The Literal Meaning of Definite Descriptions

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Contents

Chapter 1: Introducing the framework

§1.1. Formal semantics as a study of natural language

The general purpose of a semantic theory for natural language is to give an account of those properties of language that make communication, as well as other uses of language, possible. As Stephen Neale puts it,

> we need to remind ourselves from time to time that the project is intelligible only to the extent that it forms part of a more encompassing project, which may be characterized in terms of a Master Question, a question in the service of which all other substantive questions in theoretical linguistics and the philosophy of language are asked: How rich of an explanation can we provide of our capacity to express and sharpen our thoughts, and to communicate information about the world and about our beliefs, desires, plans, commitments, hopes, fears, and feelings so *efficiently*—so quickly, systematically and consistently—using various noises, marks, and gestures? (Neale forthcoming: 4)

There is a wide variety of phenomena related to language and language use: from syntactic and phonetic phenomena, to pragmatic phenomena (such as implicature), to cognitive ones (such as language acquisition and language competence), and to historical phenomena (such as lexical change).

To a first approximation, we might say that, of all these, a semantic theory focuses on phenomena pertaining to *meaning*. The task of the semanticist could be formulated by asking a more specific question than Neale's Master Question: what meaning properties do linguistic expressions have, and how do they contribute to making communication possible? However, strictly speaking, this first approximation is not correct, as semantic theory is not a study of the *intuitive* concept of meaning. Instead, semantic theory studies certain aspects of the use of language and postulates various notions of meaning (or *semantic value*) that play a role in accounting for the phenomena studied.

In explaining how this is done, we can start with the uncontroversial observation that linguistic communication is made possible by the fact that speakers and hearers have *shared knowledge of a language*. If this were not so, we would not be able to communicate – or at least not as efficiently as we do. This becomes clear when one overhears a conversation that takes place in a language one does not speak. But what is a language, that of which we have shared knowledge? In "Languages and Language" Lewis gives two different answers to this question: on the one hand, a language is "[s]omething which assigns meanings to certain strings of types of sounds or of marks." (1975: 3) Here, 'meaning' is again to be understood as a theoretical notion. On the other hand, Lewis writes, a language is a

> social phenomenon which is part of the natural history of human beings; a sphere of human action, wherein people utter strings of vocal sounds, or inscribe strings of marks, and wherein people respond by thought or action to the sounds or marks which they observe to have been so produced. (1975: 3)

The connection between the aforementioned function and the "rational, convention-governed human social activity" is that a particular population *uses* a language (in the function sense). In terms of Lewis's distinction, we could think of natural language semantics as taking up the aim of discovering which one of the possible languages (in the function sense) that one can conceive of characterizes correctly those aspects of the linguistic behaviour of that population that the theory aims to account for. Before looking at what it means to say that a semantic theory assigns meanings to natural language expressions, let us look at the kind of linguistic phenomena that the theory aims at characterizing. This is relevant in as much as those phenomena provide *the data* against which the correctness of theory is tested.

As Lewis's quote points out, the phenomena to explain are aspects of language *use*. Among the phenomena that constitute the use of a language a central place is occupied by successful linguistic communication. There are also *non-communicative* uses of language, such as taking classroom notes, writing in one's diary, inner speech or 'thinking out loud'. There are also cases of *unsuccessful* communication, as things may go wrong for a great variety of reasons: the audience does not speak the language the speaker uses, she does not realize the phone connection was lost etc. These peripheral uses of language are relevant phenomena to consider, but they are usually not taken to be the main source of linguistic data, so I leave them aside.

