further below.

[144]See section 2.2

is already accepted in the old context, we check whether the presupposition is true at all the elements of the old context. In that sense, we have to evaluate the presupposition at the old context. In the sequence (108), the second sentence presupposes that there is exactly one cat, and this presupposition has to be evaluated at the old context. If the context were a set of elements (worlds or situations) in which there is exactly one cat, the presupposition would be satisfied and so the presupposition would not lead to infelicity. If, on the other hand, the elements did not contain exactly one cat, the presupposition would not be satisfied and the presupposition should make asserting the second sentence of the sequence inappropriate. The set of minimal situations in which the first sentence of (108) is true contains only situations in which there is exactly one cat, and so if the context of an assertion of the second sentence were this set, the context would indeed satisfy the uniqueness presupposition of the second sentence, which could explain why the presupposition triggered by the definite description does not make asserting the sequence inappropriate. In order for this explanation to work, we have to consider what the context of an assertion of the second sentence in the sequence (108) looks like.

Without further background assumptions about the conversation, we don't know much about the context of an assertion of the second sentence of (108), but we do know that the speaker has already asserted that there is a cat; we should therefore explore how this assertion changes the context. On Stalnaker's view, the context is a model of what is jointly accepted, or common ground, in the conversation, which Stalnaker takes to be a matter of the interlocutors' mental states.[145] One might wonder whether assuming the context to be a model of the common ground is compatible with the suggestion that presuppositions have to be already accepted in the context, in light of how presuppositions in sequences seem to behave. If a speaker utters a sequence of sentences, it is generally felici-

[145]See Stalnaker 2002

tous for sentences that come later in the sequence to presuppose what is entailed by sentences that come before:

(111) Jerry: Someone bought ice cream. It was Jane who bought it.
Jenna: Really? I don't believe someone actually bought ice cream.

Jerry's utterance seems okay even though the second sentence Jerry utters presupposes that someone bought ice cream. In this case, the presupposition is entailed by the first sentence Jerry utters. But the utterance seems okay even though Jenna later rejects Jerry's utterance. One might therefore doubt that, when Jerry asserts that it was Jane who bought the ice cream, it *is* accepted in the conversation that someone bought ice cream.

There are different ways one could respond to this worry. For example, one could suggest that when Jerry asserts that it was Jane who bought the ice cream, Jerry at least believes or assumes or pretends that it is accepted in the conversation that someone bought ice cream, and that this is enough to make Jerry's second assertion felicitous.[146] But it's not obvious that this response works. Jerry's utterance would remain felicitous even if Jerry explicitly acknowledged that Jenna won't believe him:

(112) Jerry: I know you won't believe me, but someone bought ice cream. It was Jane who bought it.
Jenna: You're right, I don't believe you.

In this case, it doesn't seem very plausible that Jerry believes or assumes or pretends that, at the time of his second assertion, it is jointly accepted in the conversation that someone bought ice cream.[147]

[146] As Stalnaker (1999) makes clear, "a speaker may act as if certain propositions are part of the common background when he knows that they are not" (p. 51), presupposing something while knowing that it isn't common ground. Perhaps this "pretense" (ibid.) is enough to make the speaker's utterance appropriate. (Cf. one of the notions of a sentence presupposition suggested, but not endorsed, by Stalnaker: "One might say that a sentence x presupposes that Q just in case the use of x to make a statement is appropriate [...] only in contexts where Q is presupposed by the speaker" (Stalnaker 1999, p. 50). The suggestion seems to be that the appropriateness of the utterance depends on what the speaker presupposes; whether it is appropriate for the speaker to presuppose whatever it is she presupposes could perhaps be treated as a separate issue.)

[147] For similar but more elaborate arguments that go in the same direction, see Harris 2020. See

This, however, doesn't show that presuppositions of an assertion don't have to be, in some sense, old news in order for the assertion to be appropriate. If it were not already accepted between Jerry and Jenna that someone bought ice cream, Jerry's utterance would be odd if he merely asserted (113a), without first saying that someone bought ice cream.

(113) a. It was Jane who bought ice cream.
b. Someone bought ice cream. It was Jane who bought it.

If Jerry asserts (113b) instead, Jenna can't similarly complain that it's news to her that someone bought ice cream, even if she doesn't believe what Jerry says. She can merely complain that what Jerry said was wrong or perhaps that he doesn't know what he's talking about.

This does raise the question of what exactly counts as old news. Being part of the common ground may be one way of being old news, but examples such as (112) suggest that it at least isn't the only way. There are different ways one could try to make the notion of being old news more precise, but I won't try to settle this issue here.[148] What is important for present purposes is that we can use contexts to model what is old news at some point during a conversation even if we reject the view that something is old news in a conversation just in case it is part of the common ground. When Jerry asserts that someone bought ice cream, the claim that someone bought ice cream becomes old news. We can model this by

also Schlenker 2010a, pp. 117–20, on conjunction and whether local contexts represent what is common belief; see Stalnaker 2014, pp. 97–102, for a response to Schlenker.

[148]There are various options to consider. What is old news could for example be a matter of what the speakers have committed themselves to for the purposes of the conversation, where this might differ from what they have jointly accepted. (See e.g. Geurts 2019 for an approach that puts commitments on centre stage in the pragmatics.) Another, perhaps related suggestion, could be that what is old news, for an utterance of a speaker, is determined by what the speaker has already proposed to add to the context (without having retracted the proposal), even if the proposal was not accepted by the speakers' interlocutors. (Or consider Schlenker 2010a, p. 120, suggesting that context sets should be taken to represent "*what follows from the speaker's utterance given the global context*".) As D. Lewis (1979, pp. 345–46) discusses, the "conversational score" (p. 345) [roughly, the state of a conversation, which Lewis likens to the score of a game at a particular moment] could be a matter of the interlocutors' mental attitudes (like Stalnaker's common ground), but it could also be a matter of the rules of conversations (and which rules hold could be to some extent independent of the interlocutors' mental states). Exploring different views on this matter in detail would go beyond the scope of this thesis.

assuming that a context, representing what is old news, is updated with the claim that someone bought ice cream. Consequently, the presupposition that someone bought ice cream is accepted in this context and Jerry can go on and assert that it was Jane who bought ice cream. What matters is that if a speaker makes a series of assertions, what they assert earlier enters into the context that serves as background for what they assert later, and presuppositions of later assertions are required to be satisfied by this context.

Let's return to the indefinite-definite sequence (114). What would the context look like after it has been updated by an assertion of the first sentence, that is, after it has been updated with the proposition the first sentence expresses?

(114) There's a cat. The cat is hungry.

What the context would look like depends on what we take contexts to be. In chapters 2 and 3, we already encountered different conceptions of the context. On some of them, contexts are sets of possible worlds; on others, contexts are sets of situations. Let's consider what these different conceptions would mean for (114).

On the Stalnakerian view, a context is the set of all possible worlds that are compatible with what has been accepted. Let's assume, for the sake of simplicity, that we start with the empty context. On the Stalnakerian view, the empty context is the set of all possible worlds, and we update a context c with a proposition p by excluding from c all worlds in which p isn't true. If we update the empty context with the claim that there is a cat, we arrive at the set of all possible worlds in which there is a cat.[149] Let's call this set c'. This set includes worlds in which there are several cats, since there being more than one cat is compatible with there being a cat. Not all worlds in the context are therefore worlds in which there is exactly one cat. Accordingly, the context doesn't satisfy the uniqueness

[149] What proposition is expressed by 'There's a cat'? For now, I make the simplifying assumption that it is $\lambda s.\exists x \textsc{cat}(x)(s)$. I will say more about the semantics of indefinites in section 6.2.3.

presupposition triggered by 'the cat' in the second sentence. We therefore can't update c' with (115b), the proposition expressed by (115a), if we assume the principle that presuppositions have to be satisfied by the context in order for it to be possible to update the context.[150]

(115) a. ς_i The cat s_i is hungry.
b. $\lambda s.\textsc{hungry}(\iota x \textsc{cat}(x)(s))(s)$

Like Stalnaker, Schwarz assumes that a context is a set of possible worlds. Unlike Stalnaker, Schwarz assumes that a proposition is asserted of a topic situation that may be smaller than a whole world. A context is updated by excluding each world w from the context where the asserted proposition is not true at w's counterpart of the topic situation. Presuppositions have to be true not at all worlds in the context but at all counterparts of the topic situation that are part of some world of the context.[151] Suppose that we have made no assumptions yet about how many cats there are at the topic situation. Then the context contains worlds where the counterpart of the topic situation contains no cats, worlds where the counterpart contains exactly one cat as well as worlds where there are several cats at the counterpart. When we update with the claim that there is a cat, we exclude those worlds where the counterpart of the topic situation contains no cat; but we don't exclude worlds where the counterpart contains more than one cat. Consequently, the context contains situations where (115b) is neither true nor false.

[150]See section 4.2.2 for the semantics. Since I assume that possible worlds are situations, there is not in principle a problem about updating a set of worlds with a proposition that is true or false at situations. What if we assume that the situation variable is free rather than bound as in (115a)? In that case, the presupposition would be that there is exactly one cat in the situation assigned to s_i. Now the question is what situation is assigned to s_i. If the speaker doesn't have a particular cat in mind, the speaker's mental state arguably doesn't help determine one (see section 4.3.4). If the situation assigned were the topic situation, than the presupposition would be that there is exactly one cat at the topic situation. But then it's unclear how we could explain that sequences such as (114) can be used to describe situations in which there is more than one cat (see section 4.3.2). For these reasons, I don't see that with the assumption that the situation variable is free, we are in a better position to explain what is going on. Prima facie, the bound reading is in a better position to explain how an indefinite-definite sequence such as (114) need not be about a particular cat, since, on the bound reading, the definite description doesn't denote a particular cat.

[151]See section 2.4.

The presupposition of the second sentence of (114) is not satisfied by the context, and so the context can't be updated with the second sentence. It therefore seems that the Schwarzian context update procedure has no clear advantage over Stalnaker's when it comes to sequences such as (114).

Next, let's turn to those conceptions of the context according to which a context is a set of situations rather than a set of worlds. In chapter 3, I discussed different ways of thinking about such sets, which are equipped with different rules for updating the context and different assumptions about the conditions under which a context is accurate. For now, I focus on definite contexts, which have topic situations that the contexts aim to describe.[152] For present purposes, the important distinction is between what I called *non-minimal* and *minimal* contexts. Non-minimal contexts contain candidates for *being* the topic situation. By contrast, minimal contexts contain candidates for *being part* of the topic situation, which means that the topic situation may be bigger than any situation in the context. The minimal contexts are called 'minimal' because, roughly speaking, the situations in them are just big enough so that everything accepted about the topic situation is true at them, but not bigger.[153]

Non-minimal contexts are in the same boat as Stalnakerian and Schwarzian contexts when it comes to indefinite-definite sequences such as (116):

(116) There's a cat. The cat is hungry.

The empty non-minimal context is the set of all situations. Update proceeds by intersection, and so if we update the empty context with the claim that there is a cat, we arrive at a new context that contains all those situations in which there is a cat. Any situation in which there is a cat counts as candidate for being the topic

[152] Definite contexts are more similar to Schwarzian contexts than what I call indefinite contexts, but the following points apply very similarly to indefinite contexts.

[153] Why only roughly? Because if there are non-persistent propositions among the propositions accepted, those may fail to be true at the situations in the context, depending on what has been accepted later on; they are merely guaranteed to be true at some part of the situations in the context. See section 3.1.3 for discussion.

situation. This includes situations in which there is more than one cat, and so the context does not satisfy the presupposition that there is exactly one cat. The context cannot be updated with the proposition expressed by the second sentence of (116).

Minimal contexts, however, look more promising. The empty minimal context is the set of all the smallest situations, which do not contain more than one cat.[154] To update a minimal context with some claim, we expand the situations in the context so that the claim is true at the expanded situation but no further than that. If we update the empty context with the claim that there is a cat, the new context will therefore contain only situations in which there is exactly one cat. After all, any situation with two cats would have a smaller situation as part in which the claim that there is a cat is already true, and so such a situation would be too big to be included in the new context.[155] Since the context contains only situations with exactly one cat, the context does satisfy the presupposition that there is exactly one cat, and so the context can be updated with the proposition expressed by the second sentence of (116). Nevertheless, that there are only situations with exactly one cat in the context does not mean that the context is accurate only if the topic situation contains exactly one cat. This is so because the situations in the context are candidates for being part of the topic situation, and a situation that contains exactly one cat may well be part of a larger situation in which there is more than one cat.[156] Therefore, that the context contains only

[154] As discussed in section 3.1.4, it's not entirely clear what these smallest situations would look like, but any situation in which there are two cats, we may assume, contains a smaller situation with only one cat, and so no situation with more than one cat would be among the smallest situations.

[155] If we assume instead that the empty minimal context is the set of all situations, and update the empty context with the claim that there is a cat, we plausibly also arrive at a set of situations that each only contain one cat. The updated context would be the set of all the smallest of those situations that expand some situation in such a way that there is a cat at them. The set of all situations that expand some situation in such a way that there is a cat at the expanded situation is simply the set of all situations in which there is a cat. And the smallest of these situations are the minimal situations in which there is a cat, which each contain exactly one cat.

[156] A minimal context with topic situation s_t is accurate just in case the context contains a situation that is part of s_t; see section 3.1.2.

situations with one cat doesn't mean that the speaker is committed to the claim that the topic situation contains only one cat. This fits well with the impression that a sequence such as (116) may be used to describe a situation in which there is more than one cat.

How does the minimal context change when it is then updated with the second claim of (116)? Each situation of the context contains exactly one cat, and to update the context with (117), we have to expand each situation s of the context in such a way that the cat in the expanded situation is hungry, but no further.

(117) $\lambda s.\textsc{hungry}(\iota x \textsc{cat}(x)(s))(s)$

Consequently, the new context still only contains situations in which there is exactly one cat, but now the cat in each situation is hungry. If some situation s of the old context cannot be expanded in that way, the new context will not contain a situation of which s is a part. This happens for a situation s of the old context if the cat in s is not hungry in any expansion of s.[157]

Of the various conceptions of the context that I have considered, minimal contexts therefore seem to be the most promising for dealing with indefinite-definite sequences. The situations in minimal contexts grow over the course of a conversation. At the beginning, when nothing or very little has been accepted about the topic situation, the situations in the context are very small. When a new claim is accepted, the situations grow just enough so that what has been accepted becomes true at them. Because the situations in minimal contexts are always kept as small as possible, the minimal contexts provide a basis for explaining why in a sequence such as (118), the context for an assertion of the second sentence satisfies the uniqueness presupposition triggered by the definite 'the cat'.[158]

[157]If s has an expansion s' in which some other cat, not the cat in s, is hungry, s' would not be included in the new context, since s' contains two cats, and so (117) would be neither true nor false at s'.

[158]Using the terminology of section 3.1.3, the reason why minimal and non-minimal contexts make different predictions when it comes to a proposition such as (117) is that this proposition

(118) There's a cat. The cat is hungry.

And since the situations in minimal contexts are not candidates for being the topic situation but for being part of the topic situation, a context may satisfy a uniqueness presupposition without committing the interlocutors to the claim that the topic situation also satisfies that presupposition. This helps explain why a speaker may assert (118) without committing herself to the claim that the topic situation contains only one cat. This is, I think, a promising start for an account of indefinite-definite sequences, but many challenges remain. I will sketch some of them in the next section, before trying to respond to some of them in the following chapters.

4.5 Some Open Questions

In this chapter, I turned to definite descriptions. Following Elbourne (2013), I sketched one way to implement the idea that definite descriptions presuppose existence and uniqueness at some situation, assuming that definite descriptions contain an unpronounced situation variable. Against this background, I looked at simple indefinite-definite sequences such as (119). These sequences are challenging for the situation semantic account.

(119) There's a cat. The cat is hungry.

Following K. Lewis (2021) and others, I argued that the uniqueness presupposition of the second sentence of (119) is not inherited by the entire sequence, and that the sequence as a whole can be used to describe, truly, a situation in which there is more than one cat, in spite of the uniqueness presupposition of the definite description 'the cat'. I briefly considered various strategies a situation semanticist might appeal to in order to explain this (invoking conversational

is not T-or-F-persistent: it is true or false at situations that are part of larger situations where it is neither true nor false; see (35).

implicatures, the speaker's intentions, or super- and subvaluationist interpretation strategies), and I argued that these strategies are not fully convincing. I then turned to the idea that the presupposition triggered by the definite descriptions in the second sentence of (119) has to be satisfied by the conversational context, which is determined at least in part by the first sentence (or rather, by the speaker's assertion of the first sentence). In chapters 2 and 3, we already encountered different conceptions of the context, some based on possible worlds (such as Stalnaker's) and others based on possible situations. Since the first sentence of (119) does not entail that there is at most one cat, possible worlds and possible situations at which the first sentence is true include worlds and situations in which there is more than one cat. As a consequence, Stalnaker's contexts and non-minimal contexts don't help when it comes to (119): after update with the claim that there is a cat, they don't satisfy the uniqueness presupposition that there is at most one cat (unless it was already established in the context that there is at most one cat in the whole world or in the topic situation). Minimal contexts, by contrast, seem more promising in this respect: the empty minimal context, updated with the claim that there is a cat, contains only situations in which there is exactly one cat, satisfying the uniqueness presupposition of 'the cat'. Minimal contexts contain candidates for being *part* of the situation the speaker aims to describe, and so a context that contains only situations with one cat may accurately describe a situation in which there are multiple cats. However, this appeal to minimal contexts leaves a range of questions open that I haven't addressed so far, including the following:

(1) There are various kinds of sequences that are prima facie problematic for the account as developed so far. Here are four kinds of sequences that are particularly tricky:

(a) *sage-plant sequences.* So-called sage-plant sentences such as 'If someone buys a sage plant here, she (always) buys eight others along with it' (Heim

1990a, p. 147) are a well-known challenge for theories according to which definite descriptions require uniqueness. These sentences have sequential analogues, such as 'John bought a sage plant. He bought eight others along with it/the sage plant.' Such sage-plant sequences are challenging for the semantics as sketched above, which I discuss in section 5.1.

(b) *bishop sequences.* So-called bishop sentences such as 'If a bishop meets a bishop, she/the bishop greets her/the bishop' (see Heim 1990a, p. 148) are another well-known challenge for accounts on which definite descriptions require uniqueness. Bishop sentences also have sequential analogues, such as 'A bishop met a bishop. The bishop greeted the bishop.' Arguably, such bishop sequences are felicitous, and it is not clear how the approach as sketched so far could account for this, since a minimal context, updated with the claim that a bishop met a bishop, only contains situations in which there are two bishops. Prima facie, such a minimal context does not satisfy the uniqueness presupposition of 'the bishop' in the second sentence.

(c) *sequences with too much information.* Sometimes, the definite description 'the cat' can be used even though it has been explicitly asserted that there is more than one cat, as in 'There are three cats. There's a cat on the mat. The cat is hungry.' If we update a minimal context with the claim that there are three cats, the situations in the context contain three cats, and so they don't satisfy the uniqueness presupposition of the third sentence in the sequence. Even minimal contexts therefore don't seem to satisfy the uniqueness presupposition.

(d) *sequences with intentional identity.* Definites can be embedded under attitude verbs and be anaphoric on indefinites that are embedded under another attitude verb in another sentence, as 'the man' in 'Mark wants to meet a man. He wants the man to be interesting.' (Mandelkern and Rothschild

> 2020, p. 101) There are various ways of making these sequences even more complicated, as in Geach's famous *Hob-Nob example*: 'Hob thinks a witch has blighted Bob's mare, and Nob wonders whether she (the same witch) killed Cob's sow.' (Geach 1967, p. 628) Here, two different people are said to hold two different kinds of attitudes, and nonetheless 'the same witch' embedded in the second sentence seems to be anaphoric on 'a witch', embedded in the first sentence.[159]

In the next chapter, I discuss sage-plant sequences and sequences with too much information. I do not look at bishop sequences in this thesis in any detail. They are a serious problem, but I don't have much to add to the existing literature on bishop sentences. I think that whatever one wants to say about bishop sentences can similarly be adopted in the case of bishop sequences. I therefore leave a closer examination of these sequences for another time.[160] I also don't examine sequences with intentional identity here.[161]

(2) On the present account of context update, the situations in the context are expanded *minimally* in such a way that the asserted proposition is true at the expanded situations. This raises concerns about the interpretation of negated sentences such as 'It's not the case that there's a cat' and quantificational sentences such as 'Every cat is hungry.' For example, interpreting 'It's not the case that there's a cat' as expressing the proposition $\lambda s.\neg\exists x \textsc{cat}(x)(s)$ would have implausible consequences, as updating a context with that proposition doesn't ensure that the situations in the updated context can't be expanded even further, to

[159] This example by Geach is a conjunction, but it would be equally felicitous if it turned into a sequence of two sentences.

[160] For some discussion of bishop sentences, see e.g. Ludlow 1994; Elbourne 2005; Elbourne 2016.

[161] There is a substantive literature on what is going on in such cases, which I cannot revisit here. For some recent discussion, see e.g. Lanier 2014; Sandgren 2018. Other tricky sequences that I don't discuss include cases of so-called telescoping, such as 'Each degree candidate walked to the stage. He took his diploma from the Dean and returned to his seat.' (Roberts 1989, p. 717, attributed to Barbara Partee); the conditions under which such sequences are felicitous appear to be rather complicated; for some discussion, see e.g. Roberts 1989, pp. 717–18, and Ludlow 1994, pp. 178–80.

even larger situations that do contain cats. In section 6.2.3, I address this challenge.

(3) The sequence 'There's a cat. The cat is hungry' is very similar to the conjunction 'There's a cat and the cat is hungry.' This raises the question of how the account suggested here for sequences is related to the behaviour of presuppositions within single sentences. Chapter 6 approaches that question.

Chapter 5

From Context to Discourse

5.1 From Contexts to Truth-Conditions

5.1.1 Sage-Plant Sequences

One problem for the view sketched in the previous chapter arises from examples such as the following, which I will call *sage-plant sequences*:

(120) Someone bought a sage plant. Along with the sage plant, she bought eight other sage plants.[162]

(121) A dog was in the park. The dog got into a fight with another dog.[163]

(122) There's a cat. The cat is playing with another cat.[164]

Consider the third sequence, (122). The definite description 'the cat' triggers a uniqueness presupposition that there is only one cat, but in order for the second sentence to be true, there must be at least two cats. The uniqueness presupposition can't be required to be true at the same situation where there have to be two cats, on pain of contradiction. This means that we can't interpret the second sentence along the same lines as was suggested above for (123a):

[162] Cf. Heim 1990b, p. 147: 'If someone buys a sage plant here, she (always) buys eight others along with it.' Hence the name.

[163] See Szabó 2000, p. 46

[164] See also Mandelkern and Rothschild 2020, p. 94 for other examples of what they call 'generalized sage plant sentences'.

(123) a. ς_i The cat s_i is hungry.
b. $\lambda s.\textsc{hungry}(\iota x \textsc{cat}(x)(s))(s)$

Here, the uniqueness presupposition has to be true at the same situation at which the cat has to be hungry, in order for the proposition to be true. If, analogously, the uniqueness presupposition had to be true at the same situation at which there would have to be a second cat, in order for the sentence to be true, the sentence and its uniqueness presupposition could not both be true. One strategy to avoid this result is to disentangle somehow the situation where the presupposition has to be true and the situation of evaluation, where there needs to be a second cat. Now I want to sketch one way to achieve this.[165]

As a first step, let's assume that the context may serve as one of the parameters on which the interpretation of expressions may depend, in addition to the assignment function: $[\![\ ]\!]$ is, from now on, a function from contexts and assignment functions to semantic values, and $[\![\alpha]\!]^{c,g}$ is the semantic value of α relative to a context c and assignment function g.[166] Secondly, let's assume that there is what we could call a *situation abstractor*:[167]

(124) $[\![\delta_i \alpha]\!]^{c,g} = \lambda s.[\![\alpha]\!]^{c,g[s/i]}$

If, for example, α is an expression of type $\langle s,t\rangle$, then $\delta_i\alpha$ is an expression of type $\langle s,st\rangle$. If there is a free variable with index i in α, that variable is bound to the first argument of the resulting function. With this abstractor, we can bind the

[165]Such a strategy is sometimes also used for donkey sentences; see e.g. Elbourne 2013, pp. 121–23, on 'Every man who owns a donkey beats the donkey'. Roughly, Elbourne predicts this sentence to be true just in case every individual x is such that every minimal situation s where x is a man who owns a donkey can be extended to a situation s' such that x beats in s' the donkey of s. The definite description 'the donkey' is evaluated at s rather than at the extended situation s', and so the uniqueness presupposition has to be true at s but not at s'; s' could contain more than one donkey. (Elbourne doesn't explicitly discuss sage-plant sentences in this passage, but see his discussion of a similar case in Elbourne 2013, pp. 129–32.)

[166]See Klinedinst and Rothschild 2012 for treating local contexts as semantic parameters, who mention van Benthem 1989 as early predecessor.

[167]This is a variable abstractor for situation variables, which works just like variable abstraction for individual variables; see e.g. Heim and Kratzer 1998, p. 96, Elbourne 2013, p. 33 on Predicate Abstraction (for individual variables), and Percus 2000, pp. 180, 186, on variable abstractors for both individual and situation variables.

situation variable of a definite description as follows:

(125) a. δ_i [The cat s_i is hungry]
b. $[\![(125a)]\!]^{c,g} = \lambda s.\lambda s'.\textsc{hungry}(\iota x\textsc{cat}(x)(s))(s')$

The semantic value of (125a) is a function of type $\langle s, st\rangle$. Applied to a situation s and a situation s', the value of this function is # (neither true nor false) just in case there is not exactly one cat at s; and if the value isn't #, the value is 1 (true) just in case the cat at s is hungry at s'. Crucially, the situation where there has to be exactly one cat (namely, s) is now disentangled from the situation where the cat has to be hungry (namely, s').[168]

However, we are not finished yet. The semantic value in (125b) is not a proposition, and so it can't be what a speaker asserts with the second sentence of (127), at least not if we hold that the content of an assertion is always a proposition.

(127) There's a cat. The cat is hungry.

The idea I began with was that the definite description in the second sentence of (127) is evaluated at the situations in the context of (an assertion of) the second sentence; all situations in that context contain exactly one cat, and in order for the second sentence to be true, the cat of some situation in the context has to be

[168]Elbourne (2013) does not have a situation abstractor like δ, but the same effect could be achieved with a close variant of Elbourne's semantics, as follows:

(126) a. $[\![\mathrm{QP}]\!]^{c,g} = \lambda p_{\langle s,t\rangle}.\lambda s.\lambda s'.p(s')$ (see QA_{FIC}, Elbourne 2013, p. 72)
b. $[\![\Sigma_i \alpha]\!]^{c,g} = \lambda s.\lambda s'.[\![\alpha]\!]^{c,g[s/i]}(s)(s')$ (see Situation Binding II, Elbourne 2013, p. 33)
c. $\Sigma_i[QP$[The cat s_i is hungry]]
d. $[\![(126c)]\!]^{c,g} = \lambda s.\lambda s'.\textsc{hungry}(\iota x\textsc{cat}(x)(s))(s')$

The resulting interpretation in (126d) is the same as in (125b). The only difference to Elbourne's system is that with QP and Σ, the situation variable is bound to the first argument of the resulting function, whereas with Elbourne's QA_{FIC} and Situation Binding II, the variable would be bound to the second argument. I find it more convenient if presuppositions have to be true at the first argument rather than the second, but this difference is not substantial, as far as I can tell. I find the situation abstractor δ elegant, but it could be replaced by Elbourne's machinery. As long as there are no differing conditions on where δ or the combination of Σ and QP may appear, the two are interchangeable. My use of δ therefore doesn't add anything substantial over and above what is already assumed by Elbourne (2013).

hungry. One way to predict such truth-conditions is by assuming that there is an unpronounced existential quantifier, ɘ, in the second sentence:[169]

(128) $[\![\text{ɘ}]\!]^{c,g} = \lambda p_{\langle s,st \rangle}.\lambda s.\exists s' : s' \in c.s' \leq s \wedge p(s')(s)$

(129) a. ɘ [δ_i[The cat s_i is hungry]]

b. $[\![(129a)]\!]^{c,g} = \lambda s.\exists s' : s' \in c.s' \leq s \wedge \textsc{hungry}(\iota x \textsc{cat}(x)(s'))(s)$

The existential quantifier is restricted to the situations of the context; it only quantifies over the situations in the context, and so any truth-value gaps at situations outside of the context are ignored. Accordingly, the proposition expressed by (129a) is neither true nor false at any situation s just in case not every situation s' that is in the context c contains exactly one cat. Thus, the proposition (129b) is either true or false at every situation or neither true nor false at every situation, depending on what the context c is like.[170] If the proposition is true or false, it is true at s just in case s expands some situation s' of the context c in such a way that the cat in s' is hungry at s. The definite description 'the cat' is evaluated at the situations of the context rather than at the situation of evaluation, and so the uniqueness presupposition has to be true only at the situations of the context but not at the situation the proposition is evaluated at. This helps solve the problem raised by sage-plant sequences. After all, the reason they were a problem for the earlier approach was that the definite description was evaluated at the situation of evaluation and so its uniqueness presupposition had to be true at the situation of evaluation.