Intuitively, when linguistic communication is successful, speakers manage to convey *thoughts* to their intended audiences. Normally, I utter 'I am going to school' with the intention to convey the thought that (at the time of the utterance) I am going to (a particular) school. When communication is successful I manage to do so. Now, it is plausible to expect that there is a systematic relation between certain linguistic properties of the expressions uttered and the thoughts expressed by speech acts performed by uttering those expressions. In order to explain successful linguistic communication (or at least certain aspects of it, as discussed below) we postulate that there is a property of words – call it their 'linguistic meaning' – that speakers have knowledge of in virtue of their linguistic competence, and which *determines* (or at least *constrains*) the thoughts we express by using language in communication.[1] Devising a semantic theory is giving a substantive view about this relation between the meaning of expressions uttered and the thought expressed.

A puzzle seems to arise for the semanticist who aims at discovering the semantic properties of expressions: if, by hypothesis, the competent language user has knowledge of the meaning of expressions and of how they determine the thought expressed, then what is there left for the semanticist to discover? It looks like we already have the knowledge that the semantic theory promises to offer, in virtue of being competent speakers of English.[2] But this puzzle is only apparent: the competent language user does not have explicit, discursive and theoretical knowledge of the semantic properties of the expressions she uses. She only has *implicit* knowledge of language. It is true that at times speakers may have explicit beliefs about what words mean, sometimes properly or improperly informed by definitions in the dictionaries, or information about their etymology etc. These beliefs are sometimes formulated in ways that remind linguistic theory, as when a speaker expresses her belief that a particular word is *ambiguous*; or says that the *meaning* of a word is this or that; or that a particular speaker *literally said* that so-and-so, or merely *implied* it; or that she *referred* to this object and not to that; or that this sentence expresses that *proposition* etc. But there is no reason to assume that these claims express the competent speakers' implicit knowledge of the language. Instead, it is in language *use* that their abilities are exhibited, not in their beliefs about

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[1] Some authors deny that there is a systematic relation between the meaning of words and the thought that they are used to convey. For instance, Searle (1989) argues that the meaning of the sentence and the contextual details relevant in interpreting it are still insufficient in order to determine the thought expressed. In many cases "background assumptions" are required in interpreting the sentence. These background assumptions could not in principle be represented by the sentence uttered, but they are relevant to determining the content of the act of uttering that sentence: "the assumptions are not specifiable as part of the semantic content of the sentence, or as presuppositions of the applicability of the semantic content" (Searle 1978: 214) for two reasons: first, they are indeterminate in number; and second, any attempt to specify a background assumption would generate more background assumptions that need to be specified. If this is indeed true, then there is no systematic relation between the meaning of words and the thoughts they are used to convey. I ignore this problem here and embrace the standard assumption that there is such a systematic relation, which semantic theories study.

[2] This is a version of what is sometimes called *Grice's paradox*, which Grice (1989b: 49) formulates in relation to the distinction between literal meaning and implicature: "If we, as speakers, have the requisite knowledge of the conventional meaning of sentences we employ to implicate, when uttering them, something… how can we, as theorists, have difficulty with respect to just those cases in deciding where conventional meaning ends and implicature begins?"

their use of language. As Dever (2012: 48) puts it, the competent speaker's "grasp of the theories will typically be implicit, as with her grasp of the theory of walking. She can do what needs to be done, but is not usually aware of *how* she does it." If this is so, the semanticist cannot simply ask the competent speaker's opinion about the correct semantic theory, or ask her to choose the right theory from a list of alternatives. A semanticist cannot do what, for instance, the ethnologist does when she gathers orally transmitted folk stories and poems. That is, it is not the speakers' intuitive and pre-theoretical descriptions of linguistic phenomena that constitute the relevant data for testing a hypothesis about the meaning of natural language expressions. Instead, the data must come from the competent speaker's ability to distinguish those series of sounds or marks on paper that are expression-tokens from those that are not, to identify well formed expressions and to use them successfully in communication.