(130) There's a cat. The cat is playing with another cat.

In sage-plant sequences such as this, the situation where the second sentence is evaluated needs to contain two cats, in order for the second sentence to be true, and so the uniqueness presuposition cannot also be true there. This clash no

[169]Unpronounced existential quantifiers over situations are not alien to situation semantics; see e.g. Elbourne's morpheme Q (Elbourne 2013, p. 28), Büring's morpheme ≤ (Büring 2004, p. 38), and Heim's subscripted situation variables (Heim 1990a, p. 156); they are in some ways similar to ɘ, but are e.g. not restricted to situations of a context.

[170]In order for $\ulcorner \exists s' : s' \in c.\phi(s') \urcorner$ to be true or false, ϕ needs to be true or false at every situation s' in c; see section 4.2.3 on the metalanguage.

longer arises on the new view, according to which the definite description is not evaluated at the situation of evaluation but rather at the situations of the context. The situations of the context may contain exactly one cat even if the situation of evaluation contains two or more.[171]

5.1.2 The Remaining Uniqueness Presupposition

Earlier, I argued that the indefinite-definite sequence (131) as a whole does not presuppose that there is exactly one cat. Now I want to reconsider briefly whether this verdict and the proposed view are really in agreement.

(131) There's a cat. The cat is hungry.

(132) a. The cat is hungry.

b. $\lambda s.\exists s' : s' \in c.s' \leq s \wedge \textsc{hungry}(\iota x\textsc{cat}(x)(s'))(s)$

The view says that, relative to a context c, (132a) expresses the proposition (132b). (132b) is neither true nor false just in case c contains situations in which there is not exactly one cat. If the context has previously been updated with the first claim of the sequence (131), all situations in the context contain at least one cat, and so the existence presupposition of 'the cat' is guaranteed to be satisfied by the context, no matter what the context was previously like. Thus, the existence presupposition triggered by 'the cat' is not imposed on the previous context. The sequence as a whole does not presuppose that there is a cat.

The prediction regarding the uniqueness presupposition is more nuanced. A context can only be updated with the sequence (131) (that is, updated sequentially with the propositions expressed by the first and the second sentence) if it contains no situation with more than one cat. If the context did contain situations with more than one cat, the context could not be updated with (132b), even

[171] We could now for example take 'The cat is playing with another cat' to express, relative to a context c, the proposition $\lambda s.\exists s' : s' \in c.s' \leq s \wedge \exists x(\textsc{cat}(x)(s) \wedge x \neq \iota y\textsc{cat}(y)(s') \wedge \textsc{playing-with}(x)(\iota y\textsc{cat}(y)(s'))(s))$. A proposition like this does not impose contradictory demands on the situation of evaluation. (That 'another' triggers a presupposition is, however, not accounted for by this proposition.)

if it were first updated with the claim that there is a cat. The sequence (131) as a whole therefore still has a uniqueness presupposition. However, the uniqueness presupposition does not have to be satisfied by the topic situation; it does not have to be true at those situations that are treated as candidates for being the topic situation. It merely has to be true at the situations of the context, which are candidates for being part of the topic situation, because the context is a minimal context. I think that this is a reasonable result. On the one hand, it explains why (131) can be used to describe a topic situation in which there is more than one cat. On the other hand, the remaining uniqueness presupposition helps explain why sequences such as the following tend to be rather odd:

(133) There are three cats. The cat is hungry.

(134) There's a cat and another cat. The cat is hungry.

(135) There's a brown cat. There's also a black cat. The cat is hungry.

If a minimal context is updated with the first claim of (133) or (134) or the first two claims of (135), the situations in the context don't contain exactly one cat, and so they can't be updated with the final claim. As I discuss below in section 5.2, sequences like (135) are sometimes okay, and it is not straightfoward to explain why this is so, given the view that there is a remaining uniqueness presupposition. But in general, such sequences are quite bad, and the uniqueness presupposition can help explain why.

5.1.3 Asserting Relations

One of the reasons for assuming the existence of the unpronounced existential quantifier ∍ was so that we could turn (136b), the semantic value of (136a), into a proposition—a content that is assertable.

(136) a. δ_i[The cat s_i is hungry]
b. $\lambda s.\lambda s'.\textsc{hungry}(\iota x\textsc{cat}(x)(s))(s')$

It may be worth mentioning that we could try to avoid the use of an existential quantifier (or a similar device) and instead pursue a different strategy, namely to assume that the content of an assertion does not have to be of propositional type $\langle s,t\rangle$ but can also be of a more complex type, such as $\langle s,st\rangle$. On this view, (136b) could be the content of an assertion.

To make this strategy more plausible, we would have to explain what a speaker does by asserting a content of type $\langle s,st\rangle$. If by asserting a content, a speaker proposes to update the context, we would have to explain how contexts are updated with contents of type $\langle s,st\rangle$. One way to think of a function f of type $\langle s,st\rangle$ is as a relation between two situations: the relation holds between s and s' just in case f applied to s and s' is 1. Minimal contexts are updated by expanding the situations of the old context in the right way. The content has to tell us what the right way is. In the propositional case, a situation s of the context has to be expanded to a situation s' where the proposition is true:

(137) $c[p_{\langle s,t\rangle}] =\downarrow \{s : \exists s'(s' \in c \wedge s' \leq s \wedge p(s))\}$

Since the update is supposed to be minimal, we only include the smallest expansions in the new context. A relational content could similarly tells us what the expanded situations have to be like. A natural suggestion would be that the relation has to hold between a situation of the old context s' and the expanded situation s; only if it does hold, may the expanded situation be included in the new context:

(138) $c[p_{\langle s,st\rangle}] =\downarrow \{s : \exists s'(s' \in c \wedge s' \leq s \wedge p(s')(s))\}$

For instance, to update a context c with (136b), each situation s' in c has to be expanded to a situation s in such a way that the cat in s' is hungry at the expanded situation s. Since our updates are supposed to be minimal, we only include the smallest expansions in the new context, as in the propositional case.[172]

[172]The Presuppositional Bridge that connects truth-value gaps and context update (see (34) in section 3.1.3) could also be adapted to contents of type $\langle s,st\rangle$. In the case of (136b), the first argument of the function is the one where the definite description's presupposition has to be true. This fits well with the update rule (138), since the first argument for the function, s', is provided

The idea that the content of an assertion is not (always) a function from situations to truth values but rather (at least sometimes) a relation between situations may seem outlandish, but I don't think that this by itself is reason enough to dismiss the idea. However, since the unpronounced existential quantifier will prove to be helpful later on as well, I won't pursue the idea here any further.[173]

Let's take stock. In section 5.1.1, we have seen that sage-plant sequences such as (139) are a challenge for the semantics that was suggested in the foregoing chapter.

(139) There's a cat. The cat is playing with another cat.

In order for the second sentence to be true at a situation, there have to be two cats; but on the view defended here, the definite description 'the cat' presupposes that there is exactly one cat, and so the presupposition cannot be true at the same situation where the two cats have to play in order for the sentence to be true. In response to this challenge, I sketched how the semantics could keep the situation where the definite description's presupposition has to be true separate from the situation where the proposition expressed by the sentence is evaluated, by introducing a situation abstractor and an unpronounced existential quantifier into the semantics. On the resulting view, the presupposition has to be true at the situations of the context but not at the situation of evaluation, and so the situation of evaluation may contain multiple cats even if the situations in the context are

by the old context. Assuming that presuppositions always only constrain what the old context is like, that is, constrain what the first argument of the relational content is like, the bridge principle could be spelled out as follows: If p is of type $\langle s, st\rangle$, and for any situations s and s', p is true or false at s and s' only if q is true at s, then $c[p]$ is defined only if $\forall s(s \in c \rightarrow q(s) = 1)$.

[173] It may be worth pointing out that there are other accounts on which declarative sentences don't denote propositions but relations; apart from dynamic semantic theories that take contents to be relations between contexts (functions from contexts to contexts), there is, for example, also the view of Jacobson (2000). According to Jacobson, a sentence such as "He left" (ibid., p. 112) denotes a relation between individuals and propositions. Jacobson suggests that "to extract propositional information from such a sentence, the listenener must apply this function to some contextually salient individual" (ibid.), but Jacobson argues that this is not a problem, and not very different from views on which e.g. a sentence denotes a proposition only relative to an assignment function; see Elbourne 2005, pp. 34–39, for some discussion of Jacobson's view. Many thanks to Paul Elbourne for pointing out this parallel.

required to contain only one cat.

Let's call the view just proposed the *Minimal Context Account* of definite descriptions. The Minimal Context Account has several components:

1. a situation semantics of definite descriptions according to which definite descriptions come with an unpronounced situation variable and an existence and uniqueness presupposition (section 4.2.2),
2. a view of contexts according to which contexts are sets of situations that are just big enough to make true what has been accepted (section 3.2.2),
3. the idea that the situation variable of a definite description can be bound by an unpronounced existential quantifier that is restricted to the situations of the context, and
4. the suggestion that this is what happens when a definite description has an anaphoric reading in indefinite-definite sequences such as 'There's a cat. The cat is hungry.'

In the sections that follow, I will concentrate on various challenges that the Minimal Context Account faces, in order to showcase both strengths and weaknesses of the view.

5.2 The Challenge From Longer Sequences

So far, the sequences I focused on were very short, consisting mostly of two sentences. An important challenge to the Minimal Context Account arises once we turn to longer sequences. In this section, I will lay out the problem, before turning to potential solutions in the following sections.

To see why some longer sequences may be problematic for the Minimal Context Account, compare the following two sequences discussed by Mandelkern and Rothschild:

(140) a. Several couples came in today. There was one, a woman and a man. The man was being so annoying.
b. Several couples came in today. The man was being so annoying. (Mandelkern and Rothschild 2020, p. 85)

The second sequence is significantly worse than the first sequence. The only difference between the two sequences is the second sentence of (140a), which is missing in (140b). The challenge is to explain why the first sequence sounds fine, whereas the second sequence is odd. Mandelkern and Rothschild briefly consider the suggestion that "we generally interpret a definite like 'the man' relative to a minimal situation which makes the preceding sentences true" (Mandelkern and Rothschild 2020, p. 85). Mandelkern and Rothschild, however, object that this suggestion "does not distinguish (140a) from (140b), since minimal situations which make the preceding sentences true will be just those minimal situations in which several couples came in" (ibid., numbering changed).

The suggestion Mandelkern and Rothschild object to here is similar to the Minimal Context Account. As a consequence, the objection also applies to the Minimal Context Account. According to the Minimal Context Account, the definite 'the man' is evaluated at the situations of the minimal context, and the minimal context is determined, to a significant extent, by the preceding sentences. Simplifying the issue somewhat, the minimal context of a sentence preceded by sentences S_1, ..., S_n is the set of all minimal situations in which S_1, ..., S_n are true, if the preceding sentences are the only source of information that contributes to the context.[174] If Mandelkern and Rothschild are right in claiming that the min-

[174] Why does this simplify the issue? First of all, it assumes that the propositions expressed by S_1,...S_n are persistent. If they are not persistent, some propositions expressed may not be true at the situations in the minimal context even though they would be true at the minimal situations in which all the sentences are true. Secondly, it does not take into account that context update may fail if the preceding sentences have presuppositions, in which case there may be no (non-empty) minimal context even if there are minimal situations in which all preceding sentences are true; see section 3.1.3. Finally, consider that the empty context $c_\circ$ updated (minimally) with some proposition p expressed by a preceding sentence has to be the set of all minimal situations in which p is true, in order for the (simplified) correspondence between minimal contexts and minimal situations to hold. Whether this is indeed the case depends on what the situations in the empty context are like, which is not entirely clear; see section 3.1.4. It seems to me that at least

imal situations in which the first sentence of (140b) is true are the same as the minimal situations in which the first two sentences of (140a) are true, the same would hold for the relevant minimal contexts: the minimal context updated with the proposition expressed by the first sentence of (140b) would be the same as the minimal context updated by the propositions expressed by the first two sentences of (140a). If that were indeed so, it would be puzzling, from the point of view of the Minimal Context Account, that the two sequences are not equally acceptable. If the two contexts are the same, the use of 'the man' should be equally appropriate in the two sequences.

It is not clear that situation semanticists should agree with Mandelkern and Rothschild that the minimal situations in which the first two sentences of (140a) are both true really are the same as the minimal situations in which only the first sentence is true. Situation semanticists usually assume that situations are individuated in a very fine-grained way, and so they might argue that minimal situations in which several couples came in are so small that they don't settle the question of what the gender of the people involved is; it is not true at such a situation that they contain an individual who is a man at that situation (even though they may well contain an individual who is a man at a somewhat larger situation). The minimal situations in which several couples came in would therefore be distinct from minimal situations in which several couples came in and one couple consisted of a man and a woman. Only a situation of the latter type contains an individual that is a man at that situation. This could explain why the sequence (140b) is worse than the sequence (140a), the situation semanticist could argue.[175]

On this view, after we've accepted the first sentence of (140a), the situations

for the purpose of comparing (140b) and (140a), these assumptions may be granted.

[175]There is another issue with the example that I will bracket. It is unclear to me how many couples there are in a minimal situation in which several couples came in. Two couples? Three? To avoid this question, one could change the sentence e.g. to 'Exactly three couples came in today.' The contrast that Mandelkern and Rothschild point out would remain. (But this issue does indicate a challenge for those who appeal to minimal situations.)

in the context contain several couples, but their gender is not determined at the situations of the context. When we then go on to accept that one couple consisted of a woman and a man, we have to enlarge the situations in the context in such a way that one of the couples consists of a man and a woman. In each situation of the resulting context, there are several couples, and of all the people who make up these couples, exactly one is a man and exactly one is a woman. Since there is exactly one man in each situation of the context, the definite description 'the man' in the third sentence of (140a) is easily interpreted. When the second sentence is missing, as in (140b), the context for the final sentence contains only situations in which the gender of the people is not determined. This could explain why (140b) is more difficult to process than (140a).

One might worry that this response overstates the significance of the fact that in the sequence that sounds better, information about gender is made explicit. In other cases, we readily accommodate assumptions about gender that were not made explicit, as the following variant of the example illustrates:

(141) A couple came in today. The man was being so annoying.
(Mandelkern and Rothschild 2020, p. 84)

This sequence can be interpreted fairly easily. If minimal situations in which a couple came in don't determine the gender of those who make up the couple, it seems that we have to add tacitly the assumption that only one of the two was a man. So why does (141) sound okay, whereas (140b) does not? Perhaps we assume that it is less likely that there is exactly one man among the members of several couples than that there is exactly one man among the members of one couple. Perhaps this is part of the reason why we find (140b) more difficult to process than (141).

Be that as it may, there are good reasons to think that this can't be the whole story. For compare the following variants:

(142) a. Several couples came in today. The man was being so annoying.

b. Several couples came in today. There was one, a woman and a man. The man was being so annoying.
c. Several couples came in today. There was one couple. The man was being so annoying.

Not just (142b) sounds better than (142a). The sequence (142c), too, seems significantly better than (142a), in spite of the fact that the second sentence of (142c) does not state that the couple consisted of a man and a woman. In this case, we seem to accommodate that only one man was part of that couple, just like we do in (141). But in the case of (142c), it is much less clear that the minimal situations in which the first two sentences are true are different from the minimal situations in which only the first sentence is true, and so Mandelkern and Rothschild's worry resurfaces. The second sentence of (142c) adds no new information about the gender of the people involved and so the strategy suggested above for explaining the difference between (142a) and (142b) does not carry over straightforwardly to the case of (142c).

In the case of (142c), accommodation of gender information is needed to interpret the sequence, but this kind of accommodation isn't an essential feature of the problem at hand. The same worry also arises for examples in which no such accommodation is necessary:

(143) a. Three men came in today. There was one man. The man was being so annoying.
b. Three men came in today. The man was being so annoying.

The second sequence seems worse than the first sequence. The minimal situations in which the first sentence of each sequence is true contain three men who came in today. Prima facie, the second sentence of (143a) doesn't seem to add any information to that. The second sentence is already true at all the minimal situations at which the first sentence is true, it seems. If, after the first sentence has been accepted, the context consists of the minimal situations in which the first sentence is true, and we then go on to accept the second sentence of (143a), it seems that we don't have to change the minimal context at all: the second sentence is already true at the situations of the old context. And so the explanation that was offered above for why (140a) differs from (140b) doesn't seem to help in the case of (143a) and (143b).

In some similar cases, one might suggest that the linguistic environment helps interpret the definite description:

(144) There were three cats. One cat was miaowing. The cat was hungry.

Note that each minimal situation in which the first two sentences are true contains three cats, but only of the three cats is miaowing at that situation. If there is a mechanism that allows us to interpret 'the cat' in the third sentence in the same way in which we would interpret 'the cat that was miaowing', then that could explain how the uniqueness presupposition of 'the cat' is satisfied in this case, even though the situations of the minimal context contain three cats. But in the case of (145), there is at least no similarly salient descriptive material that we could use to enrich 'the man' in the third sentence and which would guarantee uniqueness:

(145) Three men came in today. There was one man. The man was being so annoying.

For instance, 'man who came in today' or 'man who was there' are not uniquely satisfied in the minimal situations in which the first two sentences of (145) are true, just like the simpler description 'man'. If there is a mechanism that ensures uniqueness in this case, it has to be a more sophisticated one, it seems.

In this section, we have seen a serious challenge to the proposal that definite descriptions in indefinite-definite sequences are evaluated at situations of the minimal context. In the following two sections, I look at two potential solutions to this challenge.

5.3 On the Structure of Propositions

The challenge that the Minimal Context Account faces is to explain what the second sentence in the sequence (146) does, so that the uniqueness presupposition triggered by the definite 'the man' in the third sentence is somehow satisfied, even though there are three undistinguished men in every minimal situation in which the first sentence of (146) is true.

(146) Three men came in today. There was one man. The man was being so annoying.

The first idea I want to discuss denies that the minimal situations in which the first two sentences of (146) are true are the same as the minimal situations in which the first sentence is true, contrary to what one might think. On this view, the situations in the context really do change if, after already having accepted the claim that three men came in today, we then go on to accept that there was one man. But what could that change be?

If the second sentence of (146) were already true at the minimal situations at which the first sentence is true, the minimal situations in which both sentences are true would be the same as those in which the first sentence is true. So in order to hold that the minimal situations in which both sentences are true are distinct from the minimal situations in which the first sentence is true, one would have to argue that the second sentence is not already true at the minimal situations at which the first sentence is true.

So far, this idea may well sound rather mysterious. Whether or not the minimal situations in which the first sentence of (146) is true are already situations in which the second sentence of (146) is also true can only be decided once we have figured out what exactly the semantics of these claims is. A detailed discussion of this would go beyond the scope of this thesis. To make the suggestion nonetheless perhaps a little less mysterious, let me briefly sketch one avenue one could try to pursue.

Suppose we follow Link (1998) and assume a mereological approach to the semantics of plurals on which, in addition to atomic individuals, there are plural individuals. For any two atomic individuals a and b, there is a plural individual $a \oplus b$, the *sum* or *fusion* of a and b. Like situations, individuals are ordered by a parthood-relation, which Link calls *individual part relation* or *i-part relation*, which may be defined in terms of fusion: an individual a is an i-part of b ($a \leq_i b$) just in case the sum of a and b is b ($a \oplus b = b$).[176] The i-part relation $\leq_i$ is distinct from the parthood relation $\leq$ over individuals and situations. One may make different assumptions about how the two relations are related. We could assume that any i-part x of an individual y is part of any situation s of which y is a part:

(147) *Crossrelational Transitivity.* $\forall x \forall y \forall s(x \leq_i y \wedge y \leq s \rightarrow x \leq s)$

This would mean that if some plural individual a is part of a situation s, any atomic individual that is an i-part of a is also part of s. But this assumption could also be rejected. We could adopt the view that a plural individual a can be part of a situation s even when its atoms are not part of s.

Plural individuals are used to interpret plural expressions. Whereas singular (count) nouns (such as 'table' or 'man') have in their extensions only atomic individuals, plural nouns (such as 'tables' or 'men') apply to singular or plural individuals (in the case of 'men', to atomic men as well as to sums of atomic men).[177] For any metalanguage predicate P of type $\langle e, st \rangle$, let $^*P$ apply at any situation s to any fusion of individuals to which P applies at s.[178] (For example, if P applies, at s, to a, b, and c, then $^*P$ applies, at s, to a, b, c, $a \oplus b$, $a \oplus c$, $b \oplus c$, and $a \oplus b \oplus c$.) The nouns 'man' and 'men' are then interpreted as follows:

(148) $[\![\text{man}]\!] = \lambda x.\lambda s.\textsc{man}(x)(s)$

(149) $[\![\text{men}]\!] = \lambda x.\lambda s.^*\textsc{man}(x)(s)$

[176] See e.g. Champollion and Krifka 2016, pp. 374–5, Link 1998, p. 17.

[177] This is what Champollion and Krifka call the *inclusive view*; see Champollion and Krifka 2016, p. 381.

[178] See Link 1998, p. 16; $^*P$ applies to anything P applies to, given that $a \oplus a = a$.

With this approach to plurality in the background, let's return to the sequence (146), repeated below as (150):

(150) Three men came in today. There was one man. The man was being so annoying.

For any individual x, let ATOMS(x) be the number of atomic individuals that are i-parts of x.[179] Abstracting away from the past tense for the sake of simplicity, the situation semanticist could suggest that the first two sentences are interpreted along the following lines:[180]

(151) a. Three men came in today.
b. $\lambda s.\exists x({}^{*}\textsc{man}(x)(s) \wedge \textsc{atoms}(x) \geq 3 \wedge^{*} \textsc{come-in-today}(x)(s))$

(152) a. There was one man.
b. $\lambda s.\exists x \textsc{man}(x)(s)$

The proposition (151b) is true at a situation s just in case there is an individual x such that x is s, x has at least three atomic individuals as parts, and x comes in at s. Since x needs to have at least three atomic individuals as parts, it needs to be a proper plural individual. (152b) is true at a situation s just in case there is an atomic man at s. Crucially, in order for (151b) to be true at a situation, there need not be any atomic man at that situation, at least not if we reject (147), Crossrelational Transitivity. Minimal situations at which (151b) is true therefore don't contain any atomic men, they merely contain a plural individual of three men. By contrast, a situation at which (152b) is true has to contain an atomic man. And so (152b) is after all not true at the minimal situations at which (151b) is true. Therefore, minimal situations where (151b) and (152b) are both true are distinct from the minimal situations where (151b) is true. Accordingly, if we start with the empty minimal context and update it first with (151b), (152b) is not already true at the situations of the context, and so the context has to be changed again if further updated with (152b). Before the update with (152b), the situations in

[179]Champollion and Krifka 2016, p. 383
[180]Cf. Link 1998, p. 70

the context each contain a plural individual consisting of three atomic men, but the situations contain no atomic man which could serve as referent of 'the man' in the third sentence of (150). Once the context is updated with (152b), each situation of the context contains exactly one atomic man, and so the existence and uniqueness presupposition of 'the man' is true at every situation of the context, even though each situation also contains a plural individual of three men. Or so the situation semanticists could try to argue in order to explain why the second sentence of (150) makes a difference to the felicity of the sequence.

A potential benefit of this approach is that it may also help explain why sequences such as the following sound fine:

(153) A man met three men. The man greeted them.

This sequence is prima facie problematic for the Minimal Context Account. After all, one might think that minimal situations in which the first sentence of (153) is true contain four atomic men. If that were so, the uniqueness presupposition of 'the man' in the second sentence would not be true at minimal situations in which the first sentence is true. However, if the minimal situations in which the first sentence is true only contain one atomic man and one plural individual of three men, rather than four atomic men, there would be exactly one atomic man at these minimal situations, and so the uniqueness presupposition of 'the man' would be true at them.[181]

On the other hand, the above is still just a sketch, and many details would have to be worked out to make the approach more convincing. One might, for example, wonder whether there is any independent reason to reject Crossrelational Transitivity. One might also worry that intuitive inferences cannot be accounted

[181] Note that the explanation does not extend straightforwardly to bishop sequences such as 'A bishop met another bishop. The bishop/He greeted the bishop/him.' Minimal situations in which the first sentence is true plausibly do contain two atomic bishops. As I said before, these sequences are a serious problem, but I have nothing new to say about them here. The same general approach I have pursued in this section, looking for and trying to exploit differences in the fine structure of minimal situations at which various propositions are true, is also used by Elbourne in his account of bishop sentences (Elbourne 2005, chapter 4, Elbourne 2016).

for on the view at hand. Intuitively, one can infer from the claim that three men came in today that there was one man. But on the suggested view, not every situation in which the former claim is true is also a situation in which latter claim is true. It is therefore not clear how to explain the intuitive inference, or so the objection might go. In response, one could point out that every situation in which three men came in today is guaranteed to be part of a larger situation in which there was one man. This may suffice to explain why we're prepared to make the inference.

Yet another worry might be that there are sequences that are very similar to (150) but not accounted for by the proposed view. Consider the contrast between the following two sequences:

(154) a. A man, a woman, and another man came in today. There was one man. The man was being very annoying.
b. A man, a woman, and another man came in today. The man was being very annoying.

The first sequence may not sound brilliant, but it seems to me that it nevertheless sounds better than the second sequence. But one might worry that minimal situations in which the first sentence of each sequence is true do not just contain a plural individual, but also two atomic men, due to the singular indefinites 'a man' and 'another man'.[182] But if that's right, it seems less plausible in this case that the minimal situations in which the first sentence of (154a) is true are not already also situations in which the second sentence of (154a) is also true. Consequently, it is less clear what the second sentence of (154a) contributes to the context, over and above what the first sentence has already contributed.

I won't try to argue here that, once the details are worked out, the approach discussed in this section will or won't work. This is a task for another time. In-

[182] Also based on Link's mereological approach to plurality, Elbourne (2005, pp. 155–6) suggests a semantics for sentences like this according to which this is indeed the case. On his view, the minimal situations in which 'A bishop and a bishop meet' is true contain minimal situations in which there is an (atomic) bishop.

stead, I want to consider a potential alternative strategy to deal with the problem at hand, shifting the focus from the propositions expressed to the structure of discourse.

5.4 On Discourse Structure

The second strategy I want to discuss is based on the observation that over the course of a conversation, the topic often shifts. On the Austinian view, each assertion describes a particular topic situation, some more or less small part of the world. When a speaker makes more than one assertion, the topic situation could be the same for each assertion, but it could also shift, so that different assertions describe different topic situations. Consider the following dialogue:

(155) A: What did you do yesterday?
B: I went to the beach.
A: And what did you do the day before that?
B: I went to the city.

It's plausible that B describes a different topic situation with each assertion.[183] Now consider again sequences such as (156a) and (156b), which are problematic for the Minimal Context Account.

(156) a. Three men came in today. There was one man. The man was being so annoying.
b. Three men came in today. The man was being so annoying.

An idea one might have is that perhaps the topic situation shifts over the course of these sequences. These shifts would not be as marked as the shift in (155), but some shifts of the topic situation may well be more subtle than others. Perhaps what happens in (156a) is that when the second sentence is asserted, there is a small shift in the topic situation that makes 'the man' in the third sentence

[183] It's an interesting question how the topic situation of an assertion is related to the question the assertion addresses (the so-called *question under discussion*). I won't address this issue here; for some discussion, see F. Schwarz 2009, pp. 136–143.

interpretable; and since that second sentence is missing in (156b), nothing indicates that the topic situation is changing, and the definite description is uninterpretable as a result.

The use of the second sentence in (156a) is puzzling. Once we know that three men came in today, we readily conclude that there was a man. If the speaker stopped after the first two sentences and merely said (157), the assertion of the second sentence would seem strange.

(157) Three men came in today. There was one man.

(158) Three men came in today. There was one man. The man was being so annoying.

Nonetheless, the use of the second sentence doesn't feel pointless as part of the longer sequence (158). One explanation could be that the second sentence serves to indicate a shift to a new topic situation. If the speaker then doesn't go on to say something about the new topic situation, as in (157), indicating a shift seems pointless in retrospect. By contrast, in (158), the speaker continues to assert something about the new topic situation, and so the second sentence has served a purpose.

To make this a bit more concrete, we could imagine that with the first sentence, the speaker aims to describe a topic situation s_1^t that encompasses what happened at a particular place—perhaps an office or a shop—over the course of a few hours earlier today. With the second sentence, the speaker then indicates that she is now describing some other topic situation s_2^t. This new topic situation may be a smaller part of the bigger topic situation s_1^t. At that point, we've been told that there are three men in the big situation s_1^t, and that there is one man in s_2^t.[184] Minimal situations where what we have been told about s_2^t is true contain

[184]We're not explicitly told that this one man is one of the three men, but it seems to me that we're likely to make this assumption; this may be a conversational implicature, perhaps because the speaker chooses not to say 'There was another man'; the effect may be due to the maxim that speakers should prefer among alternative sentences those with stronger presuppositions (Maximize Presupposition); on this maxim, which goes back to Irene Heim, and on implicatures due to differences in presuppositions, see e.g. Leahy 2016. Thank you to Felix Frühauf for discussion.

only one man, not three. These situations satisfy the existence and uniqueness presupposition of the definite description 'the man' in the third sentence. In the case of (156b), by contrast, the second sentence is missing, and so when the speaker uses the definite 'the man', we may be assuming that the speaker is still describing the same topic situation as before, namely the big situation s_1^t. But the minimal situations where what we've been told about s_1^t is true contain three men, and so these situations don't satisfy the uniqueness presupposition of 'the man', and so the use of 'the man' seems inappropriate.

Just like the approach from the foregoing section, the proposal sketched here needs to be worked out in more detail. One question it faces is why the second sentence in (156a) serves to indicate a shift in the topic situation: Why is it easily interpreted as addressing a topic situation different from the one the previous sentence aims to describe? One reason could be that the second sentence is not very informative if understood as addressing the same topic situation as the first sentence. After all, the first sentence already tells us that there were three men. If instead we take the assertion of the second sentence to address a new topic situation, the assertion is informative, since it is the first claim about the new topic situation.[185]

One might also wonder why, when faced with the shorter sequence (156b), we cannot simply assume that the speaker is now describing a smaller topic situation, and accommodate that this smaller situation contains a man. It should be noted, however, that many accounts of presuppositions invoke accommodation, and spelling out the limits of accommodation is a challenge for all of them. It is therefore not clear that the approach at hand faces more problems than its main competitors.[186]

Another question concerns how we should model the conversational con-

[185]See e.g. Stalnaker's constraints on appropriate assertions mentioned at the beginning of section 2.1

[186]For some general discussion of accommodation, see e.g. von Fintel 2008, Beaver, Geurts, and Denlinger 2021, section 5

text if the topic situation shifts. So far, I have assumed that the context is simply a set of situations, and the situations in this set are candidates for being part of *the* topic situation. If more than one topic situation has been under discussion, this simple model won't work. In the next section, I consider what a model of the context could look like if it takes into account that more than one topic situation may be under discussion in a conversation.

Yet another question is whether the approach at hand can handle all cases that the approach discussed in the foregoing section promised to deal with. Consider for instance sequence (153), repeated below as (159):

(159) A man met three men. The man greeted them.

This sequence is a challenge for the Minimal Context Account, since (at least at first sight) even minimal situations at which the first sentence is true contain four men and therefore don't satisfy the uniqueness presupposition of 'the man' in the second sentence. The idea that the topic situation sometimes shifts over the course of a sequence is not of any obvious help in explaining why the sequence nonetheless sounds fine. This may not be a problem. After all, different cases may be explained differently. But the fact remains that some other explanation for cases like (159) is needed.

There is one more question I want to raise briefly before moving on. It concerns the difference between a sequence of two sentences and their conjunction. Compare the following two sequences:

(160) a. Three men came in today. There was one man. The man was being so annoying.
b. Three men came in today and there was one man. The man was being so annoying.

It seems to me that the sequence with the conjunction (160b) sounds worse than the sequence without conjunction (160a). If this impression is correct, one explanation could be that shifts of the topic situation are impossible or at least more difficult in the middle of a conjunction than between different sentences.[187] It is not clear how the approach sketched in the foregoing section would explain the contrast.

In this and the previous section, I have sketched two different approaches to deal with problematic sequences such as (160a). I have pointed out some questions that would have to be addressed to make each of these two approaches more precise. As I have argued, there seem to be cases that one approach can explain whereas the other one can't, and vice versa. It is therefore worth highlighting that the two approaches don't exclude one another. One could appeal to both approaches to explain the data. Moreover, this need not indicate a lack of theoretical parsimony, since the two approaches have at least some independent motivation. The mereological approach to plurals has been defended for reasons unrelated to anaphora. And if each assertion aims to describe a topic situation, then it is to be expected that the topic situation sometimes shifts over the course of a sequence of assertions, whether or not this helps explain anaphora. Looking at both approaches in more detail therefore seems to me to be a promising area for future research.

5.5 Multiple Topic Situations

In this section, I want to sketch one way to combine the idea that more than one topic situation may be under discussion with the view of contexts developed in chapter 3, with a focus on minimal contexts.[188] On that view, a definite minimal context is a set of situations, and each situation in the set is a candidate for being part of the topic situation. As already pointed out in section 5.4, this simple model doesn't work if there is more than one topic situation.

[187] Note that the conditional 'If three men came in today and there was one man, the man was being annoying' is also rather strange.

[188] The following could also be adapted to non-minimal contexts, but this won't be necessary for my purposes.

Here is one way to model a context with multiple topic situations. Suppose that $t = \langle s_1, ..., s_n \rangle$ is the sequence of all topic situations that are under discussion in some conversation. (I don't mean that all the situations in t are under discussion at every point during the conversation but rather that all these topic situations have been discussed at some point during the conversation.) Let a *discourse context* for t be a set of partial assignment functions that assign to any index m, for $1 \leq m \leq n$, a situation (and are undefined for any other index). The idea is that any situation assigned to an index i by some assignment in the discourse context d is a candidate for being part of the topic situation s_i. Accordingly, we may define the *context for the topic situation* s_i as follows:

(161) *The context for* s_i. Let d be a discourse context for t, and let s_i be some situation of t. Then c_i^d is the context for s_i that is determined by d, defined as follows:

$$c_i^d = \{s : \exists g(g \in d \wedge g(i) = s)\}$$

That is, c_i^d is the set of all those situations that are assigned to i by some assignment in d. In other words, c_i^d is the set of all those situations that d counts as candidates for being part of s_i. The context for a topic situation s_i corresponds to the minimal context of the simpler model. For each topic situation under discussion, the discourse context determines a context for that topic situation. A discourse context d for t is accurate just in case the contexts for the topic situations in t are accurate.[189]

Next, we can spell out how a discourse context changes if a proposition is accepted about some topic situation. I assume that when a speaker aims to describe a situation s_i with an assertion, s_i is already part of the sequence t of topic situations under discussion.[190] The discourse context needs to change in

[189]See chapter 3 for the conditions under which contexts are accurate; in particular, see (42) on the accuracy of definite minimal contexts.

[190]If s_i isn't already part of the sequence, I assume that s_i is tacitly added to the sequence. There may be speech acts whose point is to propose to introduce a new topic situation into the discussion. Perhaps this is what happens when a speaker says 'Let's talk about what happened yesterday'. I think this would be an interesting issue to pursue further, but this will have to wait for another time.

such a way that the context for s_i changes in the same way it would change if the context were directly updated according to our earlier context update rules. For minimal contexts, the update rule is this:

(162) *Minimal Update.* $c[p] = \downarrow \{s : \exists s'(s' \in c \wedge s' \leq s) \wedge p(s)\}$[191]

As pointed out above, discourse contexts determine for each topic situation under discussion a context. If the discourse context is updated with a proposition p that is supposed to describe a topic situation s_i, then d should change in such a way that the context it determines for s_i changes in line with Minimal Update. If d is the old discourse context, and we want to update d with a proposition p, to describe a topic situation s_i, then the context for s_i determined by the new discourse context has to be the same as the old context for s_i updated with p. To describe a discourse update rule that achieves this, let me first introduce some notation. For any assignment g, index i in the domain of g, and set of situations c, let h be a *c-i-variant* of g (in short, $g|^i_c h$) just in case h is like g except that h assigns some situation of c to i. With this piece of notation, we can now describe the update of a discourse context d with a proposition p, used to describe the topic situation s_i, as follows:

(163) *Minimal Discourse Update.* $d[p]_{s_i} = \{g : \exists h(h \in d \wedge h|^i_{c^d_i[p]} g)\}$

The updated discourse context $d[p]_{s_i}$ is the set of all those assignment functions g that are just like some assignment h of the old discourse context d, except that g assigns to the index i (which stands in for the topic situation s_i) some situation of $c^d_i[p]$. The context $c^d_i[p]$ is c^d_i updated with p, where c^d_i is the old context for s_i, and the update proceeds via the familiar context update rule (162). The old context for s_i, that is, c^d_i, is determined by the old discourse context d, as specified above in (161). This discourse update rule ensures that any situation assigned to i is a member of $c^d_i[p]$, and it ensures that any member of $c^d_i[p]$ is assigned to i by

[191] See section 3.2.2

some assignment in the new discourse context.

If a speaker asserts a proposition p in a discourse context d to describe a topic situation s_i, the speaker proposes that d be changed to $d[p]_{s_i}$. If the topic situations that are under discussion are related (for example because they are assumed to overlap), then an update that aims to describe one topic situation s_i may also have effects on what is assumed about the other topic situations. Such effects are not built into the discourse update rule, since the update rule only changes the situations assigned to i. The discourse context may change in other ways as well, but I assume that these other changes are not directly part of the proposed update.

In section 5.1, I suggested that there is an unpronounced existential quantifier over situations, restricted to the situations of the context, here repeated as (164):

(164) $[\![\ni]\!]^{c,g} = \lambda p_{\langle s,st\rangle}.\lambda s.\exists s' : s' \in c.s' \leq s \wedge p(s')(s)$

If there are multiple topic situations, there are also multiple contexts, and so the semantics of the quantifier has to specify which context is the relevant one. Suppose that the discourse context replaces the context as parameter for the interpretation. Then the following quantifier could replace (164):

(165) $[\![\ni_i]\!]^{d,g} = \lambda p_{\langle s,st\rangle}.\lambda s.\exists s' : s' \in c_i^d.s' \leq s \wedge p(s')(s)$

The quantifier $\ni$ now has an index i that stands for one of the topic situations that are under discussion, namely the situation s_i. The quantifier is then restricted to the situations in the context for s_i that is determined by the discourse context d, that is, to the situations in c_i^d. This modified quantifier works just like the earlier version (164). The only difference is that now there may be more than one topic situation under discussion and the quantifier may be restricted to the context for any of the topic situations.

That the semantics can pick up information from various different previous contexts may come in handy for longer sequences such as the following, which is another variant of (140a):

(166) There were three cats in the park. There was one cat. The cat was playing with a friend of the three cats.

This sequence seems felicitous to me. Note that there are two definite descriptions in the third sentence: 'the cat', which presupposes that there is exactly one man, and 'the three cats', which arguably presupposes that there are exactly three cats. Both presuppositions cannot be satisfied by the same context. But suppose that the context has shifted between the first and the second sentence of (166), as suggested in section 5.4, and so there are two different contexts available in the discourse context. In the minimal context that was updated with the first sentence, there are three cats (and there may well be exactly three cats), and in the minimal context that was updated with the second sentence, there is a cat (and there may well be exactly one cat). Accordingly, if the two definites of the third sentence are evaluated at these two different contexts, their presuppositions may well both be satisfied.[192]

5.6 Topic Situations and Discourse Referents

On the view just suggested, a discourse context is a set of assignment functions. Each index represents a topic situation under discussion, and the situations assigned to each index are candidates for being part of that topic situation. Update of the discourse context changes which situations are treated as candidates. Structurally, this is similar to dynamic semantic views on which contexts also include assignment functions. These assignment functions are used to model

[192]In this case, the situation variables inside the two definite descriptions of the third sentence would have to be distinct, and there would have to be two unpronounced existential quantifiers $\ni_i$ and $\ni_j$ in the third sentence, one for each definite description, and each indexed to a different context. The third sentence may be used to update either one of these two contexts or yet another context.

so-called discourse referents.[193] Because of the structural similarity, it may be interesting to consider briefly how discourse referents and topic situations compare with one another.

There are many different dynamic semantic views, employing different conceptions of contexts. For the sake of concreteness, consider the following view.[194] Let's say that a *dynamic context* is a set of pairs $\langle w, g\rangle$ of a world w and a partial assignment function g from indices to individuals, with the constraint that the assignments in a dynamic context are all defined for the same indices. The indices for which the assignment functions of a dynamic context are defined are the discourse referents of the context. Consider the following dynamic context:

(167) $c_d = \{\langle w, g\rangle : g(1) \text{ is a cat at } w \text{ and } g(1) \text{ is hungry at w}\}$

This would be a context with the index 1 as its only discourse referent; it's the set of all world-assignment pairs $\langle w, g\rangle$ where the assignment g assigns to 1 some individual who is a cat at w and is hungry at w. A dynamic context is accurate at a world w just in case there is some assignment g such that $\langle w, g\rangle$ is part of the context. Accordingly, the context c_d is accurate at a world w just in case there is some assignment that assigns to 1 an individual who is a cat at w and hungry at w. There is such an assignment just in case some individual is a cat at w and is hungry at w.[195]

As this example illustrates, a discourse referent does not have to stand for a particular individual. The discourse referent 1 does not stand for a particular hungry cat. It is associated with any hungry cat by some assignment function in the context.[196] Moreover, there is no particular individual such that all the

[193] The notion of a discourse referent goes back to Karttunen (1969). Heim (1982) uses sequences of individuals rather than assignment functions, but this difference is not substantial for current purposes.

[194] For the following view, see Heim (2002), who, however, uses total instead of partial assignment functions; partial functions are used in Heim 1983; see also Kadmon (2001), ch. 2, for an overview, in particular pp. 66-7.

[195] The context c_d could be the empty context updated with the claim that some cat is hungry.

[196] A discourse referent can stand for a particular individual, in the following sense: consider e.g. $\{\langle w, g\rangle : g(1) = \text{Sally and } g(1) \text{ is hungry at w}\}$. In this case, all assignments in the context

hungry cats associated with 1 are candidates for being that individual. Things are different in the case of the indices in a discourse context. Each index in a discourse context stands for a particular topic situation, and the situations assigned to the index are candidates for being (part of) that topic situation. This is a significant difference between topic situations and discourse referents. A topic situation is a particular actual situation, whereas a discourse referent stands in for any individual that satisfies certain conditions, and these conditions are not in general satisfied only by one individual. They are therefore conceptually rather different creatures, even if both are represented by assignment indices.

However, one might wonder whether the view that each index in a discourse context stands for a particular topic situation can ultimately be upheld. Consider again the following sequence.

(168) Three men came in today. There was one man. The man was being so annoying.

Suppose that (168) is asserted by someone who knows that three men came in today and that at least one of the three men was being very annoying but does not know when exactly this man came in and does not have a particular man in mind. Perhaps the speaker wasn't there and has merely been told about what happened today at the relevant place. In section 5.4, it was suggested that with the second and third sentence of (168), the speaker aims to describe a different, smaller topic situation than with the first sentence. Now there may well be a particular topic situation that the speaker aims to describe with the first sentence: perhaps a situation that encompasses everything that happened at a particular place on the day of the utterance. But is there a particular topic situation that the speaker aims to describe with the second and third sentence? Not obviously. Suppose that in fact, two of the three men who came in were very annoying. The speaker does not have any one of the two in mind. But if that's the case, then it

assign to 1 the same individual, namely Sally. But this is not generally so, as we've seen in the case of (167).

seems also plausible that the speaker does not have a particular topic situation in mind when asserting the second and third sentence. The situation described is some situation that is part of the larger situation that the first sentence was used to describe. But which part is unclear, and it's not clear that the speaker needs to have settled on a particular one. If this is so, it suggests that there need not always be a particular topic situation that an assertion aims to describe, as long as there is some (relevant) situation that is as described.[197]

If there are such cases, we can still use discourse contexts to model the information captured in the conversation, but we arguably have to assume that the contexts determined by the discourse context are not definite contexts but indefinite contexts. As spelled out in chapter 3, indefinite contexts do not capture information about a particular situation: an indefinite (minimal) context is accurate just in case it contains some situation that is actual. (For comparison, a definite minimal context is accurate just in case it contains some situation that is part of the topic situation. The definite context thus describes a particular topic situation.) The comparison with discourse referents suggests that if we have to switch from definite contexts to indefinite contexts, we move still closer to dynamic semantics and their conception of the context.[198]

[197] Kratzer (2019) suggests briefly that assertions may have multiple topic situations rather than just one, but for different reasons. The issue also reminds one of the dispute between referential and non-referential views about tense. Partee (1973, pp. 602–2) argued that when a speaker says "I didn't turn off the stove" (ibid., p. 602), the speaker refers to a particular time in the past and says about that time that she didn't turn off the stove then; whereas in other cases, the past tense appears to be "nonspecific" (ibid., p. 603), as in "John went to a private school" (ibid.), where the speaker does not seem to refer to a particular time in the past and say about that time that John went to a private school then. Cases where the speaker has no specific topic situation in mind may be similar to these nonspecific uses of the past tense; see also fn. 198 below.

[198] As mentioned in fn. 55 in chapter 3, some dynamic semantic accounts of tense phenomena make use of "discourse events" (Partee 1984, p. 243), which are discourse referents for events and accordingly don't have to stand for particular events, just like discourse referents for individuals that are used to interpret definites and indefinites. Indefinite minimal contexts would be similar to such discourse events, in that they, too, don't stand for particular situations. (Note that events are similar to minimal situations; see e.g. Kratzer 2019, section 9.) One of the intended applications of discourse events is for the interpretation of "temporal anaphora" to "indefinite antecedents" (ibid., p. 267), for which Partee provides the following example: "Mary woke up sometime during the night. She turned on the light" (ibid.); simplifying drastically, the idea is that the first sentence introduces a discourse event of Mary waking up, and the second sentence describes another event happening after the first one. The temporal antecedent for the second

sentence is supposed to be indefinite because no particular time is specified. (Partee's account is a version of Discourse Representation Theory, building on work by Hinrichs; see e.g. Hinrichs 1986). In chapter 7, I will return to the question of how the Minimal Context Account relates to dynamic semantics.

Chapter 6

Uniqueness and Local Contexts

6.1 Introduction

So far, the focus has been on sequences of sentences and on how updating the context with one sentence provides the background for updating the context with another sentence that has a uniqueness presupposition, triggered by a definite description. In this chapter, the focus will shift towards single sentences and the behaviour of presuppositions therein.

A sequence of two sentences is very similar to their conjunction, and so many cross-sentential phenomena appear analogously in the case of conjunctions.

(169) a. There's a cat. The cat is hungry.
b. There's a cat and the cat is hungry.

The conditions under which a speaker may assert (169a) truly and felicitously are plausibly very similar to, if not identical with, the conditions under which a speaker may assert (169b) truly and felicitously. If the sequence (169a) can be used truly to describe a situation in which there is more than one cat, then so can (169b). And if (169a) doesn't presuppose that there is exactly one cat, then (169b) doesn't either. We therefore need not just an account of why the sequence (169a) doesn't presuppose that there is exactly one cat at the topic situation. We also need an account of why the same holds for the conjunction (169b). We need an account of why (169b) doesn't presuppose or entail that there is exactly one cat, even though its second conjunct does presuppose it.

That the left conjunct of a conjunction can filter presuppositions of the right conjunct is a familiar observation from the literature on presuppositions:

(170) Jane stopped smoking.
(171) Jane used to smoke cigars and she stopped smoking.

Whereas (170) presupposes that Jane used to smoke, (171) doesn't: the presupposition of the right conjunct in (171) is filtered by the left conjunct. Note that the left conjunct entails that Jane used to smoke. If the left conjunct doesn't entail the presupposition of the right conjunct, the presupposition projects:

(172) Jane used to drink whisky and she stopped smoking.

This conjunction does presuppose that Jane used to smoke. The generalisation that emerges from this and similar examples is that the presuppositions of the right conjunct of a conjunction is filtered just in case the presupposition is entailed by the left conjunct.[199]

Prima facie, this generalisation is at odds with what we see in the case of definite descriptions. The first conjunct of (169b) entails that there is a cat, but it doesn't entail that there is at most one cat. That the conjunction as a whole nonetheless doesn't presuppose that there is at most one cat is therefore surprising if this generalisation were correct. This point has been highlighted recently by Mandelkern and Rothschild (2020). They also argue that this observation generalises from simple indefinite-definite sequences and conjunctions to other

[199]See e.g. Karttunen 1973, p. 179. Many theories of presupposition projection predict that (172) presupposes that if Jane used to drink whisky, she used to smoke. The discrepancy between this predictions and the intuitive, stronger presupposition that Jane used to smoke is an instance of the so-called *proviso problem*; see also fn. 128. This is a serious problem, but I won't discuss it here.

linguistic environments, such as disjunctions and sequential attitude reports.[200] Mandelkern and Rothschild also point out that uniqueness presuppositions that are triggered not by definites but in some other way are not filtered by indefinites:

(173) There's a cat and John is aware that there is exactly one cat.
(174) Every farmer who owns a donkey is aware that she has only one donkey.[201]

Unembedded, 'John is aware that there is exactly one cat' presupposes that there is exactly one cat.[202] (173) may not presuppose that there is a cat, but it still seems to carry a non-trivial presupposition that there is at most one cat. Similarly, ⌜is aware that x has only one donkey⌝ triggers a presupposition that x has exactly one donkey, and this presupposition doesn't seem to disappear in (174), even though for example (175), a donkey sentence with a definite description, does not suggest that every farmer who owns a donkey owns only one donkey.[203]

(175) Every farmer who owns a donkey cherishes the donkey.

If one wants to hold that definite descriptions trigger a uniqueness presupposition, one should explain why the uniqueness presupposition of definites is filtered in environments where a uniqueness presupposition triggered in some other way isn't, as in (173) and (174).

The situation semantic account of definite descriptions should explain how the behaviour of the uniqueness presupposition of definite descriptions fits into a more general theory of presupposition projection. The ideal would be a unified account of presupposition projection that also accounts for the way the presuppositions of definites project. There is a multitude of theories of presupposition projection, and my aim in this chapter is neither to provide an overview nor to argue for a specific theory. Instead, I want to look at one view of projection that

[200] See Mandelkern and Rothschild 2020, pp. 86–95; I'll say more about disjunctions below.
[201] Mandelkern and Rothschild 2020, p. 100, attributed to an anonymous referee.
[202] As evidenced e.g. by its projection behaviour, for example in conditionals: 'If John is aware that there is exactly one cat, he will be happy' suggests that there is exactly one cat.
[203] Donkey sentences such as this one have received much attention from situation semantic accounts of definites; see e.g. Elbourne 2005; Elbourne 2013.

relies heavily on the notion of context and explore whether combining it with the view of contexts as sets of situations might be fruitful. More specifically, I want to consider an approach to presupposition projection that employs so-called *local contexts*. I will suggest that these local contexts are also minimal contexts, along the lines discussed in chapter 3, and I will explore whether the resulting view can deal with the uniqueness presuppositions of definite descriptions. First, I focus on sentential connectives such as conjunction; at the end of the chapter, I also consider quantifiers.

6.2 Local Contexts as Minimal Contexts

6.2.1 Conjunction

So far, we've only encountered *global contexts*: contexts that capture what has already been accepted in the conversation. To a first approximation, the idea of *local contexts* is that something may be old news at some point of an utterance even if it isn't accepted in the conversation. Consider the following conditional:

(176) If Hilary likes ice cream, an ice cream machine would be a nice gift.

If a speaker asserts this, she doesn't suggest that the interlocutors accept that Hilary likes ice cream. But in some sense, that Hilary likes ice cream is old news by the time we hear the consequent; adding this information again to the consequent would seem redundant:[204]

(177) If Hilary likes ice cream, Hilary likes ice cream and an ice cream machine would be a nice gift.

The idea is that effects like this may be described in terms of local contexts: the local context of the consequent of (177) already entails that Hilary likes ice cream,

[204] That local contexts and redundancy are closely related is an idea for example developed in more detail by Schlenker (2009), see in particular pp. 34-5 and the examples provided there, which are very similar to the ones I provide. I come back to Schlenker's theory of contexts in section 6.3 below. The idea that contexts and redundancy are related goes back to Stalnaker (1978, p. 325).

and so adding this claim to the consequent is redundant. This approach can also be extended to other cases where sentences are embedded, such as conjunctions:

(178) Hilary likes ice cream and an ice cream machine would be a nice gift.

(179) Hilary likes ice cream and an ice cream machine would be a nice gift and Hilary likes ice cream.

Adding that Hilary likes ice cream to the right conjunct seems redundant. Due to the left conjunct, the local context of the right conjunct already entails that Hilary likes ice cream.

In the case of sequences, the idea pursued earlier was that presuppositions of a sentence project onto the entire sequence just in case the presupposition is not satisfied by the context of that sentence. And I assumed that the context of a sentence in a sequence includes information contributed by sentences that come earlier in the sequence. Theories of projection based on local contexts assume that this idea can be extended to the innersentential case, by using local contexts: The presuppositions of a sentence S that is embedded in a more complex sentence project just in case the presuppositions are not satisfied by the local context of S. And, accordingly, the presuppositions of a sentence S that is embedded in a more complex sentence are filtered just in case the presuppositions are satisfied by the local context of S.[205]

This general idea has been implemented in different ways. In the situation semantics suggested in chapters (4) and (5), the presuppositions of definite descriptions are modelled as truth-value gaps.

(180) There's a cat. [϶ [δ_i [The cat s_i is hungry]]].

To achieve the result that the sequence as a whole doesn't presupposes that there is only one cat, I assumed that the situation variable s_i is bound by a situation abstractor δ, and that there is an unpronounced existential quantifier, ϶, quan-

[205]See Karttunen 1974, p. 187, where the notion of a local context is also introduced. This sort of account of projection is also adopted by dynamic semantic theories of presupposition projection; see in particular Heim 1990b.

tifying over the situations of the context relative to which the sentence is interpreted. If the context is c, the second sentence of (180) then expresses the following proposition:

(181) $\lambda s.\exists s' : s' \in c.(s' \leq s \wedge \textsc{hungry}(\iota x\textsc{cat}(x)(s'))(s))$

This proposition is true or false at s just in case the situations in c contain exactly one cat; if true or false, it is true at s just in case the cat of some situation in c is hungry at s'. Since the context c is a minimal context, already updated with the first claim of (180), every situation c does indeed contain exactly one cat (unless it has been claimed before that there is more than one cat). This approach can be extended to the conjunction (182) if we assume that the unpronounced quantifier may quantify over the situations in the local context of the second conjunct:

(182) There's a cat and the cat is hungry.

First, let's assume that every conjunct of a conjunction is interpreted relative to its own local context:[206]

(183) $[\![\phi \text{ and } \psi]\!]^{c,g} = \lambda s.[\![\phi]\!]^{c_l,g}(s) \wedge [\![\psi]\!]^{c_r,g}(s)$

Secondly, let's assume that the situation pronoun of 'the cat' in (182) is bound as in the sequence (180):

(184) There's a cat and [∍ [δ_i [the cat s_i is hungry]]].

Let's also assume that the first conjunct of (184) is interpreted as follows:

(185) $\lambda s.\exists x\textsc{cat}(x)(s)$

With these assumptions, the conjunction (184) as a whole, relative to a context c, expresses the following proposition:

(186) $\lambda s.\exists x\textsc{cat}(x)(s) \wedge \exists s' : s' \in c_r.(s' \leq s \wedge \textsc{hungry}(\iota\textsc{cat}(x)(s'))(s))$

[206]See Klinedinst and Rothschild 2012, pp. 149–50, for this way of treating local contexts as parameters for the interpretation, including of conjunctions and disjunctions, to account for presupposition projection along very similar lines as suggested here; see also Portner 1992, p. 59, for such a semantics for conjunction in a situation semantic setting.