§1.2. Force, content and truth-conditions

In order to start thinking about what the linguistic meaning of expressions is – i.e., what the property of words that determines (or at least constrains) the thoughts we express by using language is – it is useful to consider the following *simple model of linguistic communication*: communication takes place between two conscious agents, a speaker S and an addressee A. According to this model, S produces a certain complex of sounds or marks on a paper with the intention that A respond to that action in the way that S intends A to respond, e.g. answer a question, open a window etc. Communication is said to be *successful* if and only if S's intention is fulfilled.

This simple model of linguistic communication is incorrect in the way it defines successful linguistic communication. For intuitively we want to say that linguistic communication could be successful even if S's intention is *not* fulfilled. Suppose S utters the sentence 'Please, open the window' with the intention to get A to open the window. If A does not open it, communication is not successful, on the present model. This is not correct. It may be that the window is blocked, for instance. So we should distinguish between different intentions that a speaker may have. S's intention to *request that* A open the window is different from S's intention to achieve the result of getting A to open the window. It may even happen that S requests A to do so while knowing she cannot manage to.

Suppose S addresses A uttering ‘I have just bought a new bicycle’. Typically in such cases S has the intention to *assert* the thought that S has just bought a new bicycle. But typically she also has the intention to make A *believe* that S has a new bicycle. These are different intentions that S may have. Following Austin (1962: 101), we can call the former aspect of a speech act, its *force*. The force of an utterance of a sentence characterizes the kind of move in a “language game” that the speaker makes with it (Green 2014: §2.1). The act of asserting that *p* differs from the act of requesting that *p*, or promising that *p* in as much as they have a different force. If we focus on the latter intention that S has in uttering the sentence, then we talk about a *perlocution*, or the characteristic effect that the utterance of the sentence has on the audience. This effect can be one of informing A that *p*, convincing A that *p*, frightening A, getting A to make it the case that *p* etc. There is a relation between force and perlocutionary effect: S aims at achieving a perlocutionary effect *by way of* uttering a sentence with a certain force, e.g. asserting that she has bought a new bicycle. But there is also an important difference: the force of an utterance depends on what the speaker intends to do with it, but the perlocutionary effect that the speech act has is not totally within the control of the speaker, as it depends on external factors such as, e.g. A’s disposition to believe what S asserts. S may fail to achieve the intended effect if A believes that S is a compulsive liar. The force of an utterance is systematically related to what the speaker *means* by that utterance, in a way that the perlocutionary effect is not. This makes force a more important concept from the point of view of semantic theory than that of perlocutionary effect.

We should further distinguish, according to a classical analysis of speech acts, between the *force* and the *content* of a speech act. One can *assert* that *p*, *promise* that *p*, *request* that *p*, *order* that *p* etc. Here *p* is the propositional content of the speech act, i.e. that which is asserted, required, ordered etc. Speech acts with a different force may have the same content. And the other way around: different speech acts may have the same force but a different content. So we need to separate the two components of a speech act. The study of force and the study of content are in principle different theoretical inquiries.

We postulated above that there is a property of words, their ‘linguistic meaning’, which determines (or at least constrains) the thoughts we express by using language in communication. We could now use the force vs. content distinction to eliminate talk of “the thought expressed by an utterance” in favour of these more sophisticated notions.

We can reformulate the above claim about meaning by saying that the meaning of a sentence uttered determines (or at least constrains) *the force and the content* of the speech acts performed by uttering that sentence.

Let us focus more closely on the notion of *content*. One special class of contents are called *propositions*. In semantic theorizing, propositional contents are usually given many different theoretical roles: that which utterances of indicative sentences express, the referents of *that*-clauses, the content of speech acts, the object of propositional attitudes, that which is conveyed by implicatures, that which is presupposed, that which is truth-evaluable, that which is apt of having modal properties such as necessity and contingency etc. The aspect of contents that is the most relevant for us at this point is that propositional contents play an essential role in determining the *truth-conditions* and the *truth-value* of an assertive utterance of a sentence.