As discussed in 4.2.3, I assume that a conjunction $\ulcorner\phi \wedge \psi\urcorner$ is neither true nor false just in case at least one conjunct is neither true nor false. Accordingly, (186) is neither true nor false at any situation s just in case not every situation s' in the local context c_r contains exactly one cat. If (186) is true or false, it is true at s just in case there is some cat at s and the cat in some situation s' of c_r is hungry at s. So far, I haven't said what situations c_r contains, but if c_r contains the same situations as the context of the second sentence in the sequence (180), the sequence as a whole is true or false under the same conditions as the conjunction (184).

In the case of the sequence (180), I assumed that the context of the second sentence is a minimal context, updated with the claim expressed by the first sentence. If the initial context is c, the context for the second sentence would therefore be c updated with the proposition (185). Suppose that in the case of the conjunction (184), the initial, global context is also c. Moreover, suppose that the local context of the right conjunct of a conjunction $\ulcorner\phi \wedge \psi\urcorner$ is c updated with the proposition expressed by the left conjunct:

$$c_r = c[[\![\phi]\!]^{c_l,g}]$$

Given these assumptions, the local context of the right conjunct is indeed the same as the context of the second sentence of the sequence, since the proposition expressed by the left conjunct is also (185).

If the initial context is the empty minimal context, the local context for the right conjunct is the set of all minimal situations in which there is a cat, and the conjunction (184) is true at a situation s just in case there is a cat at s, some minimal situation s' in which there is a cat is part of s, and the cat in s' is hungry at s. A situation s satisfies these conditions just in case there is some cat in s that is hungry at s.

Presupposition projection is generally assumed to be asymmetric in conjunctions:[207]

(187) a. Jane used to smoke cigars and she stopped smoking.
b. Jane stopped smoking and she used to smoke cigars.

Whereas (187a) doesn't presuppose that Jane used to smoke, (187b) does.[208] Reversing the order of the conjuncts of a conjunction such as (188a) seems to have the same effect:

(188) a. There's a brown cat and the cat is hungry.
b. The cat is hungry and there's a brown cat.

Whereas (188a) doesn't presuppose that there is exactly one cat, (188b) does. In the present framework, this effect can be accounted for by assuming that the local context of the first conjunct of a conjunction does not take into account the second conjunct: the local context of the first conjunct is simply the same as the global context of the conjunction (rather than the global context updated with the proposition expressed by the right conjunct):

(189) $[\![\phi \text{ and } \psi]\!]^{c,g} = \lambda s.[\![\phi]\!]^{c,g}(s) \wedge [\![\psi]\!]^{c_r,g}(s)$

As a result, the reversed conjunction (188b) is only true or false if the global context already contains only situations in which there is exactly one cat.

This approach to projection raises a number of questions. One question is how to extend it to other connectives, such as disjunction, and to the presuppositions of quantificational sentences. I will turn to disjunctions in the next section, and to quantifiers in section 6.4. Another question is how the local contexts are determined. Is there some general procedure for determining what the local context of an embedded sentence is? I will turn to this question in section 6.3. But first, I want to compare the present approach very briefly with a situation semantics for conjunction suggested by Mandelkern and Rothschild (2020).

207 See e.g. Karttunen 1973, pp. 178–9

208 For discussion of and experimental data on the asymmetry of projection in conjunctions, see e.g. Mandelkern, Zehr, et al. 2020.

Mandelkern and Rothschild (2020) explore how what they call *e-type theories* can account for the ways in which the presuppositions of definites project. On their view, an e-type theory assumes that indefinites are existential quantifiers and that definites trigger existence and uniqueness presuppositions that are evaluated at situations, like on the view developed here. Mandelkern and Rothschild highlight that e-type theories have to account for the way definites project in sequences, conjunctions, disjunctions, and so. And they make a suggestion for what a situation semantics for conjunction could look like.[209] Here is the semantics for definite descriptions and for conjunction that Mandelkern and Rothschild suggest e-type theories could adopt:

(190) $[\![\text{[The F]}_i \text{ G}]\!]^{g,s}$
a. presupposes there is a unique F in $g(i)$;
b. where the presupposition is satisfied, is true iff the unique F in $g(i)$ is G in s. (Mandelkern and Rothschild 2020, p. 97)

(191) $[\![\text{p and q}]\!]^{g,s} = 1$ iff $[\![\text{p}]\!]^{g,s} = 1$ and for some minimal situation $s' \leq s$ s.t. $[\![\text{p}]\!]^{g,s'} = 1$, $[\![\text{q}]\!]^{g[s' \to r],s} = 1$. (Mandelkern and Rothschild 2020, p. 98)

This conjunction has a built-in existential quantifier over minimal situations at which the first conjunct is true. If there is a definite description in the second conjunct, its situation index may be bound by this existential quantifier.

(192) There's a cat and the cat$_i$ is hungry.

With this kind of semantics, the conjunction (192) would then be predicted to be true at a situation s just in case there's a cat at s and there is, in s, some minimal situation s' in which there is a cat such that the cat of s' is hungry at s, and so the presupposition of the definite description would be satisfied, according to Mandelkern and Rothschild.[210]

However, Mandelkern and Rothschild (2020, pp. 99–101) argue that this way of accounting for the projection and filtering of the presuppositions of def-

[209] They also make suggestions for other cases, such as disjunction, but to keep the discussion simpler, I focus on conjunction.

[210] See Mandelkern and Rothschild 2020, pp. 98–9

inites is problematic. They raise different worries for this type of semantics, of which I want to mention two. Their first worry is one that we have already encountered before, namely, that the mechanism invoked here to deal with presupposition filtering in conjunction will not generalise to indefinite-definite sequences, since in a sequence of several sentences, there is no operator (such as a quantifier or perhaps a conjunction) under which the different sentences are all embedded. Mandelkern and Rothschild's second worry is that if e-type theories adopt this kind of semantics for conjunction to explain how the presuppositions of definites are filtered, their overall account of presupposition projection will not be unified: The semantics (191) may account for the filtering of presuppositions of definite descriptions, but it won't account for presupposition projection in general, and so a different mechanism will be needed for other presuppositions: The semantics (191) only deals with the presuppositions of definites; on the other hand, a general mechanism for presupposition projection won't account for the filtering of the presuppositions of definites, since indefinite claims do not in general filter uniqueness presuppositions if they are not triggered by definites but in some other way, for example by 'is aware that there is exactly one cat'.[211]

At least briefly, I want to discuss how I think these worries relate to the semantics of conjunction that I have suggested above. I agree with the first worry, which is why I suggested appealing to minimal contexts in order to account for indefinite-definite sequences.[212] Once minimal contexts are part of the overall theory, I take it to be natural to also try to use them to deal with conjunctions and other connectives. On the view that I suggested, the mechanism that filters presuppositions by binding the situation variables of definite descriptions (via a variable abstractor and the quantifier $\ni$) may be kept separate from the semantics

[211] As discussed in section 6.1, illustrated by examples such as (173) ('There's a cat and John is aware that there is exactly one cat').

[212] As discussed in chapter 4. Mandelkern and Rothschild (2020, p. 103), in turn, agree that e-type theories will need some pragmatic mechanism to account for sequences; they suggest that indefinites and definites in different sentences could be co-indexed, with assignment functions shifting between sentences, but they don't discuss in more detail what this would look like.

of conjunction (and other connectives), which keeps the semantics of the connectives simple. Moreover, the use of local contexts connects the account of how the presuppositions are filtered to a general theory of presupposition projection. The presuppositions of definite descriptions, just like other presuppositions, project just in case they are not satisfied by the local context. The mechanism that filters the uniqueness presuppositions, on my view, is therefore not separate from the more general theory of how presuppositions project. At least in that way, I think, my account is preferable to a semantics for conjunction (and other connectives) along the lines of (191). There remains the worry that uniqueness presuppositions that are not triggered by definite descriptions behave differently from those triggered by definite descriptions. I will address this worry below in section 6.2.5, and I will also briefly return to it in the concluding chapter 7.

6.2.2 Disjunction

How presuppositions project in disjunctions is a tricky issue.[213] It generally seems that the first disjunct of a disjunction can filter the presuppositions of the second disjunct—not by entailing the presuppositions but rather by excluding them.[214]

(193) Jane used to drink whisky or she stopped smoking.
(194) Jane never smoked or she stopped smoking.

Whereas (193) presupposes that Jane used to smoke, (194) doesn't. In the case of (194), the left disjunct doesn't entail that Jane used to smoke; rather, its negation does: If it's not the case Jane never smoked, then Jane used to smoke. Similarly, it has been argued that the presuppositions of definites can be filtered by negated indefinites in disjunctions such as these:

[213] See e.g. Soames 1979 for some discussion.

[214] See e.g. Karttunen 1973, p. 180; whether the reverse is also true is more controversial; see e.g. Schlenker 2009, pp. 38–40 for discussion.

(195) a. Either there's no bathroom in this house or it's in a funny place. (Roberts 1989, p. 702, attributed to Barbara Partee)
b. Either there's no bathroom in this house or the bathroom is in a funny place.

(196) a. Either John does not own a donkey, or he keeps it very quiet. (Evans 1977, p. 530)
b. Either John does not own a donkey, or he keeps the donkey very quiet.

(197) Either there isn't a cat or the cat is hungry.

Consider the disjunction (197). This disjunction doesn't seem to presuppose that there is exactly one cat. In this case, the first disjunct doesn't entail that there is a cat; rather, the first disjunct is false just in case there is a cat.

It may not be obvious whether or not disjunctions like these presuppose uniqueness. Perhaps we find these disjunctions felicitous because we are happy to accommodate a uniqueness assumption. For example, perhaps we accommodate that there is at most one bathroom in the house under consideration, in the case of (195b), or that there is at most one cat, in the case of (197). But consider for instance the following variant of (197):

(198) Either there isn't a cat or the cat is playing with another cat.

This disjunction seems felicitous, but it seems unlikely that this is because we accommodate that there is at most one cat. After all, the second disjunct would be false if there was only one cat, and it doesn't seem that we take the speaker to be committed to the truth of the first disjunct. This is some evidence that the uniqueness presupposition really is filtered in such disjunctions.[215]

Since the first disjunct of a disjunction can filter the presuppositions of the second disjunct, the local context of the second disjunct has to take the first disjunct into account. In disjunctions such as (198), the first disjunct is a negated indefinite. So far, I have said little about the semantics of indefinites, and even

[215] This point is from Mandelkern and Rothschild 2020, p. 94, example (31). For some more discussion of anaphora in disjunctions, see e.g. Simons 1996 and Mandelkern and Rothschild 2020, pp. 91–2. Elbourne (2013, pp. 66–7) only very briefly discusses presupposition projection in disjunctions and gives an example with 'exactly one' rather than 'a' ("Either there is not exactly one knave at the Palace or the knave stole the tarts", p. 66).

less about the semantics of negation. In the next section, we will see that indefinites and negation raise some tricky questions for the Minimal Context Account.

6.2.3 Negation and Indefinites

A Challenge

So far, I assumed that indefinites are essentially existential quantifiers; I assumed that an indefinite claim such as (199a) expressed a proposition such as (199b):

(199) a. There is a cat.
b. $\lambda s.\exists x \textsc{cat}(x)(s)$

So far, this assumption seemed good enough for my purposes. However, the issue becomes more complicated as soon as we also consider the semantics of negation. Suppose that sentential negation is interpreted as follows:

(200) $[\![\text{not}]\!] = \lambda p.\lambda s.\neg p(s)$

Then the negation (201a) of (199a) expresses the proposition (201b):

(201) a. There isn't a cat.
b. $\lambda s.\neg\exists x \textsc{cat}(x)(s)$

If a speaker asserts (201a) to describe a topic situation s_t, the speaker excludes that there are any cats in s_t. However, if we update a minimal context with the proposition (201b), the update doesn't ensure that the resulting context accurately describes s_t only if s_t doesn't contain any cats. If we update a context c with (201b), we have to expand every situation c in such a way that (201b) is true at the expanded situation, and only the smallest expansions make it into the updated context. If there is a situation s in c that doesn't contain any cats, (201b) is already true at s, and so s will remain in the context when we update it. However, s is only a candidate for being part of s_t, rather than for being s_t, since the context is a minimal context. The situation s could still be part of a larger situation in which there are cats. Therefore, the update does not ensure that the only remaining candidates for being s_t contain no cats. Relatedly, we would fail to predict that describing one and the same topic situation with the following sequence is incoherent.

(202) There isn't a cat. There is a cat.

After update with (201b), the situations in the context may be part of larger situations in which there is a cat. Therefore, a subsequent update with (199b) is not guaranteed to reduce the context to the empty set. If (201a) were interpreted as (201b), this would lead to an implausible context update, given the framework of minimal contexts.

The problem has three potential sources: the account of minimal context update, the interpretation of negation, and the interpretation of indefinites. Since my aim is to explore the use of minimal contexts, my focus will be on the other two sources. First, I will look at negation; then I consider modifying the semantics for indefinites.

Generic Negation

Kratzer (1989, pp. 643–44) makes an observation about negation that is closely connected to the problem just raised. Kratzer argues that if English negation is interpreted as in (203), some negated sentences will express non-persistent propositions.

(203) $[\![\textit{not } \alpha]\!]^g$ is true in a situation $s \in S$ if and only if $[\![\alpha]\!]^g$ is not true in s. (Kratzer 1989, p. 643)

(204) There isn't a paper lying on a table. (Kratzer 1989, p. 644)

In particular, Kratzer argues that the proposition expressed by (204) would not be persistent. There are parts of this world that don't contain a paper, and in those parts, the proposition expressed by (204) would be true, even though it would not be true at the world as a whole, since there are papers lying on tables.[216]

[216] Kratzer seems to assume here an interpretation for indefinites similar to the one I have been assuming above; see also Kratzer 1989, p. 620.

Note that the same failure of persistence underlies the problem we've seen in the foregoing section. There, the problem was also that the proposition expressed by 'There isn't a cat' could be true at a situation s that is in the context without being true at expansions of s.

Since Kratzer assumes that all propositions expressed by English sentences are persistent, she proposes to adopt a different semantics for negation. Kratzer makes two suggestions, but I will only discuss one of them here, which Kratzer calls "generic" (1989, p. 644) negation.[217] Adapted to the present framework, the proposal would be the following:

(205) $[\![\text{not}]\!]^g = \lambda p.\lambda s.\forall s'(s \leq s' \rightarrow \neg p(s'))$ (see Kratzer 1989, p. 644)

With this semantics, (206a) would express (206b):

(206) a. There isn't a cat.
b. $\lambda s.\forall s'(s \leq s' \rightarrow \neg\exists x \textsc{cat}(x)(s'))$

This proposition is true at a situation s just in case no expansion of s contains a cat. It is persistent, since it is only true at a situation s if it also true at all expansions of s. As a consequence, the problem of the foregoing section is avoided: If we update a minimal context with (206b), the situations in the new context are not part of bigger situations in which there are cats.

Unfortunately, this comes at a price. If negation is interpreted as in (207), double negation is valid; ⌜not not α⌝ is true at s just in case α is true at s.

(207) $[\![\text{not}]\!] = \lambda p.\lambda s.\neg p(s)$

However, with a semantics for negation such as (205), double negation becomes invalid; if α expresses the proposition p, then ⌜not not α⌝ expresses (208):

(208) $\lambda s.\exists s'(s \leq s' \wedge p(s'))$

The negation of 'There isn't a cat' would accordingly express (209) rather than

[217] For the second suggestion, see Kratzer 1989, pp. 645–47; it assumes that negated claims are only true at situations in which a range of alternatives are true, which may depend on the focus; it would go beyond the limits of this chapter to discuss this proposal in sufficient detail.

(210):

(209) $\lambda s.\exists s'(s \leq s' \wedge \exists x\textsc{cat}(x)(s'))$

(210) $\lambda s.\exists x\textsc{cat}(x)(s)$

Whereas update of a minimal context with (210) ensures that every situation in the updated context contains a cat, update with (209) merely ensures that every situation in the updated context is part of a situation that contains a cat.

The failure of double negation is problematic, as double negation is an intuitively plausible principle. Its failure is not just in general worrying, it also has troubling consequences when it comes to indefinite-definite sequences, since doubly negated indefinites have been argued to serve as antecedents for definites:

(211) John didn't remember not to bring an umbrella, although we had no room for it. (Krahmer and Muskens 1994, p. 197)

(212) It is not true that John didn't bring an umbrella. It was purple and it stood in the hallway. (ibid.)

(213) It's not the case that there isn't a cat. The cat is hungry.

If, for example, update with the first sentence of (213) doesn't ensure that every situation in the updated context contains a cat, it becomes more difficult to explain why 'the cat' may be used in the subsequent sentence. The problem also shows up in the case of disjunctions. Consider again (214):

(214) Either there isn't a cat or the cat is playing with another cat.

In section 6.2.2, it was suggested that the definite in the second disjunct is appropriate because the first disjunct is false just in case there is a cat. But (206b) is false at a situation s just in case s is part of a situation in which there is a cat, which may be true even if s itself doesn't contain a cat.[218]

One might try to appeal to some pragmatic process such as accommodation

[218]See Krahmer and Muskens (1994), who discuss a very similar problem for dynamic semantic theories on which double negation also fails; they also point out the connection between the problem with cases such as (211) and with disjunctions such as (214). In Heim's (1982) dynamic semantics, negation introduces universal quantification over assignment functions, and so the failure of double negation has a source that is structurally parallel to the failure of double negation in the case of Kratzer's generic negation. See also Mandelkern (forthcoming) for discussion.

to deal with the failure of double negation in these cases. Perhaps when we have updated a context with the claim that every situation can be extended in a certain way (e.g. in such a way that the extended situation contains a cat), we may then tacitly adjust the context and extend every situation of the context in that way, even though this isn't strictly what the original update demanded. I don't have a knock-down argument against this suggestion. One thing to note, however, is that standard versions of dynamic semantics have a very similar problem with double negation, which is also not valid on these views.[219] One may have hoped that situation semantics has an advantage here over these dynamic semantic theories. But if negation has to be understood as generic, along the lines of (205), this hope is disappointed. What is more, situation semantics may even be at a disadvantage compared to some non-standard varieties of dynamic semantics which do validate double negation.[220] It is therefore at least worth considering whether there is a way to avoid Kratzer's generic negation. This is what I turn to next.

Witness Conditions

As pointed out, the problem under consideration has (at least) two potential sources: the semantics of negation and the semantics of indefinites. Now I want to consider whether the problem could be solved by changing the semantics of indefinites, without abandoning (215).

(215) $[\![\text{not}]\!] = \lambda p.\lambda s.\neg p(s)$

So far, I assumed that (216) expresses (217):

(216) There's a cat.
(217) $\lambda s.\exists x \textsc{cat}(x)(s)$

The negation (218) is non-persistent, because it can be true at a situation s even if s is part of a larger situation in which there is a cat.

[219]See fn. 218 above.
[220]See e.g. Mandelkern (forthcoming).

(218) $\lambda s.\neg\exists x\textsc{cat}(x)(s)$

One way to avoid this is to assume that (216) is neither true nor false at a situation s if there is no cat at s but s is part of a larger situation in which there is a cat. Put slightly differently, the assumption is that (216) is true or false at s only if the following holds: if s is part of a situation in which there is a cat, then s itself contains a cat.[221] This is essentially a situation semantic version of an idea developed by Mandelkern (forthcoming), also in order to validate double negation, but in a different semantic framework. Following Mandelkern, I will call this condition of indefinites a *witness* condition.[222]

So far, the only truth-value gaps that I appealed to came from definite descriptions (and the ι-terms used to interpret them). In order to implement other truth-value gaps, let's assume that the metalanguage contains a presupposition operator δ, adopted from Beaver and Krahmer (2001, p. 151): If α is an expression of type t, let $\ulcorner\delta\alpha\urcorner$ also be an expression of type t, interpreted as follows:[223]

(219) $|\ulcorner\delta\alpha\urcorner|^{M,g} = \# \text{ iff } |\alpha|^{M,g} = 0 \text{ or } |\alpha|^{M,g} = \#,$
$|\ulcorner\delta\alpha\urcorner|^{M,g} = 1 \text{ iff } |\alpha|^{M,g} = 1$

This presupposition operator can be used to implement truth-value gaps. If α and β are formula of type t, then $\ulcorner\alpha \wedge \delta\beta\urcorner$ is also a formula of type t, and this conjunction is neither true nor false if β is not true. That way, we can also implement the witness presupposition:

(220) $\lambda s.\exists x\textsc{cat}(x)(s) \wedge \delta(\exists s'(s \leq s' \wedge \exists x\textsc{cat}(x)(s')) \rightarrow \exists x\textsc{cat}(x)(s)))$

This proposition is true or false at a situation s if and only if either there is a cat

[221] $\neg(\neg\exists x\textsc{cat}(x)(s) \wedge \exists s'(s \leq s' \wedge \exists x\textsc{cat}(x)(s')))$ and $\exists s'(s \leq s' \wedge \exists x\textsc{cat}(x)(s')) \rightarrow \exists x\textsc{cat}(x)(s)$ are equivalent.

[222] The semantics of Mandelkern (forthcoming) is motivated by some of the same data regarding double negation and disjunction that I looked at here. Mandelkern suggests that "indefinites with the form $\ulcorner$Some$_x$ F is $F\urcorner$ have a *witness bound* [...]. The witness bound requires, at a point [of evaluation] $\langle g, w\rangle$, that, if *anything* is F and G in w, then $g(x)$ is", where g is an assignment function and w a world. It would be interesting to compare the present system with Mandelkern's in more detail, but I leave this for another time.

[223] This δ in the metalanguage should not be confused with the object language situation abstractor δ_i that was introduced in section 5.1.

at s or s is not part of a situation in which there is a cat. If true or false, it is true just in case there is a cat at s. Let's assume that this is the proposition expressed by (221):

(221) There's a cat.

Then the negation (222a) expresses the proposition (222b):

(222) a. There isn't a cat.
b. $\lambda s.\neg(\exists x\textsc{cat}(x)(s) \wedge \delta(\exists s'(s \leq s' \wedge \exists x\textsc{cat}(x)(s')) \rightarrow \exists x\textsc{cat}(x)(s))))$

Truth-value gaps project through negation; α and $\ulcorner\neg\alpha\urcorner$ are neither true nor false under the same conditions. Accordingly, (222b) is equivalent to the following proposition:[224]

(223) $\lambda s.\neg\exists x\textsc{cat}(x)(s) \wedge \delta(\exists s'(s \leq s' \wedge \exists x\textsc{cat}(x)(s')) \rightarrow \exists x\textsc{cat}(x)(s)))$

Due to the δ-condition, this proposition is again true or false at s just in case either there is a cat at s or s is not part of a situation in which there is a cat. Because of its first conjunct, the proposition is true at s only if there is no cat at s. Altogether, the proposition is true at s just in case there is no cat at s and s is not part of a situation in which there is a cat. This means that (223) is persistent: if it is true at s, s is not part of any situation in which there is a cat, and so (223) is also true at any situation of which s is a part. It also means that if we update a minimal context with (223), the situations in the updated context don't contain any cat and are not part of larger situations in which there is a cat. Accordingly, we now do predict that updating a context with the following sequence reduces the context to the empty set.

(224) There isn't a cat. There is a cat.

This solves the problem of negated indefinites, without adopting a quantificational semantics for negation that invalidates double negation, such as Kratzer's generic negation.

[224] In general, $\ulcorner\neg(\alpha \wedge \delta\beta)\urcorner$ is equivalent to $\ulcorner\neg\alpha \wedge \delta\beta\urcorner$.

Before moving on, I want to address one worry for the view that (225a) expresses (225b):

(225) a. There isn't a cat.
b. $\lambda s.\neg\exists x\textsc{cat}(x)(s) \wedge \delta(\exists s'(s \leq s' \wedge \exists x\textsc{cat}(x)(s')) \rightarrow \exists x\textsc{cat}(x)(s)))$

As discussed above, (225b) is not true at any situation that is part of another situation in which there is a cat. One might worry that this condition is too strong. If we update a minimal context with (225b), the only situations that remain in the context are not part of any situation in which there is a cat. The context is accurate only if at least one of the situations in it are part of the topic situation. Assuming that the topic situation is an actual situation, it follows that the context is accurate only if at least one situation in it is actual. But the situations in the context are not part of any situation in which there is a cat, and so if any of them is actual, the entire actual world doesn't contain any cats. (After all, any actual situation is part of the actual world.) But plausibly, not every speaker who uses (225a) to make an assertion is committed to the claim that there are no cats anywhere in the entire world.

One way to avoid this result is to assume that the witness condition is restricted to counterparts of the topic situation. That way, the speaker would only be committed to the claim that there is no cat anywhere in the topic situation. Suppose that s_t is the topic situation of an utterance of (225a); a restricted interpretation could look as follows:

(226) $\lambda s.\neg\exists x\textsc{cat}(x)(s) \wedge \delta(\exists s'(s \leq s' \wedge s' \leq \gamma_{s_t,w_s} \wedge \exists x\textsc{cat}(x)(s')) \rightarrow \exists x\textsc{cat}(x)(s)))$

This proposition is undefined at a situation s just in case there is no cat at s, but s is part of a situation s' that (i) contains a cat, and (ii) is part of γ_{s_t,w_s}, the counterpart of the topic situation s_t at the world of s (that is, at w_s). As long as these two conditions are not both satisfied, (226) is true or false at s even if the counterpart of the topic situation is itself part of a bigger situation in which there is a cat. If the counterpart of the topic situation is smaller than the world w_s to which it belongs, (226) may be true at s even if there are cats at w_s. Accordingly, if one updates a context with (226), the situations that remain in the context may also be part of worlds in which there are cats, as long as they are not part of a counterpart of the topic situation in which there are cats.

Restricting the witness condition along these lines seems plausible to me. But even though I think that some such restriction is ultimately necessary, I will bracket this complication in what follows. As far as I can tell, this simplification doesn't affect the core of what I'm going to say.

Witness Conditions and Homogeneity

One question is whether the witness condition has the same pragmatic status as other presuppositions, which have to be satisfied by the old context, at least according to the Stalnakerian view. As Mandelkern (forthcoming) points out, the witness condition is usually not true at all elements of the old context. Therefore, if the witness condition were a presupposition, update of a context with an indefinite claim would usually be undefined, given the Stalnakerian view. For example, the situations in the empty minimal context do not all satisfy the witness condition of an indefinite claim such as 'There's a cat', and so the empty context could not be updated with this claim. They don't all already contain a cat or are not part a situation in which there is a cat.[225]

One might therefore wonder whether the witness condition really is a presupposition. As Soames (2008a, pp. 105–11) has argued, Stalnaker's arguments for the view that all truth-value gaps impose constraints on the context are not entirely convincing. Perhaps some truth-value gaps impose constraints on the context and others don't.[226] But if the witness condition isn't a presupposition,

[225]Some situations in the empty context are part of situations in which there are cats, and if the situations of the empty context don't contain any individuals, they don't contain any cats either. (See section 3.1.4 for discussion of what the empty minimal context is like.) As mentioned in fn. 222, the witness condition is a constraint on assignment functions, and so has a different shape in Mandelkern's theory, but this point carries over to the witness condition that I use.

[226]See also the suggestion of an anonymous reviewer in a fn. of Mandelkern (forthcoming).

what kind of condition is it?

Let's consider again how the addition of the witness condition changes the interpretation of (227a) from (227b) to (227c) and the interpretation of (228a) from (228b) to (228c):

(227) a. There's a cat.
b. $\lambda s.\exists x\textsc{cat}(x)(s)$
c. $\lambda s.\exists x\textsc{cat}(x)(s) \wedge \delta(\exists s'(s \leq s' \wedge \exists x\textsc{cat}(x)(s')) \rightarrow \exists x\textsc{cat}(x)(s)))$

(228) a. There isn't a cat.
b. $\lambda s.\neg\exists x\textsc{cat}(x)(s)$
c. $\lambda s.\neg\exists x\textsc{cat}(x)(s) \wedge \delta(\exists s'(s \leq s' \wedge \exists x\textsc{cat}(x)(s')) \rightarrow \exists x\textsc{cat}(x)(s)))$

As we've already seen, the addition of the witness condition affects whether (228a) is persistent: (228b) is not persistent, whereas (228c) is persistent. But this is not so in the case of (227a): (227b) and (227c) are both persistent. Instead, what the witness condition does is turn the proposition into an *upwards homogeneous* proposition.

So-called *homogeneity effects* arise when certain predicates, homogeneous predicates, are applied to pluralities.[227] Imagine that there are several lights, exactly half of them are turned off, and someone says:

(229) The lights are turned off.

(230) The lights aren't turned off.

There is something odd about utterances such as these. It has been suggested that neither utterance seems to be clearly true or clearly false, even though one is the negation of the other.[228] Moreover, it would often be more natural to respond to them with 'Well, some of them are' than with a simple 'Yes' or 'No'. By contrast,

[227] See Križ 2019 for a good overview.

[228] As Križ (2019, pp. 13–14) makes clear, truth-value judgments about such utterances vary, depending on the circumstances. For example, (230) may be more easily judged true if what is at stake is whether any lights are turned on (e.g. when one is leaving the house for the holidays and all the lights need to be turned off). How to explain such variations is a matter of ongoing dispute. I take it that assuming that such utterances really are neither true nor false is at least as controversial as assuming that sentences with false presuppositions are neither true nor false, but as in the case of presuppositions, I will not discuss objections to truth-value gaps here (see also fn. 24 in section 2.2).

an utterance of (231) would be straightfowardly false:

(231) The lights are all turned off.

The uttterances of (229) and (230) are so-called *homogeneity violations*. In the case of (229), the violation is the result of applying the predicate ‘are turned off’ to a plurality of lights that isn’t homogeneous in the relevant respect: some of the lights are turned off but some of them aren’t. The effect remains if the sentence is negated, as in (230).[229]

Križ (2019) assumes that utterances suffering from homogeneity violations are neither true nor false, but he argues that homogeneity constraints differ from ordinary presuppositions. In particular, it seems that homogeneity constraints don’t already have to be common ground in the conversation. It is fine to assert (229) even if it’s not yet part of the common ground that either all lights are turned off or none of them are.[230]

Križ argues that predicates are the source of homogeneity violations. Some predicates, homogeneous predicates, require that the things to which they are applied are homogeneous in certain ways. And if a homogeneous predicate is applied to an object that isn’t homogeneous in the relevant way, homogeneity is violated, resulting in a truth-value gap. Križ suggests the following general characterization of predicates that require homogeneity:

(232) A homogeneous predicate that is not true of a plurality a is undefined of a if it is true of some plurality b that overlaps (i.e., has parts in common) with a. (Križ 2019, p. 5)

[229] See e.g. Križ 2019, pp. 1–3.

[230] As Spector (2013) points out, *wait a minute*-responses that question homogeneity assumptions are rather strange, whereas these responses are generally okay if they target presuppositions. For example, it seems okay to respond to ‘Mary quit smoking’ with ‘Wait a minute! I didn’t know Mary used to smoke’; but it is rather strange to respond to ‘The lights are turned off’ with ‘Wait a minute! I didn’t know the lights are either all turned off or all turned on.’ (see also Križ 2019, pp. 3–4). The felicity of a *wait a minute*-response has been taken to be one indicator for presuppositions (see von Fintel 2004). Spector and Križ also argue that homogeneity constraints and presuppositions project differently. For example, whereas ‘Not all of John’s ten children stopped smoking’ suggests that all of John’s ten children used to smoke, ‘Not all of John’s ten children read the books’ doesn’t suggest “that none of the children read only some of the books” (Križ 2019, p. 4; see also Spector 2013)

Consider again (229). It's not true of the lights that they are turned off, but it is true of some of them that they are turned off; assuming that 'are turned off' is a homogeneous predicate, it is therefore not defined for the lights, according to (232). In this example, the lights that are turned off are a part of the lights under consideration, which is why they overlap. Since there are different ways for things to overlap, one can distinguish between different types of homogeneity. In particular, one can distinguish between what Križ (2019) calls *downwards* and *upwards* homogeneity:

(233) a. A downwards homogeneous predicate that is not true of a plurality a is undefined of a if it is true of some plurality b that is a proper part of a.
b. An upwards homogeneous predicate that is not true of a plurality a is undefined of a if it is true of some plurality b of which a is a proper part.
(see Križ 2019, p. 5)

A sentence is not a predicate, but the proposition expressed by a sentence is applied to situations, similar to how a predicate is applied to individuals. Since situations have parts, considerations about homogeneity can therefore also be brought to bear on propositions.[231] In particular, following (233b), we may say that a proposition p is upwards homogeneous just in case the following holds:

(234) $\forall s'(p(s') \neq 1 \rightarrow (\exists s(s' < s \wedge p(s) = 1) \rightarrow p(s') = \#))$

(234) is equivalent to:

(235) $\forall s(p(s) = 1 \rightarrow \forall s'(s' < s \rightarrow p(s') \neq 0))$

[231] Reformulating (233a) for propositions, we get that a proposition p is downwards homogeneous just in case the following holds: (i) $\forall s'(p(s') \neq 1 \rightarrow (\exists s(s < s' \wedge p(s) = 1) \rightarrow p(s') = \#))$. This is equivalent to: (ii) $\forall s(p(s) = 1 \rightarrow \forall s'(s < s' \rightarrow p(s') \neq 0))$. Compare this to what it takes for a proposition p to be persistent: (iii) $\forall s(p(s) = 1 \rightarrow \forall s'(s \leq s' \rightarrow p(s') = 1))$. If a proposition p satisfies (iii), it also satisfies (ii): if p is true at every expansion s' of any situation s at which p is true, then p is never false at any expansion s' of s. In that sense, persistent propositions are downwards homogeneous. On the other hand, a proposition may satisfy (ii) without satisfying (iii), namely if the proposition is undefined (rather than true) at some expansion s' of a situation s at which the proposition is true. Violations of downwards homogeneity occur if the proposition is applied to such an expansion. Persistent propositions don't have truth-value gaps at any such expansions and therefore don't give rise to these homogeneity violations.

That is, p is upwards homogeneous just in case, if p is true at some situation s, then p isn't false at any part s' of s.

With this notion in the background, let's reconsider the indefinite claim (236a) and its interpretation. (236b) is already persistent, and so is (236c). However, (236b) is not upwards homogeneous: A situation in which there is a cat can have a part in which there is no cat, and so the proposition (236b) does not satisfy the upwards homogeneity condition (235).

(236) a. There's a cat.
b. $\lambda s.\exists x \textsc{cat}(x)(s)$
c. $\lambda s.\exists x \textsc{cat}(x)(s) \wedge \delta(\exists s'(s \leq s' \wedge \exists x \textsc{cat}(x)(s')) \rightarrow \exists x \textsc{cat}(x)(s)))$

When the witness condition is added, the proposition becomes upwards homogeneous: if s is a situation in which there is a cat, and s' is a part of s in which there is no cat, then (236c) is neither true nor false at s', rather than false. Therefore (236c) satisfies the upwards homogeneity constraint (235).

If (236c) is applied to a situation s in which there is no cat but s is part of a situation s' in which there is a cat, we're dealing with an upwards homogeneity violation. (236c) is not true at s, but it is true at s', of which s is a proper part. This violation is structurally analogous to other violations of upwards homogeneity, as in the following example:

(237) The boys are performing *Hamlet*. (Križ 2019, p. 5)

Križ (2019, pp. 5–6) suggests that, due to upwards homogeneity, (237) is neither true nor false if the boys are part of larger group of students who, together, are playing Hamlet: The predicate 'are performing Hamlet' is true if applied to the whole group of students, but it is not true if applied to the boys, and so it is neither true nor false if applied to the boys.

If this structural parallel points in the right direction, it could help explain what kind of constraint the witness condition of indefinites is: not a presupposition but a homogeneity condition. The truth-value gaps of (236a) would accordingly be homogeneity violations rather than instances of a false presupposition. As pointed out, it seems that homogeneity conditions have a different pragmatic status compared to presuppositions: it seems that they don't already have to be accepted in the conversation. This also seems to be the case for the witness condition, as pointed out earlier.[232] I think it would be interesting to explore this in more detail, but instead I want to return now to the question that prompted the excursion to the semantics of negation and indefinites: the question of how the presuppositions of definite descriptions project in disjunctions.

6.2.4 Back to Disjunction

With the semantics for indefinites and negation proposed in the foregoing section in the background, let's reconsider disjunctions such as (238):

(238) There isn't a cat or the cat is hungry.

Earlier, we've seen that there is reason to think that this disjunction doesn't presuppose that there is exactly one cat, in spite of the definite description 'the cat' in the second disjunct. As in the case of conjunction, let's assume that the disjuncts of a disjunction have their own local context:

(239) $[\![\phi \text{ or } \psi]\!]^{c,g} = \lambda s.[\![\phi]\!]^{c_l,g}(s) \vee [\![\psi]\!]^{c_r,g}(s)$

We've also seen that presuppositions of the second disjunct seem to be filtered based on what the first disjunct excludes (rather than based on what it entails, as in the case of the conjuncts of a conjunction). Let's therefore assume that the context of the second disjunct is the global context updated with the negation of the left disjunct:

(240) $c_r = c[[\![\text{not } \phi]\!]^{c_l,g}]$

[232] As mentioned in fn. 230, it has been argued that homogeneity conditions project differently from presuppositions. It is not obvious to me whether this applies to the witness condition, too. I leave this issue open here.

Now suppose that the left disjunct is (241a), interpreted as (241b), as suggested above:[233]

(241) a. There isn't a cat.
b. $\lambda s.\neg\exists x\textsc{cat}(x)(s) \wedge \delta(\exists s'(s \leq s' \wedge \exists x\textsc{cat}(x)(s')) \to \exists x\textsc{cat}(x)(s))$

In that case, the context of the second disjunct is c updated with (242):

(242) $\lambda s.\exists x\textsc{cat}(x)(s) \wedge \delta(\exists s'(s \leq s' \wedge \exists x\textsc{cat}(x)(s')) \to \exists x\textsc{cat}(x)(s))$

This is the same proposition as the one expressed by 'There's a cat'. Accordingly, if c is, for example, the empty minimal context, the local context of the second disjunct is a set of situations that each contain exactly one cat. This local context satisfies the existence and uniqueness presupposition triggered by 'the cat' in the second disjunct of (238). Now suppose that the situation pronoun of 'the cat' is bound as in (243):

(243) There isn't a cat or [϶ [δ_i[the cat s_i is hungry]]].

Then we predict that (243), relative to a context c, expresses the following proposition:

(244) $\lambda s.(\neg\exists x\textsc{cat}(x)(s) \wedge \delta(\exists s'(s \leq s' \wedge \exists x\textsc{cat}(x)(s')) \to \exists x\textsc{cat}(x)(s))) \vee$
$\exists s' : s' \in c_r.(s' \leq s \wedge \textsc{hungry}(\iota\textsc{cat}(x)(s'))(s))$

A disjunction $\ulcorner\phi \vee \psi\urcorner$ is neither true nor false if any of its disjuncts is, and so (244) is neither true nor false at a situation s if either of the following holds:

1. s contains no cat but s is part of a situation in which there is a cat;
2. there is not exactly one cat in every situation of c_r.

If true or false at s, (244) is true at s just in case there is no cat at s or the cat of some situation in c_r is hungry at s. The first condition in order for (244) to be true

[233] According to (240), the local context c_r may depend on c_l, the local context of the first disjunct. Since the interpretation of (241a) doesn't depend on the context, we can ignore this here. It's not entirely clear what the local context of the first disjunct of a disjunction is. If presupposition projection in disjunctions is asymmetric, as in conjunctions, the local context of the first disjunct is the same as the global context; if, as some have argued, projection in disjunctions is symmetric, and the second disjunct can serve to filter presuppositions of the first disjunct, the issue is more complicated; see e.g. Schlenker 2009, pp. 38–40 for some discussion.

comes from the witness condition of the first disjunct. As discussed above, it's not plausibly a presupposition and so doesn't impose a constraint on the global context c. The second condition for (244) to be true or false comes from the definite description in the second disjunct. As long as the global context c doesn't already contain situations in which there are two or more cats, the situations in c_r contain exactly one cat, and so the second condition holds. This constraint on c is the same as in the case of 'There's a cat and the cat is hungry.'

If we update a context c with (244), we extend the situations in c in such a way that (244) is true; the smallest of these extended situations are the situations of the new context. The smallest such situations make either the first disjunct of (244) true or the second disjunct. If they make the first disjunct true, they contain no cat and are not part of a situation that contains a cat. If they make the second disjunct true, they contain exactly one hungry cat. Therefore, the only situations that remain candidates for being the topic situation, after update with the disjunction either contain no cat or they contain at least one hungry cat.[234] This seems like a plausible result.

6.2.5 A Difference Between 'the' and 'exactly one'

One of the challenges mentioned at the beginning of this chapter was the observation by Mandelkern and Rothschild (2020) that, whereas indefinites seem to filter the uniqueness presupposition of definite descriptions, they clearly don't filter other uniqueness presuppositions, as in the following example:

(245) There is a cat. John is aware that there is exactly one cat.

Sentences of the form '*S* is aware that *p*' presuppose that *p*; accordingly, 'John is

[234] Recall that the situations in a minimal context are candidates for being part of the topic situation. The context is accurate only if some situation it contains is actual. If one of the situations that contains no cat is actual, the topic situation as a whole can't contain any cats, since the situation with no cats is not part of a larger situation in which there is a cat (because of the witness condition). If one of the situations that contains exactly one hungry cat is actual, the topic situation contains this situation, and so contains at least one hungry cat (and possibly more).

aware that there is exactly one cat' presupposes that there is exactly one cat.[235] This presupposition is not entirely filtered by the preceding indefinite claim that there is a cat; the sequence (245) as a whole still seems to presuppose that there is at most one cat. This contrasts with a sequence such as (246), which does not seem to presuppose that there is at most one cat, in spite of the uniqueness presupposition triggered by 'the cat'.

(246) There is a cat. The cat is hungry.

Now I briefly want to discuss how I think this difference could be accounted for on the present view. As pointed out in section 5.1.2, the view suggested here predicts that (246) doesn't require that there is at most one cat at the topic situation, but it does require that there is at most one cat at the situations in the context. In a sense, the uniqueness presupposition triggered by 'the cat' isn't really filtered, but it's not required to be true at the (candidates for being the) topic situation. By contrast, it seems to me that a uniqueness claim such as (247) concerns the topic situation as a whole.

(247) There is exactly one cat.

It seems that (247) is persistent in a way that (248) need not be.

(248) The cat is hungry.

Compare for example the following two sequences:

(249) There is a cat. The cat is playing with another cat.
(250) There is exactly one cat. The cat is playing with another cat.

Whereas (249) sounds fine, (250) is rather odd. One explanation for this contrast is that (247) requires that that there is exactly one cat at the topic situation, and so if we accept the first sentence of (250), we're committed to the claim that the topic situation contains exactly one cat. But the second claim of (250) requires

[235] Embedded under negation ('S isn't aware that p'), in the antecedent of a conditional ('If S isn't aware that p, q'), or turned into a question ('Is S aware that p?'), the implication that p tends to remain. This projection pattern is typical of presuppositions.

that there are at least two cats, and so it cannot also be true at the same topic situation. But if (247) requires that there is exactly one cat at the topic situation, it may well require the same when embedded in (251):

(251) John is aware that there is exactly one cat.

If that's right, (251) presupposes that there is exactly one cat at the topic situation, whereas (252) in (253) merely presupposes that there is exactly one cat at the situations of the context (which are candidates for being part of the topic situation).

(252) The cat is hungry.
(253) There is a cat. The cat is hungry.

More would have to be done to spell out this suggestion in detail. I haven't provided a semantics for 'exactly one' and for 'aware' that delivers the right verdict. Nonetheless, it seems plausible to me that 'exactly one' (and also 'only one') and 'the' differ with respect to how persistent they are, and that this is part of the explanation of why uniqueness presuppositions triggered with the help of 'the' differ from those triggered with the help of 'exactly one' (or 'only one').[236]

[236]Kratzer suggests a persistent semantics for 'exactly two' (Kratzer 1989, p. 622) that could be adapted to the case of 'exactly one'; as discussed above in connection with the witness condition, persistence is very demanding and should presumably be restricted to (counterparts of) the topic situation. A semantics for 'exactly one' similar to Kratzer's semantics (for 'exactly two'), but restricted to counterparts of the topic situation, could look as follows: $[\![\text{exactly one}]\!] = \lambda P_{\langle e,st\rangle}.Q_{\langle e,st\rangle}.\lambda s.\exists x(P(x)(s) \wedge Q(x)(s) \wedge \forall y((P(y)(\gamma_{s_t,w_s}) \wedge Q(y)(\gamma_{s_t,w_s})) \rightarrow y = x))$. (One may also have to require that s has to be part of γ_{s_t,w_s}, the counterpart of the topic situation s_t at the world of s; see the discussion of the restrictions of definite contexts in section 3.2.2.) However, this semantics arguably does not go well together with the view that 'not' is interpreted as $\lambda p_{\langle s,t\rangle}.\lambda s.\neg p(s)$ (as suggested earlier), since e.g. 'Not exactly one cat is hungry' could then be true at a situation s that is part of the topic situation s_t even if s_t contains exactly one hungry cat (namely if there is no hungry cat at s). A different approach would be to assume that there is a condition similar to the witness condition: $[\![\text{exactly one}]\!] = \lambda P_{\langle e,st\rangle}.Q_{\langle e,st\rangle}.\lambda s.\exists! x(P(x)(s) \wedge Q(x)(s)) \wedge \delta\forall x((P(x)(\gamma_{s_t,w_s}) \wedge Q(x)(\gamma_{s_t,w_s})) \rightarrow (P(x)(s) \wedge Q(x)(s)))$. A sentence ⌜Exactly one P is Q⌝ would be neither true nor false at a situation s if s doesn't contain all those individuals that are P and Q at γ_{s_t,w_s}. This condition would remain if the sentence is negated. (This is somewhat similar to Kratzer's "Accidental Universal Quantification" (Kratzer 1989, p. 621), according to which, roughly, a sentence ⌜Every P is Q⌝ is true at a situation s only if s contains everything that is P at the world to which s belongs.)

6.3 On the Determination of Local Contexts

All accounts that make use of local contexts face the challenge of explaining why the local contexts are the way they are.[237] For example, I assumed above that the local context of the second conjunct in a conjunction ⌜ϕ and ψ⌝ is the global context updated with the proposition expressed by the first conjunct, and that the local context of the second disjunct of a disjunction ⌜ϕ or ψ⌝ is the global context updated with the negation of the first disjunct. It seems very unlikely that this is a stipulation in the lexicon for which there is no further explanation. Presuppositions in languages other than English seem to project in the same way in conjunctions, disjunctions, and other connectives, which would be quite a coincidence if there were no deeper explanation.[238]

Schlenker (2009) suggests that the local context of an expression that is embedded in a more complex expression (e.g. a sentence ϕ embedded in a conjunction ⌜ϕ and ψ⌝) is determined by a general procedure, on the basis of a classical (bivalent) semantics.[239] The idea is that "once the semantic behavior of an operator [such as 'and'] with respect to non-presuppositional (and non-anaphoric) data is specified, its presuppositional behavior is thereby predicted as well" (Schlenker 2009, p. 9). If the general procedure is not language-specific, then cross-linguistic similarities of projection are to be expected: if e.g. English 'and' and the German conjunction 'und' have the same classical semantics, the local contexts for the conjuncts would be determined in the same way, leading to the same presupposition projection pattern in conjunctions.

In what follows, I want to sketch briefly Schlenker's approach to constructing local contexts and explore whether it could also be applied to minimal contexts. Schlenker's approach is based on Stalnaker's account of contexts and con-

[237] This challenge has been raised for dynamic semantics by Soames 2008b, first published in 1989; see also e.g. Schlenker 2009, pp. 2–9 and Stokke 2013 for further discussion.

[238] See e.g. Schlenker 2010b, p. 380

[239] See also Schlenker 2010b, Schlenker 2010a

text update. Minimal contexts are updated differently, which has consequences for how local contexts may be determined.[240]

Schlenker (2009) assumes that a context is a set of possible worlds, that a (declarative) sentence denotes a function from worlds to truth values, and that a context is updated with a claim by excluding from the context the worlds where the claim is false. Schlenker suggests that when one interprets a sentence, one tries to figure out which worlds of the context would remain in the context and which worlds would be excluded if one updated the context with that sentence.[241] To this end, the interpreter doesn't always need to determine the truth value of the sentence at all possible worlds. For example, for any (unembedded) sentence S, the interpreter only needs to determine the truth value of S at the worlds of the context; the truth value of S at worlds outside of the context is irrelevant for the task. Schlenker suggests that the local context is the smallest set of worlds that the interpreter needs to consider. If a sentence S is embedded in a more complex sentence, the interpreter can also restrict their attention to certain worlds when interpreting S. Which worlds depends not only on the context but also on the rest of the sentence. Consider a sentence S embedded in a conjunction $\ulcorner R$ and $S\urcorner$. Suppose that the interpreter interprets the conjunction step by step, beginning with the first conjunct, R, and then moving on to the second, S. When the interpreter arrives at the second conjunct, she has already interpreted the first conjunct. The second conjunct can make a difference to the truth value of the entire conjunction only at those worlds where the first conjunct is true: If the first conjunct is false, the entire conjunction is false, whether the second conjunct is true or false. Therefore, the interpreter does not have to consider the

[240] I focus on the view in Schlenker 2009 and Schlenker 2010b; the account in Schlenker 2010a differs slightly. I won't discuss potential problems for Schlenker's view or alternative approaches; for some discussion, see e.g. Schlenker 2008, Mandelkern and Romoli 2017, Mackay 2019. One problem, as Schlenker (2009, pp. 25–6) discusses, is that his account inherits the so-called proviso problem (see fn. 128 in section 4.3.2), and my account does so, too.

[241] In this section, I sometimes say (somewhat sloppily) that a context is updated with a sentence instead of saying that the context is updated with the proposition expressed by the sentence.

truth value of S at all worlds of the context but merely at all those worlds of the context at which R is true. Accordingly, the local context for S in $\ulcorner R$ and $S\urcorner$ is the set of those worlds of the global context at which R is true. Note that the local context for S does not take into account what S is. After all, the idea is that the interpreter can determine the local context of S before she interprets S, in order to make her life easier when interpreting S. By contrast, when the interpreter interprets the first conjunct, R, she hasn't interpreted the second conjunct yet, and so she doesn't take into account what S is. Accordingly, she has to determine the truth value of R at all worlds of the global context, in order to determine which worlds from the global context should be excluded. Thus, the local context of R is the same as the global context.[242]

Schlenker suggests that this procedure to determine local contexts can be divided into two steps. The first is to define the notion of an "innocuous restriction" (Schlenker 2010b, p. 382). In a second step, local contexts are then defined in terms of innocuous restrictions.[243] Roughly, an innocuous restriction for a sentence S that is embedded in a sentence Q is a proposition that we could add to S without affecting the true value of Q at the worlds of the context, no matter what S is, and no matter what comes after S. For Schlenker, adding a proposition p to a sentence S means replacing S with a conjunction $\ulcorner P$ and $S\urcorner$, where P denotes p. The conjunction $\ulcorner P$ and $S\urcorner$ is true only if P is true, and so adding p 'restricts' S to those worlds where p is true. The local context of S is then the strongest innocuous restriction, that is, the innocuous restriction that entails all other innocuous restrictions. (Or, if we take contexts to be sets of worlds, the local context is the

[242]See Schlenker 2009, pp. 9–13, Schlenker 2010b, pp. 381–83. Schlenker suggests that sentences are usually interpreted "from left to right" (Schlenker 2010b, p. 382), which explains why presupposition projection is asymmetric in conjunction. It's not entirely clear how one should understand this left-to-right bias; for discussion, see Mandelkern and Romoli 2017. (In any case, the label 'left-to-right' is adequate only for languages that are written from left to right.) Note also that Schlenker suggests that the asymmetric bias can be overridden in some cases, and he also discusses how local contexts can be derived for those cases (see Schlenker 2010b, pp. 388–89, Schlenker 2009, pp. 38–40).

[243]See e.g. Schlenker 2010b, pp. 382–83, 385, Schlenker 2009, pp. 16–17.

set of all worlds where the strongest innocuous restriction is true.)[244]

To illustrate this two-step procedure, consider again the case of a conjunction $\ulcorner R$ and $S\urcorner$, and suppose that the global context is c and that R expresses the proposition r. Let P be a sentence that denotes the following proposition:

(254) $\lambda w. w \in c \wedge r(w)$

This proposition is true at all those worlds of the context at which R, the first conjunct, is true, and false at every other world. Then $\ulcorner R$ and $S\urcorner$ is true at any world w of c just in case $\ulcorner R$ and $[P$ and $S]\urcorner$ is true at w, no matter what S is. Accordingly, (254) is an innocuous restriction for S, relative to the context c. It is, moreover, the strongest innocuous restriction, and therefore it is the local context. (If P denoted a stronger proposition p, which entails (254) but is false at some world w at which (254) is true, $\ulcorner R$ and $S\urcorner$ could be true at a world w of c while $\ulcorner R$ and $[P$ and $S]\urcorner$ is false at w, namely if S were true at w. P would therefore not be innocuous.) This is the same result as before, as it should be.[245]

Innocuous restrictions are restrictions that don't affect how the context is updated. With Stalnaker's conception of contexts and context update, restrictions added to a sentence don't affect the update of a context with that sentence (or rather, with the proposition expressed by the sentence) just in case the restriction doesn't affect the truth value of the sentence at the worlds of the context

[244] As Schlenker describes it, if d is a sentence embedded in the syntactic environment a_b, then one restricts d with a proposition p by replacing the sentence adb with a sentence $a(c$ and $d)b$, where c denotes p. Schlenker defines local contexts as follows: "The local context of an expression d of propositional or predicative type which occurs in a syntactic environment a_b in a context C is the strongest proposition or property x which guarantees that for any expression d' of the same type as d, for all strings b' for which $ad'b'$ is a well-formed sentence, $C \models^{c' \to x} a(c'$ and $d')b' \leftrightarrow ad'b'$ (If no strongest proposition or property x with the desired characteristics exists, the local context of d does not exist.)" (Schlenker 2010b, p. 385), where "$C \models^{c' \to x} F$ indicates that each world in C satisfies F when c' denotes x" (Schlenker 2010b, p. 384). Note that this definition also provides local contexts for predicates, which is arguably needed to account for presupposition projection in quantificational statements such as 'No student quit smoking'. This will become relevant in section 6.4. Note that on Schlenker's view, adding a proposition p to a sentence S is understood in syntactic terms (as conjoining S with an appropriate expression). As Schlenker (2010b, p. 382) notes, he is not committed to such a "syntactic implementation of the procedure", and "semantic variants could be found". I think that a semantic implementation may be preferable, but for the purposes of this thesis, I will roughly follow Schlenker's syntactic implementation.

[245] See Schlenker 2009, pp. 15–16.

set. After all, how a Stalnakerian context is updated with a sentence depends just on the truth value of the sentence at the worlds of the context. The idea that the local context of a sentence S embedded in a sentence Q is a restriction that doesn't affect the update with Q can also be adapted to other conceptions of the context. But given a different context update procedure, as in the case of minimal contexts, the conditions under which a restriction is innocuous may turn out to be different.

Let's examine whether Schlenker's characterization of innocuous restrictions would also work for minimal contexts. Schlenker requires that innocuous restrictions preserve the truth value of the whole sentence at the worlds that are in the context; they don't have to preserve the truth value at worlds outside of the context. This, however, isn't appropriate for minimal contexts. Recall how minimal contexts are updated:

(255) $c[p] =\downarrow \{s : \exists s'(s' \in c \wedge s' \leq s \wedge p(s))\}$

A context c, updated with a proposition p, is the set of the smallest situations that expand some situation of c and where p is true. Generally, $c[p]$ contains situations that are not already in c: the situations in a context are usually expanded when we update the context. (That is, update of minimal contexts is not intersective, as the update of Stalnakerian contexts.) In general, which situations are part of the updated context $c[p]$ depends not just on the truth value of p at the situations in c; it also depends on the truth value of p at situations that expand the situations in c, that is, at the situations in $\uparrow c$. For minimal contexts, innocuous restrictions should accordingly be required to preserve the truth value of the whole sentence not merely at all the situations that are in the context c but rather at all situations in $\uparrow c$.