The notion of truth and truth-conditions are essential to semantic theorizing, at least as it is pursued in the philosophical tradition. As David Lewis famously put it, "Semantics with no treatment of truth-conditions is not semantics." (Lewis 1970: 18) The concepts of *truth*, together with that of *reference* are fundamental ways in which language connects with the extra-linguistic reality. We use language to express and convey believes, and other mental states, about the world. The information we communicate linguistically can be *true* or *false*, and it can be *about* one thing or another.[3]

Now, to characterize an assertive utterance of a sentence as having a certain truth-value (being either true or false) is not a theoretically very useful characterization of assertions, as many assertions share the same truth-value. The notion of *truth-conditions* is useful in obtaining a more fine-grained characterization of assertions. Assertions have a truth-value in virtue of the relation they have with the extra-linguistic reality. They express a set of *truth-conditions*, i.e. conditions that are necessary and sufficient for the assertion to be true. When S seriously utters 'I am sitting at my desk now' what she says is true or false depending on how the world is. If the world were different in the relevant respect the assertion would have had a different truth-value. In

[3] Not all authors agree that reference and truth-value are *semantic* properties, i.e. properties of linguistic expressions. It may very well be the case that reference and truth-value are not properties of linguistic expressions, and are not determined or constrained by linguistic meaning. Authors such as Strawson (1950) and Bach (2004) argue that reference is a pragmatic and not a semantic notion. Others, e.g. Travis (1997), Recanati (2004) and other contextualists, have argued that an interesting notion of semantic notion could only be achieved if we allow pragmatic mechanisms to play a role in determining semantic content.

other words, we can imagine *possible worlds* with respect to which the utterance of the sentence has a different truth-value than it has with respect to the *actual* world.[4] It has a different truth-value for those worlds in which the speaker of the actual utterance is not sitting at his desk at the moment of speech. We can conceive of truth-conditions as a function from possible worlds to truth-values. Alternatively we can describe truth-conditions as sets of possible worlds, those in which the utterance of the sentence is true.

These latter observations are relevant for building a semantic theory especially in relation to the question concerning how to test a semantic theory. Competent speakers have the ability to grasp the truth-conditions of assertions, i.e. to grasp *what must be the case and what is sufficient* for an utterance to be true. If an agent is ignorant of the *conditions* under which the utterance is true or false it is difficult to see how she could assess the truth-value of the utterance once she has access to the relevant facts. As Wittgenstein put it, grasp of truth-conditions is required not only for evaluating an utterance for its truth-value, but for *understanding* it: "To understand a proposition means to know what is the case if it is true. (One can understand it, therefore, without knowing whether it is true.)" (Wittgenstein 1922: 4.024)

Now, competent speakers do not normally possess the technical *notion* of truth-conditions. The competent speaker's grasp of the truth-conditions of assertions is merely implicit. But language users do have an explicit grasp of the notion of a *true* or *false* utterance of a sentence. The knowledge of the truth-conditions of an utterance of a sentence manifests itself in the speaker's dispositions to assign truth-values to utterances of sentences relative to various situations, in conditions in which the speakers know the facts about those situations relevant for the evaluation of the sentence. As Jason Stanely writes,

> As native speakers of the language, we have robust intuitions about the truth and falsity of what is said by an utterance of English relative to different possible situations… if we did not have robust intuitions about the truth-conditions of our utterances, it would not be clear how to test such hypotheses [about meaning]. (2007: 6)

[4] One way to introduce the actual world is as follows: "The actual world is the possible state that the world is actually in." (Soames 2005: 359 n.6) Alternatively, the actual world can be defined as follows: "define @, *the actual world*, to be the world that assigns truth to a sentence s_i just in case s_i is, in fact, true." (Dever 2012: 52) This later definition is, however, circular for our purposes.

If this is correct, we can rely on competent speakers' ability to acquire data against which we can test our semantic hypotheses. Relying on competent speakers' truth-value intuitions has been part of the methodology for testing hypotheses about the truth-conditions of utterances of sentences at least since Carnap (1947b).