This, however, has unwelcome consequences if we assume that the local context of a sentence S is the set of situations at which the strongest innocuous restriction for S is true, as Schlenker suggests. Consider an unembedded sentence

S, used to update a global context c. One would expect that the local context of an unembedded sentence is the same as its global context. But this is not what we would predict. The truth value of S at any situation that is not in $\uparrow c$ has no impact on the update, and so the situations not in $\uparrow c$ may be ignored. But the truth value of S at any situation in $\uparrow c$ is potentially relevant for determining what c updated with S is, and so no situation in $\uparrow c$ can be ignored when we interpret S. The proposition (256) is therefore the strongest proposition we can add to S, without taking into account what proposition S expresses, that doesn't risk affecting how c is updated:

(256) $\lambda s.\exists s'(s' \in c \wedge s' \leq s)$

Adding (256) to S is innocuous: We can update c with (257) instead of with $[\![\mathrm{S}]\!]$ without risking affecting the update, for any sentence S.

(257) $\lambda s.\exists s'(s' \in c \wedge s' \leq s) \wedge [\![\mathrm{S}]\!](s)$

But adding any proposition that is stronger than (256) would risk affecting the update. (256) is thus the strongest innocuous restriction for S. The set of situations at which (256) is true is $\uparrow c$. If we follow Schlenker's suggestion and assume that the local context is the set of situations at which the strongest innocuous restriction is true, $\uparrow c$ would be the local context of S, rather than c itself.[246]

On Schlenker's view, restricting a sentence S with a proposition p is understood in terms of conjunction: One conjoins S with another sentence that expresses p, and the conjunction of the two is S restricted to p. If we restricted a sentence S with its minimal context c in the same way, the restriction would not be innocuous.

(258) $\lambda s.s \in c$

This proposition is true of those situations that are in the context c. Restricting S with its context would mean adding (258) to S. But suppose that some sentence

[246]This issue generalises. For example, for a conjunction $\ulcorner R$ and $S \urcorner$, relative to a global context c, the local context for S would not be predicted to be $c[[\![\mathrm{R}]\!]]$, as suggested in section 6.2.1.

R denotes (258). Updating c with S would generally not have the same result as updating c with $\ulcorner R$ and $S\urcorner$. This is so, again, because the result of updating a minimal context with a sentence S generally depends on the truth value of S at situations outside of c.

But recall how contexts are used on the minimal context view. They are not added in the way just sketched. Instead, they serve as restriction of a quantifier, namely an unpronounced existential quantifier over the situations of the context, $\ni$. This quantifier can be prefixed to a sentence S, potentially binding (with the help of a binder δ_i) a situation variable s_i in S:

(259) a. $[\ni\ [\delta_i\ S]]$
b. $[\![\ni]\!]^{c,g} = \lambda p_{\langle s,st\rangle}.\lambda s.\exists s' : s' \in c.s' \leq s \wedge p(s')(s)$
c. $[\![\delta_i \alpha]\!]^{c,g} = \lambda s.[\![\alpha]\!]^{c,g[s/i]}$

If there is no situation variable to be bound in S, we can leave out δ_i and replace $\ni$ with a simpler variant, $\ni_p$. The resulting interpretation is the same as with $\ni$, namely (260c):

(260) a. $[\ni_p\ S]$
b. $[\![\ni_p]\!]^{c,g} = \lambda p_{\langle s,t\rangle}.\lambda s.\exists s' : s' \in c.s' \leq s \wedge p(s)$
c. $[\![\ni_p\ S]\!]^{c,g} = \lambda s.\exists s' : s' \in c.s' \leq s \wedge [\![\mathrm{S}]\!]^{c,g}(s)$

If S has no truth value gaps, the proposition expressed by (260a) is equivalent to the proposition (257), repeated below as (261):

(261) $\lambda s.\exists s'(s' \in c \wedge s' \leq s) \wedge [\![\mathrm{S}]\!](s)$

And as discussed above, updating c with (261) has the same effect as updating c with $[\![\mathrm{S}]\!]$. Accordingly, updating c with S has the same effect as updating c with $[\ni_p\ S]$. The way $\ni_p$ 'adds' the minimal context c to S ensures that the addition is innocuous.

One way of thinking about this is that local *minimal* contexts are not innocuous restrictions in Schlenker's sense; only their expansions are: If c is a local minimal context of a sentence S, then adding the set of expansions $\uparrow c$ (or rather,

$\lambda s.s \in \uparrow c$) to S has to be innocuous and thus won't affect the update.[247] Secondly, in order for c to be the local context, $\uparrow c$ has to be the *strongest* innocuous restriction we can add. And finally, c cannot be just any set of situations whose set of expansions is the strongest innocuous restriction. It is the set that contains only the *smallest* situations such that their set of expansions is the strongest innocuous restriction. A local minimal context for a sentence S is thus the set of the smallest situations whose set of expansions is the strongest innocuous restriction we can add to S.

Let r be the strongest innocuous restriction that can be added to a sentence S, in a global (minimal) context c. Then, given certain assumptions about innocuous restrictions, $\downarrow r$ is the local minimal context of S:

(262) *Local Minimal Contexts.* If r is the strongest innocuous restriction for a sentence S, the local minimal context for S is $\downarrow r$.

To show that this is indeed the case, I will make two assumptions about innocuous restrictions that I think are reasonable. The first assumption is that innocuous restrictions are persistent; if a restriction contains a situation s, it also contains all situations of which s is a part. The second assumption is that every situation in an innocuous restriction has a smallest part in the restriction; if a restriction contains a situation s, then it also contains a situation s' that is part of s and that has no smaller part also contained in the restriction.

As described above, two things need to holds in order for $\downarrow r$ to be the local minimal context, assuming that r is the strongest innocuous restriction: For one thing, the set of expansions of $\downarrow r$ has to be r. Secondly, the situations in $\downarrow r$ have to be the smallest situations such that the set of their expansions is r. Regarding the first point, note that for every restriction r, $\uparrow\downarrow r = r$.[248] Accordingly, the set

[247] For the sake of brevity, I here take a restriction to be a set of situations rather the proposition that is true at s just in case s is in the set.

[248] Assume (1) $\forall s \forall s'(s \in r \wedge s \leq s' \rightarrow s' \in r)$ and (2) $\forall s(s \in r \rightarrow \exists s'(s' \leq s \wedge s' \in r \wedge \neg \exists s''(s'' \in r \wedge s'' < s'))$. Suppose that s is in r. Because of (2), s has a part that is in $\downarrow r$; and so, since $\uparrow\downarrow r$ contains every expansion of every situation in $\downarrow r$, $\uparrow\downarrow r$ also contains s. Conversely, suppose that a situation s is in $\uparrow\downarrow r$. Then s is either in $\downarrow r$ or it expands some situation s' that is in $\downarrow r$. If s is in $\downarrow r$, it is

of expansions of $\downarrow r$ is indeed r. Concerning the second point, note that every set whose set of expansions is r has to contain every situation in $\downarrow r$. For suppose that a is some set whose set of expansions is r. The only way for $\uparrow a$ to include the smallest situations of r is for them to be already included in a; $\downarrow r$ has to be a subset of a.[249] Any other situation that we could additionally include in a is a proper expansion of some situation in $\downarrow r$ and so would not be one of the smallest situations whose set of expansions is r. There are consequently no smaller situations than those in $\downarrow r$ whose set of expansions is r.

Since $\downarrow r$ is a subset of any set of situations a whose set of expansions $\uparrow a$ is r, and $\uparrow\downarrow r$ is r, $\downarrow r$ is also the smallest set of situations whose set of expansions is r. Accordingly, we could also say that the local minimal context for a sentence S is the smallest set of situations whose set of expansions is the strongest innocuous restriction for S: the smallest set of situations whose expansions are the situations where the truth value of S might make a difference to the overall update of the global context.

Minimal contexts are sets of situations that are expanded when the context is updated with a sentence (or the proposition the sentence expresses). A local minimal context for an embedded sentence S is a set of situations that we may assume S serves to expand without risking that the update of the global context is affected. More precisely, a local minimal context for a sentence S is the *smallest* set of situations that we may assume S serves to expand without risking that the update of the global context is affected. And that set is the set of the smallest situations at which the strongest innocuous restriction for S is true.

With this idea for how local minimal contexts are determined as background, let's consider again an unembedded sentence S, used to update a global

also in r ($\downarrow r$ is, after all, a subset of r). And if s expands some situation s' that is in $\downarrow r$, then s is also in r, since s' is in r, s' is part of s, and r is persistent, by assumption (1). Therefore, if s is in $\uparrow\downarrow r$, it is also in r. Therefore, s is in $\uparrow\downarrow r$ just in case s is in r.

[249] If a included a proper part of any situation s in $\downarrow r$, then s would also be included in $\uparrow a$, but $\uparrow a$ would contain said proper part of s, which is by hypothesis not an element of r, and so $\uparrow a$ would not be r.

context c. As discussed above, the strongest innocuous restriction we could add to S is $\uparrow c$. Accordingly, the local minimal context for S is $\downarrow\uparrow c$, which is c. We predict that the local context of an unembedded sentence is the same as its global context, as desired.

Let's also revisit some of the local contexts I appealed to in section 6.2. First, consider the local context of the second conjunct of a conjunction $\ulcorner P$ and $S\urcorner$, and suppose that P expresses the proposition p.[250] The strongest innocuous restriction for S, given a global context c, is the following proposition:

(263) $\lambda s.s \in \uparrow c \wedge p(s)$

A restriction for the second conjunct S is innocuous just in case it doesn't affect update of c, no matter what S is. The update is guaranteed to be unaffected if the restriction has no impact on the truth value of the sentence at all expansions of c, that is, at all situations of $\uparrow c$. At all situations of $\uparrow c$, $\ulcorner P$ and $S\urcorner$ is true just in case $\ulcorner P$ and $[R$ and $S]\urcorner$ is true, if R expresses (263), no matter what S is. Moreover, (263) is the strongest innocuous restriction. For suppose R were false at some situation s at which (263) is true; then if S happened to be true at s, $\ulcorner P$ and $[R$ and $S]\urcorner$ would be false at s even though $\ulcorner P$ and $S\urcorner$ would be true. Since (263) is true at s, s would be a situation of $\uparrow c$ and so the difference in truth value could affect the update of c.[251] The local minimal context for the second conjunct of $\ulcorner P$ and $S\urcorner$ is therefore the set of the smallest situations at which (263) is true:

(264) $\downarrow \{s : s \in \uparrow c \wedge p(s)\}$

This, in turn, is the same as $c[p]$, the global minimal context c updated (by minimal update) with the proposition expressed by the first conjunct.[252] This is the same local context that I assumed earlier in section 6.2.1.

[250] Here is the interpretation for conjunction assumed in section 6.2.1: $[\![P \text{ and } S]\!]^{c,g} = \lambda s.[\![P]\!]^{c_l,g}(s) \wedge [\![S]\!]^{c_r,g}(s)$. Assuming that local contexts are determined asymmetrically, c_l (and therefore the interpretation of the first conjunct) does not depend on the interpretation of the second conjunct.

[251] Cf. Schlenker 2009, pp. 15–6

[252] See the reformulation (32) of the update rule in section 3.1.2

Next, consider the local context of a negated sentence ⌜Not S⌝.[253] The strongest innocuous restriction we could add to S, given a global context c, is this:

(265) $\lambda s.s \in \uparrow c$

Suppose that R expresses (265). Then at all situations in $\uparrow c$, ⌜Not S⌝ is true just in case ⌜Not [R and S]⌝ is true, no matter what proposition S expresses. Therefore, (265) is an innocuous restriction for S. It is, moreover, the strongest innocuous restriction. For suppose that R were false at a situation s at which (265) is true; then if S happened to be true at s, ⌜Not [R and S]⌝ would be true at s even though ⌜Not S⌝ would be false. Since (265) is assumed to be true at s, s is in $\uparrow c$, and so the difference in truth value at s of ⌜Not S⌝ and ⌜Not [R and S]⌝ could affect how the context c is updated.[254] The local minimal context for S in ⌜Not S⌝ is therefore the set of the smallest situations at which (265) is true, that is, it is the global minimal context c. This is prima facie a plausible result. After all, presuppositions of a sentence are assumed to project if the sentence is negated.[255] Consider that a sequence such as (267) is no less felicitous than (266):

(266) There is a cat. The cat is hungry.
(267) There is a cat. The cat isn't hungry.

To account for the fact that such sequences are equally felicitous, the context for 'the cat' should be the same in both cases.[256]

[253] Here is the interpretation for negation assumed in section 6.2.3: $[\![\text{not}]\!] = \lambda p.\lambda s.\neg p(s)$.

[254] Cf. Schlenker 2009, p. 19

[255] As is well-known, presuppositions sometimes don't seem to project if the sentence is negated, e.g. when a speaker says 'It's not the case that Mary quit smoking. She never smoked in the first place.' For discussion of such uses of negation, see e.g. Horn 1989, chapter 6. One explanation is that the presupposition is accommodated at the local context of 'Mary quit smoking'; see e.g. Heim 2002, pp. 254–55 (first published in 1983).

[256] One worry is that the negated second sentence of (267) is predicted to be ambiguous, depending on the position of the existential quantifier, if both (268) and (269) are possible structures of that sentence:

(268) ∍ [δ_i [not [the cat s_i is hungry]]
(269) not ∍ [δ_i [the cat s_i is hungry]]

Whereas (268) expresses (i) $\lambda s.\exists s' : s' \in c.s' \leq s \wedge \neg\textsc{hungry}(\iota x\textsc{cat}(x)(s'))(s)$, (269) expresses (ii)

Next, consider the local context of a second disjunct of a disjunction $\ulcorner P$ or $S\urcorner$, and suppose again that P expresses the proposition p.[257] The strongest innocuous restriction we could add to S, given a global context c, would be this:

(270) $\lambda s.s \in \uparrow c \wedge \neg p(s)$

Suppose that the sentence R expresses (270). At all situations of $\uparrow c$, $\ulcorner P$ or $S\urcorner$ is true just in case $\ulcorner P$ or $[R$ and $S]\urcorner$ is true, no matter what S is.[258] Therefore, the restriction is innocuous. It is also the strongest innocuous restriction. For suppose R were false at some situation s at which (270) is true. Then if S happened to be true at s, $\ulcorner P$ or $S\urcorner$ would be true at s, but $\ulcorner P$ or $[R$ and $S]\urcorner$ would be false at s. (After all, $\ulcorner R$ and $S\urcorner$ would be false because of R's falsity, and P would be false because (270) was assumed to be true at s.) Moreover, s would be among the situations in $\uparrow s$ because we assumed that (270) is true at s. Therefore, this difference in truth value at s of $\ulcorner R$ and $S\urcorner$ and $\ulcorner P$ or $[R$ and $S]\urcorner$ would not be innocuous.[259] If (270) is the strongest innocuous restriction we can add to the second disjunct of a disjunction, then the local context for the second disjunct is the set of the smallest situations at which (270) is true, assuming that c is the global context and that p is the proposition expressed by the first disjunct:

(271) $\downarrow \{s : s \in \uparrow c \wedge \neg p(s)\}$

This, in turn, is the same as $c[\neg p]$, the context c updated with the negation of the first disjunct, which is the same as the local context that I assumed for disjunctions in section 6.2.4.

$\lambda s.\neg\exists s' : s' \in c.s' \leq s \wedge \textsc{hungry}(\iota x\textsc{cat}(x)(s'))(s)$, assuming that the global context for the sentence is c and that the local context of a sentence embedded under negation is the same as the global context. Whereas (i) looks like a reasonable interpretation, it is not so clear that (ii) is an available reading. Perhaps a preference for (i) has to do with a preference for global as opposed to local accommodation (see e.g. Heim 2002), but I'm not sure.

[257] Here is the interpretation for disjunction assumed in section 6.2.4: $[\![P \text{ or } S]\!]^{c,g} = \lambda s.[\![P]\!]^{c_l,g}(s) \vee [\![S]\!]^{c_r,g}(s)$

[258] If P is true at s, then $\ulcorner P$ or $S\urcorner$ and $\ulcorner P$ or $[R$ and $S]\urcorner$ are both true, because of the first disjunct. If P is false at some s in $\uparrow c$, then $\ulcorner P$ or $S\urcorner$ is true at s just in case S is true at s. In that case, $\ulcorner R$ and $S\urcorner$ is also true at s, since R is then also true at s (because p is false at s, and s is in $\uparrow c$). Accordingly, $\ulcorner P$ or $[R$ and $S]\urcorner$ is then also true at s.

[259] Cf. Schlenker 2009, pp. 21–22

In this section, I sketched Schlenker's idea for how local contexts are determined and I discussed whether this idea could also be applied to minimal contexts. I argued that Schlenker's approach would have to be modified and I suggested one way of doing so. The first reason why Schlenker's approach would have to be modified is that minimal contexts are updated differently than the Stalnakerian contexts that Schlenker assumes. On Schlenker's view, a restriction is innocuous only if it preserves the truth value of the sentence under consideration at all the worlds that are in the context. But if the contexts are minimal contexts, looking at the truth value at the situations in the context is not enough. To ensure that a restriction can't affect how the context is updated, we need to consider not just the situations in the context but also all the situations that expand the situations in the context. This is so because an update of a minimal context does not merely exclude situations from the context, it may also expand the situations in the context. The second reason why Schlenker's approach would have to be modified also has to do with the role the situations in a minimal context play. The worlds in a Stalnakerian context are candidates for being the actual world, but the situations in a minimal context are candidates for being part of the topic situation. Moreover, a minimal context does not contain all candidates for being part of the topic situation. It only contains the smallest candidates at which everything that has been accepted about the topic situation is true. Correspondingly, a local minimal context for a sentence S is not the set of all situations at which the strongest restriction for S is true, but rather the set that contains only the smallest situations at which the strongest innocuous restriction for S is true. And as argued above, this leads to predictions that match the local contexts that I assumed in earlier sections.

6.4 Quantifiers and Local Contexts

So far, I have merely looked at how presuppositions project in sequences, conjunctions, and disjunctions. I have not considered how presuppositions project in quantificational statements. These are notoriously tricky for accounts of projection. In part, this is because there is considerable unclarity as to how presuppositions project in quantificational statements, and so it is to some extent unclear which predictions would be correct.[260]

Presupposition projection in quantificational statements has played an important role for situation semantic accounts of definites. After all, one of the main type of example these theories have examined in detail are donkey-sentences such as this one:

(272) Every farmer who owns a donkey feeds the donkey.
(273) No farmer who owns a donkey feeds the donkey.

These sentences do not implicate that every farmer who owns a donkey has only one donkey, in spite of the definite description 'the donkey' in the nuclear scope of the quantifier.[261] But in general, presuppositions do seem to project out of the restrictor of such quantifiers:

(274) Every farmer quit smoking.
(275) No farmer quit smoking.

These sentences do seem to have non-trivial presuppositions. More precisely, they seem to presuppose that every farmer used to smoke.[262] As briefly men-

[260]See e.g. Chemla 2009 for interesting discussion and experimental results.

[261]Following standard terminology, I call 'farmer who owns a donkey' the *restrictor* of the quantifier 'every', and 'feeds the donkey' the nuclear scope. More abstractly, if $[[Q[NP_1]][NP_2]]$ is a quantificational statement with the quantifier Q, NP_1 is the restrictor and NP_2 is the nuclear scope.

[262]See e.g. Chemla 2009 for discussion; as Chemla points out, some theories of presupposition projection predict a weaker presupposition for such sentences, namely the presupposition that some farmer used to smoke; see Chemla 2009, pp. 300–1, for references. Chemla argues that the presupposition of sentences like (275) are in fact universal rather than merely existential, but he also suggests that the strength of the presupposition varies depending on the quantifier. In any case, (272) and (273) also do not presuppose that some farmer has at most one donkey, and so even if one predicts that the presuppositions of Q in ⌜Every P Q⌝ and ⌜No P Q⌝ project merely

tioned in section 4.3.1, situation semanticists have suggested that sentences such as (272) and (273) don't implicate that every farmer has at most one donkey because these sentences involve quantification over minimal situations. More precisely, the idea is that quantifiers such as 'no' and 'every' do not just quantify over individuals but also over minimal situations at which individuals satisfy the restrictor. For example, (272) is true just in case every individual x is such that every minimal situation s at which x is a farmer and owns a donkey is part of a larger situation where x feeds the donkey in s. The presupposition triggered by 'the cat' merely has to be true at minimal situations at which a farmer owns a donkey, rather than at situations that contain farmers with all their donkeys. That is why the uniqueness presupposition of 'the donkey' does not give rise to an implication that every farmer owns at most one donkey, or so is the rough idea. Since this idea has been a crucial component of situation semantic accounts of definites, I now want to discuss how it fits into the approach developed so far.

First, I want to sketch a semantics for (276) of the kind that has been proposed by situation semanticists:[263]

(276) Every farmer who owns a donkey feeds the donkey.

Following F. Schwarz (2012), I assume that just like 'the', 'every' also comes with an unpronounced situation variable which restricts which individuals are quantified over. Like Schwarz, I assume that 'every' first combines with the situation variable and then with the overt restrictor; on this view, a sentence ⌜Every P Q⌝ has the structure [[[Every s_i] P] Q].

For any property P of type $\langle e, st\rangle$, let $\downarrow P$ be a property that applies to x at s just in case P applies to x at s and s has no proper part s' such that P also applies to x at s'. In other words, x is $\downarrow P$ at s just in case s is a minimal situation at which

existentially, this prediction would still appear to be at odds with donkey sentences such as (272) and (273).

[263]For proposals along similar lines, see Heim 1990a, Büring 2004, Elbourne 2005, F. Schwarz 2012, Elbourne 2013. I'm not claiming that what I'm about to sketch is exactly the same as any of these accounts, but the differences won't matter for my purposes.

x is P.[264] Accordingly, for any individual x and s, $\downarrow P(x)(s)$ is true just in case s is a minimal situation at which x is P. Using this notation, let's assume the following semantics for 'every':[265]

(277) $[\![\text{every}]\!]^{c,g} = \lambda s'''.\lambda P_{\langle e,st\rangle}.\lambda Q_{\langle e,sst\rangle}.\lambda s.\forall x\forall s'((s' \leq s''' \wedge \downarrow P(x)(s')) \rightarrow \exists s''(s' \leq s'' \wedge s'' \leq s \wedge Q(x)(s')(s'')))$

Consider a sentence of this form:

(278) $[[[\text{Every } s_i]\ P]\ Q]$

Let's assume that s_i is assigned some situation s_r. Given the semantics (277), (278) is true at s just in case every individual x and every situation s' such that (i) s' is part of s_r and (ii) s' is a minimal situation at which x is P is part of a situation s'' that is also part of s and at which x is Q at s' and s''.[266]

Next, let's consider the interpretation of the overt restrictor (279a) and the nuclear scope (280b) of (276). For the restrictor, I assume the following interpretation:[267]

(279) a. farmer who owns a donkey
b. $\lambda x.\lambda s.\textsc{farmer}(x)(s) \wedge \exists y(\textsc{donkey}(y)(s) \wedge \textsc{owns}(x)(y)(s))$

For the interpretation of the nuclear scope, I assume that the situation variable of 'the donkey' is bound by a variant of the situation abstractor δ that I already used for the interpretation of sequences. This variant δ^{pr} works just like δ, except that δ^{pr} is applied to predicates of type $\langle e, st\rangle$ and turns them into predicates of type $\langle e, sst\rangle$, whereas δ is applied to propositions of type $\langle s, t\rangle$ and turns them into relations of type $\langle s, st\rangle$. As with δ, the point of δ^{pr} is to disentangle the situation where the definite's existence and uniqueness presupposition has to be true from the situation where the predicate has to apply.[268]

[264] If we identify a predicate P of type $\langle e,st\rangle$ with the set of pairs $\langle x,s\rangle$ such that P is x at s, $\downarrow P$ would correspond to $\{\langle x,s\rangle : \langle x,s\rangle \in P \wedge \neg\exists s'(\langle x,s'\rangle \in P \wedge s' < s)\}$.

[265] See F. Schwarz 2012, p. 452 and Elbourne 2013, p. 26 for two very similar entries.

[266] We will see shortly why Q is of type $\langle e,sst\rangle$ rather than $\langle e,st\rangle$.

[267] For the sake of simplicity, I ignore here the issues concerning the persistence of indefinites that I discussed in section 6.2.3.

[268] See section 5.1.1, where this mechanism was introduced to deal with sage-plant sequences

(280) a. $[\![\delta_i^{pr}\,\alpha]\!]^{c,g} = \lambda x.\lambda s.\lambda s'.[\![\alpha]\!]^{c,g[i/s]}(s')$
b. δ_j^{pr} [feeds [the donkey s_j]]
c. $\lambda x.\lambda s.\lambda s'.\textsc{feeds}(x)(\iota y\textsc{donkey}(y)(s))(s')$

Note that in the resulting denotation (280c) of (280b), the definite description is evaluated at the situation s, whereas the feeding has to happen at situation s'.

Putting all these pieces together, (281a) is interpreted as (281b), assuming that some situation s_r is assigned to the variable s_i that restricts 'every':

(281) a. [[Every s_i] farmer who owns a donkey] [δ_j^{pr} feeds the donkey s_j].
b. $\lambda s.\forall x \forall s'((s' \leq s_r \wedge \downarrow R(x)(s')) \rightarrow \exists s''(s' \leq s'' \wedge s'' \leq s \wedge Q(x)(s')(s'')))$
$R = \lambda x.\lambda s.\textsc{farmer}(x)(s) \wedge \exists y(\textsc{donkey}(y)(s) \wedge \textsc{owns}(x)(y)(s))$
$Q = \lambda x.\lambda s.\lambda s'.\textsc{feeds}(x)(\iota y\textsc{donkey}(y)(s))(s')$

The prediction is that (281a) is true at a situation s just in case every individual x and every situation s' such that s' is part of s_r and s' is a minimal situation in which x is a farmer and owns a donkey is part of a situation s'' that is part of s and x feeds in s'' the donkey of s'. This seems like a fairly plausible prediction. In particular, this does not seem to entail that every farmer in s_r has at most one donkey, since for every farmer in s_r, there could be several distinct minimal situations in which that farmer owns a donkey, as long as they are all part of a larger situation in which the farmer feeds that donkey.

However, recall that I have made certain assumptions about how the meta-language deals with truth-value gaps and with ι-terms that fail to denote.[269] In particular, I have assumed that $\ulcorner\forall x\alpha\urcorner$ and $\ulcorner\exists x\alpha\urcorner$ are neither true nor false just in case α is neither true nor false for some x (in the relevant domain).[270] Moreover, in order for $\ulcorner(\alpha \rightarrow \beta)\urcorner$ and $\ulcorner(\alpha \wedge \beta)\urcorner$ to be true or false, both α and β have to be true

such as 'There is a cat. The cat is playing with another cat'; the same mechanism can be used to deal with sage-plant sentences such as 'Every farmer who buys a sage-plant buys eight others along with the sage-plant'. To implement this, I assume the variant δ^{pr} of δ. See Elbourne 2013, pp. 129–32 for discussion of a similar example (cf. also example (21) in Heim 1990a, p. 147); Elbourne's implementation is slightly different but closely related (see also fn. 168).

[269] See section 4.2.3

[270] The variable x could be of type e but also of type s; see section 4.2.3: If α is an expression of type t, and x a variable of type a, $|\ulcorner\forall x\alpha\urcorner|^{M,g} = \#$ iff $|\alpha|^{M,g[d/x]} = \#$ for some $d \in D_a$, $|\ulcorner\forall x\alpha\urcorner|^{M,g} = 1$ iff $|\alpha|^{M,g[d/x]} = 1$ for all $d \in D_a$, and $|\ulcorner\forall x\alpha\urcorner|^{M,g} = 0$ otherwise. $\ulcorner\exists x\phi\urcorner$ was defined as $\ulcorner\neg\forall x\neg\phi\urcorner$.

or false. Accordingly, a formula of the form $\ulcorner\forall x \forall s'(\alpha \rightarrow \exists s''(\beta \wedge \gamma))\urcorner$ (such as the one in (281b)) is neither true nor false if there are situations s_1 and s_2 and an individual x_1 such that γ is neither true nor false for that individual and these situations.[271] But now let's look again at (281b), where '$\textsc{feeds}(x)(\iota y \textsc{donkey}(y)(s'))(s'')$' takes the place of γ. The problem is that there *are* individuals x_1 and situations s_1 and s_2 for which '$\textsc{feeds}(x)(\iota y \textsc{donkey}(y)(s'))(s'')$' is neither true nor false. After all, in the domain of all situations, there are situations in which there is not exactly one donkey, and so if we assign some such situation to s', the ι-term is undefined and the entire expression '$\textsc{feeds}(x)(\iota y \textsc{donkey}(y)(s'))(s'')$' is neither true nor false.[272] Consequently, we predict that the proposition (281b) is always neither true nor false. That the antecedent of the conditional in (281b) demands that the situation s' is a minimal situation in which a farmer owns a donkey does not change this, given how the chosen metalanguage deals with truth-value gaps.

How much of a problem this is for those situation semantic theories that have adopted similar approaches to donkey sentences is not clear. After all, these theories could assume a different account of how truth-value gaps percolate up in complex sentences, and perhaps that account will make better predictions. Heim (1990a, pp. 140–1), for example, discusses the following sentence:

(282) Every man that owns exactly one donkey beats it. (Heim 1990a, p. 140)

Heim assumes that the scope 'beats it' is only true or false of individuals who own exactly one donkey. Even though there are individuals who do not own exactly one donkey, Heim suggests that (282) is true or false because the truth value of (282) does not depend on whether 'beats it' applies to individuals who don't own exactly one donkey—presumably because of the restrictor of the sentence. Heim then acknowledges that this "ought to fall out from a general theory of presupposition projection" (p. 141), but no such theory is provided. Elbourne

[271] More precisely, if $|\gamma|^{M,g[x_1/x, s_1/s', s_2/s'']} = \#$.

[272] Or, as it was described in section 4.2.3, the ι-term denotes the extraneous object $\#_e$.

(2013), on the other hand, describes the semantics of quantifiers such as 'every' using English quantifiers in the metalanguage (e.g. in the lexical entry for 'every': "[...] for all individuals x: for all situations s' such that [...]", Elbourne 2013, p. 26). We may well have an intuitive grasp of how these English quantifiers in the metalanguage deal with presuppositions in their scope, just like we have an intuitive grasp of they deal with presuppositions when we're not in the business of describing the semantics of English. But I think that if we want a theory of how presuppositions project (including the presuppositions of definite descriptions), we should aim for a more explicit account of projection.[273] At the very least, I think that there is a gap here that such situation semantic approaches should try to close.

Closer to home, this is a problem for the theory of definite descriptions that I have tried to develop here. After all, it would be good if this theory could adopt the treatment of donkey sentences that situation semanticists have already suggested. But as argued above, adoping the semantics for 'every' sketched above would not work, given how I have assumed truth-value gaps behave. Something therefore needs to be changed.

One option would be to try to use a different account of how truth-value gaps project.[274] But here I want to explore whether the kind of approach I suggested for conjunctions and disjunctions could be extended to quantificational statements. On this approach, presuppositions of an embedded expres-

[273]Elbourne might reply that I, too, use English quantifiers when I describe the semantics of the formal metalanguage (see section 4.2.3). That seems like a fair rejoinder. Perhaps these quantifiers could be replaced using purely set-theoretic vocabulary. (Beaver and Krahmer (2001, p. 156) e.g. avoid using English quantifiers in their semantics for their formal language, except for in one clause.) On the other hand, one might suspect that it's impossible to avoid presuppositions in the metalanguage altogether, and so our understanding of the metalanguage may always require an understanding of how presuppositions in the metalanguage behave. Then perhaps the problem here, too, isn't so much the use of English quantifiers in the metalanguage but rather the absence of a theory of projection (roughly, general principles that tell us how truth-value gaps percolate up), whether this theory is given using English or some other language. (For how Elbourne thinks about presupposition projection, see in particular Elbourne 2013, pp. 57–8, 65–6.)

[274]Recent proposals for trivalent theories of presupposition projections include George 2008, Fox 2008, and Winter 2019.

sion project unless they are entailed by that expression's local minimal context. Technically, this was implemented with the help of the unpronounced existential quantifier $\backepsilon$ that is restricted to the situations of the local context. Roughly, if α is neither true nor false at s unless some proposition p is true at s, and the local context of α is c, then $\ulcorner \backepsilon\ \alpha \urcorner$ is true or false (at any situation) just in case p is true at every situation in c, and $\ulcorner \backepsilon\ \alpha \urcorner$ is neither true nor false (at any situation) just in case p is not true at some situation in c. The quantifier $\backepsilon$ checks the presuppositions of α at the local context of α. If the presuppositions are true at the situations of the local context, the presupposition does not project (and $\ulcorner \backepsilon\ \alpha \urcorner$ is true or false at every situation); if the presuppositions are not true at all the situations of the local context, the presuppositions project (and $\ulcorner \backepsilon\ \alpha \urcorner$ is neither true nor false at any situation, which essentially guarantees that the sentence in which $\ulcorner \backepsilon\ \alpha \urcorner$ is embedded is also neither true nor false).[275]

Now I want to sketch a way to extend this machinery to quantifiers. As before, I assume that a sentence $\ulcorner$Every P $Q\urcorner$ has the structure $\ulcorner$[[[Every s_i] P] Q]$\urcorner$. But now I don't assume that quantification over *minimal* situations is directly built into the semantics of 'every'.

(283) $[\![\text{every}]\!]^{c,g} = \lambda s'.\lambda P_{\langle e,st\rangle}.\lambda Q_{\langle e,st\rangle}.\lambda s.\forall x(P(x)(s') \rightarrow (P(x)(s) \wedge Q(x)(s)))$

According to this simpler semantics, $\ulcorner$[[[Every s_i] P] Q]$\urcorner$ is predicted to be true at a situation s just in case every individual that is P at the situation assigned to s_i is P at s and Q at s.[276]

[275]On the view under consideration, the truth-value gap of a constituent always projects unless $\backepsilon$ removes the gap. But if a constituent α is neither true nor false at any situation, the local context of α would have to be the empty set in order for $\ulcorner \backepsilon\ \alpha \urcorner$ to be true or false. A local context is the empty set only if assumptions that are jointly necessarily false have found their way into the local context, which often means that the sentence is odd for independent reasons.

[276]This semantics for 'every' is a version of Kratzer's "Accidental Universal Quantification" (Kratzer 1989, p. 621). The main difference is that on Kratzer's semantics, 'every' does not come with a situation variable that provides the restriction s'; instead, 'every' is always 'restricted' to the whole world of s, in order to make the proposition persistent. (It may be worth highlighting that in her paper, Kratzer is not concerned with the semantics of definites.) See also Zweig 2006, p. 295, for a version of Kratzer's suggestion that is restricted to the topic situation rather than to the world of the situation of evaluation (but that, contrary to what I'm assuming, builds quantification over minimal situations into the semantics, following Elbourne 2005). Looking at

The restrictor and the scope of 'every' are not of propositional type $\langle s,t\rangle$ but of type $\langle e,st\rangle$ (or perhaps $\langle e,sst\rangle$). Accordingly, the local contexts for scope and restrictor are also not of type $\langle s,t\rangle$ but of type $\langle e,st\rangle$.[277] Therefore, we also need a variant of ϶ that deals with such local contexts; I will call this variant $϶^{pr}$. To make the discussion more concrete, I will once again look at the following donkey sentence:

(284) Every farmer who owns a donkey feeds the donkey.

Let's assume that this sentence has the following structure:

(285) [[Every s_i] farmer who owns a donkey] [$϶^{pr}$ [δ_j^{pr} [feeds [the donkey s_j]]]]

Just like above, I assume that the situation variable of 'the donkey' in the nuclear scope is bound by δ^{pr}, so that (286a) is interpreted as (286b). And as before, I assume that the overt restrictor (287a) is interpreted as (287b):

(286) a. δ_j^{pr} [feeds [the donkey s_j]]
b. $\lambda x.\lambda s.\lambda s'.\textsc{feeds}(x)(\iota y\textsc{donkey}(y)(s))(s')$

(287) a. farmer who owns a donkey
b. $\lambda x.\lambda s.\textsc{farmer}(x)(s) \wedge \exists y(\textsc{donkey}(y)(s) \wedge \textsc{owns}(x)(y)(s))$

Since the scope (286a) is of type $\langle e,sst\rangle$, the unpronounced existential quantifier $϶^{pr}$ has to take functions of that same type as input, and it has to deliver a function of type $\langle e,st\rangle$ as output, so that the restrictor as a whole can then combine with 'every':

(288) $[\![϶^{pr}]\!]^{c,g} = \lambda P_{\langle e,sst\rangle}.\lambda x.\lambda s.\exists s' : s' \in c(x).s' \leq s \wedge P(x)(s')(s)$

This variant works just like ϶, except for the differences in types. Given a context c, (289a) then denotes (289b):

(289) a. $϶^{pr}$ [δ_j^{pr} [feeds [the donkey s_j]]]

(283), I think that it may be desirable to replace $P(x)(s')$ in the antecedent with $P(x)(\gamma_{s',w_s})$. After all, the restrictor situation s' is world-bound and will therefore not in general be part of the same world as the situation of evaluation s. (Elbourne (2013, 121, fn. 2) makes the same observation but suggests that it may not be a problem.)

[277] Or, in terms of sets, they are not sets of situations but rather sets of tuples of an individual and a situation.

b. $\lambda x.\lambda s.\exists s' : s' \in c(x).s' \leq s \wedge \textsc{feeds}(x)(\iota y\textsc{donkey}(y)(s'))(s)$

If c is a context of type $\langle e, st\rangle$, and x is an individual, then $c(x)$ is a proposition. I will say that the set of situations at which $c(x)$ is true is the context *for x*. (289b) applies to an individual x at a situation s just in case there is some situation s' in the context for x such that x feeds at s the donkey of s'.

The semantics for 'every' provided in (283) does not explicitly allow for the context of the scope or the restrictor to differ from the global context. As in the case of conjunction and disjunction discussed earlier, one way to allow this would be to rewrite the semantics as follows:

(290) $[\![[[\text{every } s_i]\ \alpha]\ \beta]\!]^{c,g} = \lambda s.\forall x([\![\alpha]\!]^{c_r,g}(x)([\![s_i]\!]^{c,g}) \rightarrow ([\![\alpha]\!]^{c_r,g}(x)(s) \wedge [\![\beta]\!]^{c_n,g}(x)(s)))$

Here, c_r is the local context of the restrictor and c_n the local context of the nuclear scope. The semantics itself doesn't say what these local contexts are or how they are related to the global context, a point to which I will return below.

Putting all these pieces together, we predict that (291) expresses the proposition (292), assuming that some situation s_r is assigned to the free variable s_i by the assignment function and assuming that the local context for the nuclear scope is c_n:

(291) [[Every s_i] farmer who owns a donkey] [$\ni^{pr}$ [δ_j^{pr} [feeds [the donkey s_j]]]]

(292) $\lambda s.\forall x((\textsc{farmer}(x)(s_r) \wedge \exists y(\textsc{donkey}(y)(s_r) \wedge \textsc{owns}(x)(y)(s_r))) \rightarrow$
$(\textsc{farmer}(x)(s) \wedge \exists y(\textsc{donkey}(y)(s) \wedge \textsc{owns}(x)(y)(s)) \wedge \exists s' : s' \in c_n(x).(s' \leq s \wedge$
$\textsc{feeds}(x)(\iota z\textsc{donkey}(z)(s'))(s))))$

This rather lengthy proposition is true or false just in case every local context $c_n(x)$ for any individual x contains only situations in which there is exactly one donkey. If true or false, the proposition is true at a situation s just in case every individual x that is a farmer with a donkey at s_r is a farmer with a donkey at s and feeds at s the donkey of some situation in x's local context $c_n(x)$.

Two comments on this result. First of all, note that these truth-conditions are rather weak. In order for the sentence to be true, the donkey-owning farmers of s_r each have to feed one donkey, even if they each own more than one donkey. Intuitively, (292) is true only if every donkey-owning farmer under consideration feeds every donkey they own. It has been noted that donkey sentences sometimes seem to have weaker truth-conditions:

(293) Everyone who owned a bike used it/the bike to get to the concert.

This sentence does not seem to suggest that everyone who owned a bike used every bike they owned to get to the concert. How exactly to account for both weak and strong readings of donkey sentences is a matter of ongoing dispute, and I won't try to settle this here.[278] (Note that we could assume a variant of $\backepsilon^{pr}$ that quantifies universally rather than existentially over the situations of the local context, which would lead to strong readings. But unless such a variant is independently motivated, this would be rather ad hoc; moreover, this would still not explain under what conditions a strong or a weak reading is preferred.)

Secondly, I still haven't said anything about what the local context of the nuclear scope of (291) is. But whether the predicted truth-conditions are plausible crucially depends on this. We know that for every individual x, the local context for x (that is, $c_n(x)$) needs to contain exactly one donkey, in order for us to predict that (291) is true or false. In line with the situation semantic approach to donkey sentences, we would hope that for any x, $c_n(x)$ is (more or less) the set of all minimal situations in which x is a farmer who owns a donkey. In that case, each situation in the context would contain exactly one donkey, and we would accordingly predict that (291) is true or false. But ideally, that this is indeed so is not postulated but rather somehow derived.

In section 6.3, I considered how Schlenker's approach to determining local contexts could be adapted to minimal contexts. Let's explore whether this approach could also help when it comes to donkey sentences. According to the

[278] See e.g. Champollion, Bumford, and Henderson 2019 for a recent discussion of such examples.

view adopted from Schlenker, a local context for an expression E is determined by the strongest innocuous restriction one could add to E. So far, I only looked at local contexts for expressions of type $\langle s,t\rangle$, but the strategy can be extended to local contexts for expressions of type $\langle e,st\rangle$.[279] Suppose that β is some predicate embedded in a sentence S (e.g. β in a sentence ⌜Every α β⌝). Then an innocuous restriction for β is a property that we could add to β without risking affecting how the global context is updated with S, no matter what β is and no matter what comes after β in S.[280] In syntactic terms, adding a property R to β can be understood as conjoining β with a predicate γ that expresses R. If β expresses the property P and γ expresses the property R, their conjunction ⌜γ and β⌝ is interpreted as follows:

(294) $[\![\gamma \text{ and } \beta]\!] = \lambda x.\lambda s.R(x)(s) \wedge P(x)(s)$

As in the case of local contexts for embedded sentences, I assume that the local minimal context for a predicate P embedded in a sentence S, used in a global (minimal) context c, is determined by the strongest innocuous restriction we could add to P.[281]

For sentences, the local context was assumed to be the set of minimal situations at which the strongest innocuous restriction is true.[282] We can generalise this assumption to predicates. Recall that for any property P, $\downarrow P$ is the property that applies to x at s just in case s is a minimal situation at which P applies to x. Similarly, let's say that if p is a proposition, $\downarrow p$ is that proposition that is true at any situation s just in case s is a minimal situation at which p is true. Then we can define local contexts for both predicates and sentences as follows:

[279] Here I'm again following Schlenker; see e.g. Schlenker 2009, pp. 22–24, where he applies his approach to local contexts for predicates in quantificational sentences.

[280] By property, I here mean a function of type $\langle e,st\rangle$.

[281] I assume that a property P is at least as strong as (or, entails) a property Q just in case whenever P applies to any individual x at a situation s, then Q also applies to x at s (see Schlenker 2009, pp. 14–5 on generalised entailment and conjunction).

[282] See (262) in section 6.3.

(295) *Local Minimal Contexts.* If r is the strongest innocuous restriction for a predicate or sentence S, the local minimal context for S is $\downarrow r$.

According to this, the local context c of a sentence is a proposition that is true at and only at the smallest situations at which the strongest innocuous restriction is true.[283] The local context c of a predicate is a property, and the local context $c(x)$ for some individual x is a proposition. In accordance with the sentential case, that proposition $c(x)$ is true at and only at the smallest situations at which the strongest innocuous restriction holds of x.

Let's apply this to a sentence $\ulcorner$[[Every s_i] α] $\beta\urcorner$, used to update a global minimal context c. What is the local minimal context of the nuclear scope β? Here is, again, the semantics for 'every' that I assume:

(296) $[\![\text{every}]\!]^{c,g} = \lambda s'.\lambda P_{\langle e,st\rangle}.\lambda Q_{\langle e,st\rangle}.\lambda s.\forall x(P(x)(s') \rightarrow (P(x)(s) \wedge Q(x)(s)))$

Suppose that s' is assigned some situation s_r and that α denotes some property P. Then the strongest innocuous property for β is this:

(297) $\lambda x.\lambda s.s \in \uparrow c \wedge P(x)(s_r) \wedge P(x)(s)$

Suppose that some predicate γ expresses the property (297). Then at all situations in $\uparrow c$, $\ulcorner$[[Every s_i] α] $\beta\urcorner$ is true just in case $\ulcorner$[[Every s_i] α] γ and $\beta\urcorner$ is true, no matter what property β expresses. Therefore, (297) is an innocuous restriction. It is, moreover, the strongest innocuous restriction. For suppose γ did not apply to some individual a and situation s to which (297) applies. Then $\ulcorner$[[Every s_i] α] γ and $\beta\urcorner$ would not be true at s. (After all, (297) applies to a at s, and so $P(a)(s_r)$ and $P(a)(s)$ are true, whereas the nuclear scope $\ulcorner\gamma$ and $\beta\urcorner$ would not hold of a at s, because of γ.) However, $\ulcorner$[[Every s_i] α] $\beta\urcorner$ could well be true at s. Moreover, s is an expansion of some situation of the global context c, since (297) applies to a at s (and so $s \in \uparrow c$). Therefore, this difference in truth value of $\ulcorner$[[Every s_i] α] $\beta\urcorner$ and $\ulcorner$[[Every s_i] α] γ and $\beta\urcorner$ could affect how c is updated, and

[283] That local contexts for sentences are now propositions rather than sets of situations is unproblematic; we could e.g. easily redefine the semantics of $\ni$ as follows: $[\![\ni]\!]^c = \lambda p_{\langle s,st\rangle}.\lambda s.\exists s' : c(s').s' \leq s \wedge p(s')(s)$ (the only difference being that '$s' \in c$' was replaced with '$c(s')$').

so restricting β with a property stronger than (297) would not be innocuous.[284] If this is correct, we predict that the local minimal context for β in $\ulcorner$[[Every s_i] α] $\beta\urcorner$ is the property $\downarrow$(297), assuming that the global context is c, that the situation s_r is assigned to the variable s_i, and that α expresses the property P. For the donkey sentence (298), this means that the local context for the nuclear scope 'feeds the donkey' is predicted to be $\downarrow$(299):

(298) Every farmer who owns a donkey feeds the donkey.

(299) $\lambda x.\lambda s.s \in \uparrow c \wedge \textsc{farmer}(x)(s_r) \wedge \exists y(\textsc{donkey}(y)(s_r) \wedge \textsc{owns}(x)(y)(s_r)) \wedge \textsc{farmer}(x)(s) \wedge \exists y(\textsc{donkey}(y)(s) \wedge \textsc{owns}(x)(y)(s))$

The local context $\downarrow$(299) is a property that applies to an individual x and a situation s just in case s is a minimal situation such that (i) s expands some situation of the global context c, (ii) x is a farmer who owns a donkey at s_r, and (iii) x is a farmer who owns a donkey at s. In order for (298) to be true or false, every minimal situation that satisfies these three conditions, for any individual x, has to contain exactly one donkey.[285]

Let's consider whether every minimal situation s that satisfies conditions (i)-(iii) for some individual x contains exactly one donkey. First, let's consider condition (iii). Any situation at which (iii) is true contains a donkey, and so any minimal situation at which (i)-(iii) are true contains a donkey. In order for (iii) to be true at any situation s, for any individual x, there need not be more than one donkey at s. As far as (iii) is concerned, the minimal situations at which (i)-(iii) hold may well contain only one donkey.

Next, let's look at condition (ii). In general, we can't assume that the situation s_r contains only one donkey. After all, we usually make claims such as (298) to talk about more than one donkey-owning farmer. But in order for it to be the case that some individual x is a farmer and owns a donkey at s_r, s_r need not be part of the minimal situation s, and so s may contain only one donkey even if

[284] Cf. Schlenker 2009, pp. 22–3 on 'every'.

[285] See (292) above.

s_r contains several. As far as conditions (ii) and (iii) are concerned, the minimal situations at which (i)-(iii) hold of some individual x contain one donkey.

So far, this is promising. But now let's turn to condition (i), which requires that the situations of the local context expand some situation of the global context. This condition is problematic. After all, there is prima facie no reason to think that (298) may only be used if there is not more than one donkey in the situations of the global context c. Sequences such as the following are perfectly fine:

(300) There are ten farmers around here. Half of them each own ten donkeys. Every farmer who owns a donkey feeds the donkey.

If in this sequence, all sentences are used to describe the same topic situation, there are fifty donkeys in each situation of the context for the third sentence. But if there is more than one donkey in the situations of c, then every situation that expands some situation of c also contains more than one donkey. In that case, even the smallest situations at which condition (i) holds contain more than one donkey. We would therefore predict that (298) is neither true nor false, which is implausible.

It is not straightforward to evaluate how troubling this unfortunate result is. Plausibly, the problem discussed here generalises to donkey sentences with other quantifiers, such as 'Some farmer who owns a donkey feeds the donkey' or 'Many farmers who own a donkey feed the donkey'.[286] It is not an isolated issue that we can easily ignore. The problem has different potential sources. For one thing, it could be that the semantics for 'every' that I assumed is not correct. If that is so, perhaps the problem disappears with the correct semantics. At the moment, however, I don't see what a situation semantics for 'every' would look like that doesn't run into a version of the same problem. Apart from the seman-

[286] I haven't discussed 'many', but with a semantics that treats indefinite claims as existential quantifiers along the lines sketched in 6.2.3, we would make a similar prediction; there, too, the situations in the local context of the nuclear scope would expand the situations of the global context.

tics of ‘every’, another culprit could be the suggestion for how local contexts are determined. Perhaps local minimal contexts are in fact determined in a different way, with a different outcome. At least I don’t know of an alternative that would lead to a better outcome (other than simply stipulating what the local context is, which I would find unsatisfying).

Another response to the problematic prediction would be to accept it and to (try to) explain why it may not be as problematic as it seems on the face of it. In section 5.2, we already encountered sequences that seemed to be ‘too long’, such as this one:

(301) There were three cats. One cat was miaowing. The cat was hungry.

After update with the first sentence, the situations in the context contain three cats, and so that context cannot be updated with the third sentence, because of the uniqueness presupposition triggered by ‘the cat’. Perhaps whatever explains why sequences such as (301) are fine also helps explain why sequences such as (300) are okay. In section 5.4, I suggested that the topic situation shifts after the first sentence of (301) and that with the topic situation, the context shifts as well. If that is right, perhaps the same happens in cases such as (300). Perhaps the first two sentences of (300) describe one topic situation and the third sentence describes a different one: The situations in the context for the first two sentences each contain ten farmers and fifty donkeys, but this is not the context the third sentence is used to update, since the context for the third sentence is a context for a slightly different topic situation. This type of reply, however, is only plausible if backed up by a fuller story about when topic situations shift. Unless there is some independent reason to think that the topic situation does indeed shift, this response is in danger of looking like a desperate manoeuvre to delay admitting defeat.

6.5 Conclusion

In this chapter, I turned from sequences of sentences to single sentences. The starting point was the observation that a sequence of two sentences is very similar to their conjunction. In particular, definite-indefinite sequences such as (302) have very similar conjunctive counterparts such as (303):

(302) There's a cat. The cat is hungry.
(303) There's a cat and the cat is hungry.

What I have tried to do in this chapter is to extend the theory developed in earlier chapters for indefinite-definite sequences to conjunctions, and from there also to other constellations of indefinites and definites, for example in disjunctions. To this end, I suggested we use local minimal contexts, and I tried to show how Schlenker's account of how local contexts are determined pragmatically could be adapted to minimal contexts. Along the way, I also had a closer look at the semantics of negation and of indefinites. As I tried to show, their semantics is rather complicated if combined with a pragmatics based on minimal contexts. I argued in favor of keeping the semantics of negation simple at the cost of having to adopt a more complex semantics for indefinites. Finally, I turned to donkey sentences, with mixed results. I assumed a semantics for 'every' that is not already designed to deal with donkey anaphora and I tried to explain the felicity of donkey sentences on the basis of this semantics, with the help of local contexts. But it turned out that applying the Schlenkerian idea for how to determine local contexts leads to predictions that are at least prima facie implausible. How problematic this is remains to be explored.

Chapter 7

Conclusion

To conclude, I want to take an inconclusive look back at some of the main features of the view that I have tried to develop here. As pointed out in section 4.1, situation semantic theories of definites and indefinites are often discussed as competitors to dynamic semantic accounts of definites and indefinites. I therefore want to highlight some of the reasons why one might take the situation semantic account sketched here to be static or dynamic. My aim is not to argue for a particular way of distinguishing between static and dynamic theories. A comparison with some aspects of so-called dynamic views is nonetheless helpful, I hope.

The view that I have presented here, the Minimal Context Account, builds on situation semantic accounts of definites and in particular on Elbourne's (2013) semantics. Definite descriptions are assumed to be referential terms (expressions of type e) with an existence and uniqueness presupposition that is restricted by an unpronounced situation variable. Presuppositions are treated as truth-value gaps. Indefinites are essentially existential quantifiers. And though I haven't discussed pronouns, the Minimal Context Account could be combined with the view that pronouns have more or less the same semantics as definite descriptions.[287] By contrast, dynamic semantic theories of definites such as Heim's (1982) assume that pronouns, definite descriptions and indefinites have essentially the

[287] See Elbourne 2005, chapter 3, and Elbourne 2013, chapter 10, for discussion of this view.

semantics of (individual) variables, distinguished from each other by their presuppositions. The context includes a record of variables that have already been introduced; indefinites have to be variables that have not yet been introduced, whereas definites have to be variables that have already been introduced. Heim also denies that definites come with a uniqueness presupposition.[288]

In spite of these differences, there are also some notable points of agreement. Both dynamic semantic accounts and the Minimal Context Account take contexts to be more complex than Stalnaker's contexts that are sets of possible worlds. On Heim's dynamic view, contexts incorporate assignment functions in addition to possible worlds. The Minimal Context Account takes contexts to be sets of situations. For comparison, recall the dynamic contexts discussed in section 5.6. A dynamic context is a set of tuples $\langle w, g\rangle$ of a world w and a partial assignment function g, with the condition that all assignments in the context are defined for the same variables. The variables for which the assignment functions in the context are already defined have already been introduced; they count as familiar. Variables for which the assignment functions are not yet defined have not already been introduced; they count as new. The familiar variables of a dynamic context are the context's so-called discourse referents. Both dynamic contexts and minimal contexts have a more complicated structure than Stalnakerian contexts. Dynamic contexts may agree on the set of possible worlds at which they are accurate even if the assignment functions they include differ. Something similar holds for minimal contexts. For any minimal context c, we can define a corresponding Stalnakerian context $c_w = \{w : \exists s(s \in c \wedge s \leq w)\}$, the set of all possible worlds which have some situation of c as a part. Two distinct minimal contexts may correspond to the same Stalnakerian context if they contain (different) parts of the same possible worlds.[289] Moreover, update both of dynamic contexts and

[288]For a brief comparison of dynamic and non-dynamic accounts along these lines, see Heim 1990a, p. 137.

[289]A minimal context c is accurate just in case c_w contains the actual world (assuming, in the case of definite minimal contexts, that the topic situation of c is an actual situation).

of minimal contexts is not intersective. If a dynamic context is updated, the new context is not always a subset of the old context, since the new context may include new discourse referents.[290] Minimal update of a minimal context may expand the situations of the old context, and so the new context contains situations that were not already in the old context. Stalnaker's update rule, by contrast, is intersective. This arguably moves the Minimal Context Account into dynamic territory.[291]

Dynamic views such as Heim's use assignment functions as part of the context to model discourse referents, which they use to interpret indefinites and definites. What discourse referents are is not entirely clear. Heim (1983) suggests that discourse referents are like file cards on which a listener notes information about individuals mentioned in a conversation. K. Lewis (2014, p. 235) writes that a "discourse referent is an abstract representation of an object under discussion". Be that as it may, a discourse referent doesn't stand for a particular real-world individual; using Heim's metaphor, distinct individuals can match the description on the same file card. The Minimal Context Account does not invoke discourse referents that represent individuals in the interpretation of definites and indefinites.[292] For the most part, I assumed that one definite minimal

[290]If an update adds a new discourse referent to the dynamic context, the partial assignment functions in the new context are defined for a variable for which the assignment functions in the old context were not defined.

[291]For a discussion of criteria for dynamicness in terms of how contexts are updated, see Rothschild and Yalcin 2017. Given their criteria, they argue that the view of Heim (1982) fails to be "strongly static" (p. 35), since update is not commutative on this view, meaning that the result of updating a context may depend on the order of the updates; they also argue that Heim's dynamic system is in fact "weakly static" (p. 36). Roughly, weakly static systems allow that how a sentence updates a context may depend on what that context is like—the context may affect which proposition the sentence expresses. The Minimal Context Account seems to fit that description, since the proposition expressed by a sentence may depend on its context (because of $\ni$). Rothschild and Yalcin (2017) also suggest formal criteria for what counts as a weakly static system (see pp. 35-7); they argue that weakly static systems are those that are antisymmetric, in the sense that, if there is some way to arrive at a context c' by updating a context c and there is also some way to arrive at c by updating c', then c and c' must be identical. As far as I can tell, update on the Minimal Context Account is antisymmetric.

[292]See section 5.6. This is also one way in which the Minimal Context Account differs from accounts such as the view of K. Lewis (2021), which combines a static semantics for definites with a dynamic pragmatics, using discourse referents (but also invoking situations in the interpretation of donkey sentences); Lewis suggests that a definite description ⌜the F⌝ is ambiguous between

context is enough to account for the phenomena under consideration. A definite minimal context represents information about a particular topic situation, similar to how Stalnaker's context represents information about a particular possible world, namely the actual one. But topic situations, which are often smaller than the whole world, can plausibly shift over the course of a conversation, and so one definite minimal context won't be enough to represent all the information accepted in a conversation. In section 5.5, I therefore suggested making use of what I called discourse contexts. A discourse context is a set of partial assignment functions, all defined for the same indices, with each index representing one topic situation under discussion. As pointed out in section 5.6, this is structurally similar to the model of discourse referents in dynamic contexts. As long as all minimal contexts are definite, each index does indeed stand for one particular (usually actual) situation. These indices are therefore not like the discourse referents of dynamic semantics. But things are different should it turn out that the Minimal Context Account has to invoke indefinite minimal contexts as well. An indefinite context does not stand for a particular situation but rather for any situation of a certain kind. An indefinite context is therefore much more like a discourse referent or a file card.[293] And if the considerations sketched in section 5.6 point in the right direction, there may indeed be a need for indefinite contexts. If that is so, the Minimal Context Account may be able to avoid discourse referents in the semantics of definites and indefinites, but it nonetheless has to rely on something very much like discourse referents.

On one way of describing the distinction between dynamic and static semantics, a semantics is static if it takes the content of a (declarative) sentence to

one reading on which it presupposes uniqueness in the world (i.e. that there is exactly one F) and a reading on which it presupposes uniqueness in discourse (i.e. that there is exactly one discourse referent that is F). It would be interesting to compare this view in more detail with the Minimal Context Account (on which 'the' is not ambiguous).

[293]Recall, from section 3.1, that an indefinite context is accurate just in case some situation it contains is actual, similar to how a file (in Heim's sense) could be said to be accurate just in case some individual satisfying the description on the file is actual.

be a proposition, and a semantics is dynamic if it takes the content of a (declarative) sentence to be a context change potential, a function from contexts to contexts.[294] The Minimal Context Account takes the content of a sentence to be a proposition, a function from situations to truth values. In this sense, the semantics is static.

On the other hand, the Minimal Context Account assumes that global and local contexts play a role in determining what proposition is expressed.[295] The local context of one part of a sentence depends on the interpretation of other parts of the sentence, and so the process of interpreting a sentence has to proceed step by step. Whether a semantics like this should be counted as dynamic in some sense is not clear.[296] On the basis of one of Schlenker's accounts of local contexts, I tried to show how local minimal contexts could be derived from the semantics following a general recipe. If this really worked, it would mean that the local minimal contexts need not be stipulated in the lexical semantics. However, I argued that in the case of donkey sentences, following the recipe leads to results that are at least questionable. More needs to be done to explore whether these results can be avoided or whether they are not as bad as they seem.

To evaluate how promising the Minimal Context Account is, one would have to compare it in detail with other accounts of definite descriptions. My main aim has been to develop an account that closes some of the gaps that I think situation semantic theories of definite descriptions such as Elbourne's have left open. Most importantly, I have tried to develop a situation-based account of indefinite-definite sequences, an issue that situation semantic accounts of definites have to my knowledge rather neglected, even though such sequences were among the motivations of dynamic semantics. My second main concern was to embed the

[294]See section 4.1

[295]Via the unpronounced existential quantifier ɘ; see section 5.1.1 and chapter 6

[296]Klinedinst and Rothschild (2012), who develop a view like this (on which the Minimal Context Account is partly based), write that their "account is essentially equivalent to dynamic semantics" (p. 149). K. Lewis (2014) argues that sub-sentential shifts of the context should not per se be seen as incompatible with static semantics.

situation semantics of definite descriptions in a more general theory of presupposition projection, since, again, this is an issue that to my knowledge situation semantic accounts of definites have not paid a lot of attention, too.[297] For both issues, minimal contexts were at the heart of my suggestion. In an indefinite-definite sequence, the indefinite claim provides a minimal context that satisfies the existence and uniqueness presupposition triggered by the following definite. Since the main addition, the assumption of minimal contexts, is in the pragmatics, this suggestion is conservative with respect to the situation semantics of definite descriptions. The main addition to the semantics was the assumption that the situation variables of definite descriptions can be bound by an existential quantifier restricted to the situations of the (global or local) context. That these situation variables can be bound in various ways is already assumed by situation semanticists. Adding the assumption that these variables can also be bound to the situations of a context does not seem like a particularly outlandish step. That the necessary modifications of the situation semantics are fairly modest speaks, I think, in favour of the view.

The assumption that presuppositions merely have to be true at the situations of minimal (global or local) contexts rather than at the situations of non-minimal contexts or the worlds of Stalnakerian contexts was mainly motivated by looking at the behaviour of definite descriptions. Since one of my aims was to embed the situation semantics in a more general theory of presupposition projection, this is not entirely satisfying. After all, if this crucial assumption is only needed for the presuppositions of definite descriptions but not for any other presuppositions, one might object that the theory of presupposition projection offered here isn't really a general theory of presupposition projection but merely a theory of how the presuppositions of definite descriptions project.

My response to this worry is, unfortunately, tentative. First of all, it may

[297] As mentioned, both issues have been pointed out as shortcomings of these situation semantic theories, in particular recently by Mandelkern and Rothschild (2020) and K. Lewis (2021).

be worth pointing out that even if the (uniqueness) presuppositions of definite descriptions were the only presupposition for which minimal rather than non-minimal contexts were required, it would not follow that minimal contexts are unsuited to deal with other presuppositions. Secondly, and relatedly, the account of projection suggested here for definite descriptions builds on familiar ideas from theories of presupposition projection. The hypothesis that presuppositions of an expression project unless they are satisfied by the local context is common to a whole range of different theories of projection. The Minimal Context Account is closely related to these theories even though it relies on a non-standard conception of contexts. Thirdly, it's not entirely clear to me that for example Heim's dynamic semantic theory of presupposition projection is in a very different position. Recall that dynamic contexts have two components, possible worlds as well as assignment functions. The assignment functions are needed primarily for the interpretation of indefinites and definites with their presuppositions, but it is not obvious to me that the assignment functions are needed to account for all presuppositions whatsoever (e.g. those triggered by 'stop'). If that is correct, then there is a similar lack of unity in the conception of contexts used by the dynamic approach: not all of its complexity is needed for all types of presuppositions. In addition, perhaps there are presuppositions for which minimal contexts turn out to be useful, apart from the presuppositions of definite terms. But exploring whether this is indeed the case is a task for another day.

There is a diverse landscape of theories of definite descriptions. In this thesis, I have not tried to provide anything like a comprehensive overview of them. Comparing the view I have suggested here with more alternative accounts of definite descriptions will be a task for the future. In particular, I think it will be interesting to compare the Minimal Context Account with dynamic semantic theories that incorporate situations, as in unpublished work by Kirkpatrick (2019), with dynamic semantic theories that incorporate a type of uniqueness constraint, such as the view of Roberts (2003), as well as with static semantic theories of definites that incorporate elements of dynamic semantics in the pragmatics, such as the theory of K. Lewis (2021).[298] As pointed out throughout this thesis, there are also various tricky cases that I haven't discussed here, including bishop sequences and sequences of attitude ascriptions with embedded indefinites and definites.[299] The discussion of donkey sentences, too, would deserve to be expanded. I did not look at quantifiers other than 'every' nor at donkey anaphora in conditionals. Even in the case of 'every', important questions were left unanswered. It remains to be seen how useful local minimal contexts really are in accounting for those cases. Even so, there is enough promise, I think, to suggest that the Minimal Context Account is worth pursuing.

[298] For critical discussion of a range of recent accounts of definite descriptions, see e.g. Elbourne 2013, chapter 1

[299] See the list of open issues in section 4.5

Bibliography

Alama, Jesse and Johannes Korbmacher (2018). "The Lambda Calculus". *Stanford Encyclopedia of Philosophy*. Ed. by Edward N. Zalta.

Austin, J. L. (1950). "Truth". *Supplementary Proceedings of the Aristotelian Society* 24.1, pp. 111–29.

Barwise, Jon (1989). *The Situation in Logic*. Stanford: Center for the Study of Language and Information (CSLI).

Barwise, Jon and John Etchemendy (1989). *The Liar: An Essay on Truth and Circularity*. New York: Oxford University Press.

Barwise, Jon and John Perry (1981). "Situations and Attitudes". *The Journal of Philosophy* 78.11, pp. 668–691.

— (1983). *Situations and Attitudes*. Cambridge, MA: MIT Press.

Beaver, David, Bart Geurts, and Kristie Denlinger (2021). "Presupposition". *Stanford Encyclopedia of Philosophy*. Ed. by Edward N. Zalta.

Beaver, David and Emiel Krahmer (2001). "A Partial Account of Presupposition Projection". *Journal of Logic, Language and Information* 10.2, pp. 147–182.

van Benthem, Johan (1989). "Semantic Parallels in Natural Language and Computation". *Logic Colloquium '89*. Ed. by H.-D. Ebbinghaus et al. Amsterdam: North Holland, pp. 331–375.

Benzmüller, Christoph and Peter Andrews (2019). "Church's Type Theory". *Stanford Encyclopedia of Philosophy*. Ed. by Edward N. Zalta.

Berman, Stephen R. (1987). "Situation-Based Semantics for Adverbs of Quantification". *University of Massachusetts Occasional Papers in Linguistics* 13.2.

Blamey, Stephen (2002). "Partial Logic". *Handbook of Philosophical Logic. 2nd Edition. Volume 5*. Ed. by D.M. Gabbay and F. Guenthner. Dordrecht: Springer, pp. 261–353.

Büring, Daniel (2004). "Crossover Situations". *Natural Language Semantics* 12.1, pp. 23–62.

Champollion, Lucas, Dylan Bumford, and Robert Henderson (2019). "Donkeys Under Discussion". *Semantics and Pragmatics* 12.1, pp. 1–50.

Champollion, Lucas and Manfred Krifka (2016). "Mereology". *The Cambridge Handbook of Formal Semantics*. Ed. by Maria Aloni and Paul Dekker. Cambridge: Cambridge University Press, pp. 369–388.

Chemla, Emmanuel (2009). "Presuppositions of Quantified Sentences: Experimental Data". *Natural Language Semantics* 17.4, pp. 299–340.

Coppock, Elizabeth (2014). "Review of Paul Elbourne, Definite Descriptions". *Nordic Journal of Linguistics* 37.1, pp. 112–120.

Dummett, Michael (1959). “Truth”. *Proceedings of the Aristotelian Society* 59.1, pp. 141–62.
Elbourne, Paul (2005). *Situations and Individuals*. Cambridge, MA: MIT Press.
— (2013). *Definite Descriptions*. Oxford: Oxford University Press.
— (2016). “Incomplete Descriptions and Indistinguishable Participants”. *Natural Language Semantics* 24.1, pp. 1–43.
Evans, Gareth (1977). “Pronouns, Quantifiers, and Relative Clauses”. *Canadian Journal of Philosophy* 7.3, pp. 467–536.
Fine, Kit (2017). “A Theory of Truthmaker Content I: Conjunction, Disjunction and Negation”. *Journal of Philosophical Logic* 46.6, pp. 625–674.
von Fintel, Kai (2004). “Would You Believe It? The King of France is Back! Presuppositions and Truth-Value Intuitions”. *Descriptions and Beyond*. Ed. by Anne Bezuidenhout Marga Reimer. Oxford: Oxford University Press, pp. 315–341.
— (2008). “What is Presupposition Accommodation, Again?” *Philosophical Perspectives* 22.1, pp. 137–170.
Fodor, Jerry A (1961). “Projection and Paraphrase in Semantics”. *Analysis* 21.4, pp. 73–77.
Fox, Danny (2008). “Two Short Notes on Schlenker’s Theory of Presupposition Projection”. *Theoretical Linguistics* 34.3, pp. 237–252.
Frege, Gottlob (1884). *Grundlagen der Arithmetik*. Breslau: Wilhelm Koebner.
— (1892). “Über Sinn und Bedeutung”. *Zeitschrift für Philosophie und philosophische Kritik* 100, pp. 25–50.
Gauker, Christopher (2008). “Zero Tolerance for Pragmatics”. *Synthese* 165.3, pp. 359–371.
— (2019). “Against the Speaker-Intention Theory of Demonstratives”. *Linguistics and Philosophy* 42.2, pp. 109–129.
Geach, Peter T. (1962). *Reference and Generality*. Ithaca: Cornell University Press.
— (1967). “Intentional Identity”. *The Journal of Philosophy* 64.20, pp. 627–632.
George, B. R. (2008). “A New Predictive Theory of Presupposition Projection”. *Semantics and Linguistic Theory*. Vol. 18, pp. 358–375.
Geurts, Bart (2019). “Communication as Commitment Sharing: Speech Acts, Implicatures, Common Ground”. *Theoretical Linguistics* 45.1-2, pp. 1–30.
Grice, Paul H (1989). “Logic and Conversation”. *Studies in the Way of Words*. Cambridge, MA: Harvard University Press, pp. 22–40.
Groenendijk, Jeroen and Martin Stokhof (1991). “Dynamic Predicate Logic”. *Linguistics and Philosophy* 14.1, pp. 39–100.
Hall, Ned, Brian Rabern, and Wolfgang Schwarz (2021). “David Lewis’s Metaphysics”. *Stanford Encyclopedia of Philosophy*. Ed. by Edward N. Zalta.
Harris, Daniel W. (2020). “We Talk to People, Not Contexts”. *Philosophical Studies* 177.9, pp. 2713–2733.
Hawthorne, John and David Manley (2012). *The Reference Book*. Oxford: Oxford University Press.
Heim, Irene (1982). *The Semantics of Definite and Indefinite Noun Phrases*. (2011 Edition).

Heim, Irene (1983). “File Change Semantics and the Familiarity Theory of Definiteness”. *Meaning, Use, and Interpretation of Language*. Ed. by Rainer Bäuerle, Christoph Schwarze, and Arnim von Stechow. Berlin: De Gruyter, pp. 164–189.

— (1990a). “E-Type Pronouns and Donkey Anaphora”. *Linguistics and Philosophy* 13.2, pp. 137–177.

— (1990b). “Presupposition Projection”. *Reader for the Nijmegen Workshop on Presupposition, Lexical Meaning, and Discourse Processes*. Ed. by Rob van der Sandt. University of Nijmegen.

— (2002). “On the Projection Problem for Presuppositions”. *Formal Semantics. The Essential Readings*. Ed. by Paul Portner and Barbara H. Partee. Oxford: Blackwell, pp. 249–260.

Heim, Irene and Angelika Kratzer (1998). *Semantics in Generative Grammar*. Malden: Blackwell.

Hinrichs, Erhard (1986). “Temporal Anaphora in Discourses of English”. *Linguistics and Philosophy* 9.1, pp. 63–82.

Horn, Laurence (1989). *A Natural History of Negation*. Chicago: University of Chicago Press.

Humberstone, I Lloyd (1981). “From Worlds to Possibilities”. *Journal of Philosophical Logic* 10.3, pp. 313–339.

Jacobson, Pauline (2000). “Paycheck Pronouns, Bach-Peters Sentences, and Variable-Free Semantics”. *Natural Language Semantics* 8.2, pp. 77–155.

Kadmon, Nirit (1987). *On Unique and Non-Unique Reference and Asymmetric Quantification*. University of Massachusetts Amherst Dissertation.

— (2001). *Formal Pragmatics. Semantics, Pragmatics, Presupposition, and Focus*. Oxford: Blackwell.

Kaiserman, Alex (2017). “Causes and Counterparts”. *Australasian Journal of Philosophy* 95.1, pp. 17–28.

Kamp, Hans (2002). “A Theory of Truth and Semantic Representation”. *Formal Semantics. The Essential Readings*. Ed. by Paul Portner and Barbara H. Partee. Oxford: Blackwell, pp. 189–222.

Kaplan, David (1989). “Demonstratives: An Essay on the Semantics, Logic, Metaphysics and Epistemology of Demonstratives and Other Indexicals”. *Themes From Kaplan*. Ed. by Joseph Almog, John Perry, and Howard Wettstein. Oxford: Oxford University Press, pp. 481–563.

Karttunen, Lauri (1969). “Discourse Referents”. *Proceedings of the 1969 Conference on Computational Linguistics*.

— (1973). “Presuppositions of Compound Sentences”. *Linguistic Inquiry* 4.2, pp. 169–193.

— (1974). “Presupposition and Linguistic Context”. *Theoretical Linguistics* 1.1-3, pp. 181–194.

Karttunen, Lauri and Stanley Peters (1979). “Conventional Implicature”. *Syntax and Semantics, Volume 11: Presupposition*. Ed. by Choon-Kyu Oh and David A. Dinneen. New York: Academic Press, pp. 1–56.

Katz, Jerrold J and Jerry A Fodor (1963). “The Structure of a Semantic Theory”. *Language* 39.2, pp. 170–210.

King, Jeffrey C. (2014). “Speaker Intentions in Context”. *Noûs* 48.2, pp. 219–237.

Kirkpatrick, James Ravi (2019). “Definite Descriptions in Discourse”. *Unpublished manuscript. University of Oxford*.

Kleene, Stephen Cole (1952). *Introduction to Metamathematics*. Amsterdam: North Holland.

Klinedinst, Nathan and Daniel Rothschild (2012). “Connectives Without Truth Tables”. *Natural Language Semantics* 20.2, pp. 137–175.

Krahmer, Emiel and Reinhard Muskens (1994). “Umbrellas and Bathrooms”. *Semantics and Linguistic Theory*. Vol. 4, pp. 179–194.

Kratzer, Angelika (1989). “An Investigation of the Lumps of Thought”. *Linguistics and Philosophy* 12.5, pp. 607–653.

— (2019). “Situations in Natural Language Semantics”. *Stanford Encyclopedia of Philosophy*. Ed. by Edward N. Zalta.

Križ, Manuel (2019). “Homogeneity Effects in Natural Language Semantics”. *Language and Linguistics Compass* 13.11.

Langendoen, D. Terence and Harris Savin (1971). “The Projection Problem for Presuppositions”. *Studies in Linguistic Semantics*. Ed. by Rinehart Holt and Winston. New York: Irvington, pp. 54–60.

Lanier, William (2014). “Intentional Identity and Descriptions”. *Philosophical Studies* 170.2, pp. 289–302.

Leahy, Brian (2016). “On Presuppositional Implicatures”. *Topoi* 35.1, pp. 83–91.

Lewis, David (1979). “Scorekeeping in a Language Game”. *Journal of Philosophical Logic* 8.1, pp. 339–359.

— (1986). *On the Plurality of Worlds*. Oxford: Blackwell.

Lewis, Karen (2013). “Speaker’s Reference and Anaphoric Pronouns”. *Philosophical Perspectives* 27, pp. 404–437.

— (2014). “Do We Need Dynamic Semantics?” *Metasemantics: New Essays on the Foundations of Meaning*. Ed. by Alexis Burgess and Brett Sherman. Oxford: Oxford University Press, pp. 231–258.

— (2021). “Descriptions, Pronouns, and Uniqueness”. *Linguistics and Philosophy*.

Link, Godehard (1998). *Algebraic Semantics in Language and Philosophy*. Stanford: CSLI Publications.

Ludlow, Peter (1994). “Conditionals, Events, and Unbound Pronouns”. *Lingua e stile* 29.2, pp. 165–183.

— (2018). “Descriptions”. *Stanford Encyclopedia of Philosophy*. Ed. by Edward N. Zalta.

Mackay, John (2019). “Subjunctive Conditionals’ Local Contexts”. *Linguistics and Philosophy* 42.3, pp. 207–221.

Mandelkern, Matthew (forthcoming). “Witnesses”. *Linguistics and Philosophy*.

— (2016). “Dissatisfaction Theory”. *Semantics and Linguistic Theory*. Vol. 26, pp. 391–416.

Mandelkern, Matthew and Jacopo Romoli (2017). “Parsing and Presuppositions in the Calculation of Local Contexts”. *Semantics and Pragmatics* 10.7, pp. 1–40.

Mandelkern, Matthew and Daniel Rothschild (2020). “Definiteness Projection”. *Natural Language Semantics* 28, pp. 77–109.
Mandelkern, Matthew, Jérémy Zehr, et al. (2020). “We’ve Discovered That Projection Across Conjunction Is Asymmetric (And It Is!)” *Linguistics and Philosophy* 43.5, pp. 473–514.
Mill, John Stuart (1843). *A System of Logic, Ratiocinative and Inductive, Being a Connected View of the Principles of Evidence, and the Methods of Scientific Investigation*. London: John W. Parker.
Milward, David (1996). “Integrating Situations Into a Theory of Discourse Anaphora”. *Proceedings of the Tenth Amsterdam Colloquium*. Ed. by P.J.E. Dekker and M.J.B. Stokhof. Amsterdam: ILLC, University of Amsterdam, pp. 519–538.
Neale, Stephen (1990). *Descriptions*. Cambridge, MA: MIT Press.
Niebergall, Karl-Georg (2011). “Mereology”. *The Continuum Companion to Philosophical Logic*. Ed. by Leon Horsten and Richard Pettigrew. London: Bloomsbury, pp. 271–298.
Partee, Barbara H. (1973). “Some Structural Analogies Between Tenses and Pronouns in English”. *The Journal of Philosophy* 70.18, pp. 601–609.
— (1984). “Nominal and Temporal Anaphora”. *Linguistics and Philosophy* 7.3, pp. 243–286.
Percus, Orin (2000). “Constraints on Some Other Variables in Syntax”. *Natural Language Semantics* 8.3, pp. 173–229.
Portner, Paul Howard (1992). “Situation Theory and the Semantics of Propositional Expressions”. PhD thesis. University of Massachusetts Amherst.
Potts, Christopher (2015). “Presupposition and Implicature”. *The Handbook of Contemporary Semantic Theory. Second Edition*. Ed. by Shalom Lappin and Chris Fox. Chichester: Wiley, pp. 168–202.
Reimer, Marga (1992). “Three Views of Demonstrative Reference”. *Synthese* 93.3, pp. 373–402.
Roberts, Craige (1989). “Modal Subordination and Pronominal Anaphora in Discourse”. *Linguistics and Philosophy* 12.6, pp. 683–721.
— (2003). “Uniqueness in Definite Doun Phrases”. *Linguistics and Philosophy* 26.3, pp. 287–350.
Rothschild, Daniel and Seth Yalcin (2017). “On the Dynamics of Conversation”. *Noûs* 51.1, pp. 24–48.
Russell, Bertrand (1905). “On Denoting”. *Mind* 14.56, pp. 479–493.
— (1919). “Chapter 16: Definite Descriptions”. *Introduction to Mathematical Philosophy*. London: Allen and Unwin.
Sandgren, Alexander (2018). “Which Witch Is Which? Exotic Objects and Intentional Identity”. *Synthese* 195.2, pp. 721–739.
Schlenker, Philippe (2008). “Be Articulate: A Pragmatic Theory of Presupposition Projection”. *Theoretical Linguistics* 34.3, pp. 157–212.
— (2009). “Local Contexts”. *Semantics and Pragmatics* 2.3, pp. 1–78.
— (2010a). “Local Contexts and Local Meanings”. *Philosophical Studies* 151.1, pp. 115–142.

Schlenker, Philippe (2010b). “Presuppositions and Local Contexts”. *Mind* 119.474, pp. 377–391.
Schwarz, Florian (2009). *Two Types of Definites in Natural Language*. University of Massachusetts Amherst Dissertation.
— (2012). “Situation Pronouns in Determiner Phrases”. *Natural Language Semantics* 20.4, pp. 431–475.
Simons, Mandy (1996). “Disjunction and Anaphora”. *Semantics and Linguistic Theory*. Vol. 6, pp. 245–260.
Soames, Scott (1979). “A Projection Problem for Speaker Presuppositions”. *Linguistic Inquiry* 10.4, pp. 623–666.
— (2008a). *Philosophical Essays, Volume 1: Natural Language: What It Means and How We Use It*. Princeton: Princeton University Press.
— (2008b). “Presupposition”. *Philosophical Essays, Volume 1: Natural Language: What It Means and How We Use It*. Princeton: Princeton University Press, pp. 73–130.
Spector, Benjamin (2013). “Homogeneity and Plurals: From the Strongest Meaning Hypothesis to Supervaluations”. *Presentation at Sinn und Bedeutung 18*.
Stalnaker, Robert (1970). “Pragmatics”. *Synthese* 22.1-2, pp. 272–289.
— (1973). “Presuppositions”. *Journal of Philosophical Logic* 2.4, pp. 447–457.
— (1978). “Assertion”. *Syntax and Semantics* 9, pp. 315–332.
— (1986). “Possible Worlds and Situations”. *Journal of Philosophical Logic* 15, pp. 109–123.
— (1998). “On the Representation of Context”. *Journal of Logic, Language and Information* 7.1, pp. 3–19.
— (1999). “Pragmatic Presuppositions”. *Context and Content: Essays on Intentionality in Speech and Thought*. Oxford: Oxford University Press, pp. 47–63.
— (2002). “Common Ground”. *Linguistics and Philosophy* 25.5-6, pp. 701–721.
— (2014). *Context*. Oxford: Oxford University Press.
Stanley, Jason and Zoltán Gendler Szabó (2000). “On Quantifier Domain Restriction”. *Mind & Language* 15.2-3, pp. 219–261.
Stokke, Andreas (2010). “Intention-Sensitive Semantics”. *Synthese* 175.3, pp. 383–404.
— (2013). “And and And*”. *Brevity*. Ed. by Laurence Goldstein. Oxford: Oxford University Press, pp. 198–213.
Strawson, P. F. (1950). “On Referring”. *Mind* 59.235, pp. 320–344.
— (1952). *Introduction to Logical Theory*. London: Methuen.
Sudo, Yasutada (2012). “On the Semantics of Phi Features on Pronouns”. PhD thesis. Massachusetts Institute of Technology.
Szabó, Zoltán Gendler (2000). “Descriptions and Uniqueness”. *Philosophical Studies* 101.1, pp. 29–57.
Varzi, Achille (2016). “Mereology”. *Stanford Encyclopedia of Philosophy*. Ed. by Edward N. Zalta.
Viebahn, Emanuel (2020). “Ways of Using Words: On Semantic Intentions”. *Philosophy and Phenomenological Research* 100.1, pp. 93–117.

Williamson, Timothy (1994). *Vagueness*. London: Routledge.
Winter, Yoad (2019). “On Presupposition Projection with Trivalent Connectives”. *Semantics and Linguistic Theory*. Vol. 29, pp. 582–608.
Zweig, Eytan (2006). “When the Donkey Lost Its Fleas: Persistence, Minimal Situations, and Embedded Quantifiers”. *Natural Language Semantics* 14.4, pp. 283–296.