Now, the strategy for acquiring data does not consist in directly asking competent speakers to identify the truth-value of an actual utterance of a sentence relative to actual or counterfactual situations (i.e. possible worlds).[5] To anticipate a discussion in chapter 4, the problem with such an approach is that the question for the evaluation of an utterance relative to non-actual circumstances of evaluation is easily confused with a different one, i.e. the question for the evaluation of a non-actual utterance of the same sentence relative to *its* context of utterance. Here is a way to illustrate the difference: an utterance of 'The next Summer Olympics will take place in Brazil.' in 2015 is true relative to the time of the context of utterance. Now what about the truth-value of that utterance relative to 2011? The question for the truth-value of that utterance relative to 2011 might easily be confused with the question for the truth-value of a different utterance of that sentence, i.e. the utterance of the sentence *in* 2011. While the first might be intuitively judged as true (because the relevant time of evaluation is anyway 2015 and not 2011), the latter will surely be judged as false (as the 2012 Summer Olympics took place in London). The competent speaker might easily confuse the two questions. To avoid this possible source of corruption of the data we always ask the speaker to evaluate an utterance relative to its actual context of utterance. This is actually in line with Carnap's (1947: 238) proposal. He writes that we should ask the speaker whether he is willing to apply a word in such and such a situation. We simply extend this proposal to sentence, and ask the speaker: "if the scenario were such and such, would it be correct to use this sentence?". As I said, I come back to this point in chapter 4.

The picture of semantic theorizing that the present discussion suggests is the following: we come up with a particular hypothesis about the meaning of a particular expression α. Next, we consider a sentence $\Phi(\alpha)$ that is uttered in a particular context with a particular force, e.g. to make an assertion, ask a question, make a declaration etc. The hypothesis about the meaning of α is tested together with hypotheses about the meaning of the other expressions in the sentence $\Phi(\alpha)$, as well as hypotheses about the

[5] Notice that it is *utterances* of sentences (or sentence-tokens) and not sentence types that bear truth-conditions (this point is further discussed in §1.8)

way these meanings determine the propositional *content* of the speech act. Propositional content determines truth-conditions,[6] and a particular assignment of truth-conditions to the utterance in question can be tested against competent speakers truth-value intuitions.

§1.3. Further methodological remarks

The above presentation of how to pursue the project of natural language semantics suggests that it is methodologically useful in testing a particular hypothesis to focus on *assertions*. This is not only because much of our everyday linguistic communication consists in making assertions. But, moreover, our main purpose in making assertions is to convey *true* information (or at least information that the audience takes to be true). We care whether the information that we convey and receive is true or false, and so we evaluate assertions for their truth-value. We do not do this for other kinds of speech acts, such as promises, requests or questions. One cannot ask meaningfully whether a question or a request is true or false. When we evaluate assertion we are particularly sensitive to their truth-value. This way, a theory that assigns a certain truth-value to an assertive utterance of a sentence can be easily tested against competent speakers' intuitive grasp of its truth-value.

This does not mean, however, that what we obtain is only a theory of the content of assertions. The characterization of content of speech acts by appeal to the notion of truth and truth-conditions is appropriate for the case of other speech acts as well. What differentiates assertions, declarations, recommendations, orders and other speech acts is not their content – an assertion and a promise, for instance, may have the same propositional content – but their force. Therefore, once we have an account of propositional content, this, together with an account of the force of different illocutionary acts, will have the desired generality to cover other kinds of speech acts as well.[7]

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[6] What is the relation between propositions and truth-conditions? The answer depends on how we want to devise our theory. Many authors deny that there is a one-to-one correspondence between propositions expressed by assertions and the truth-conditions of those assertions. For instance, all necessarily true propositions are true in all possible worlds, and so their truth-conditions are the same. However, we do not want to say that they have the same content, as intuitively different things are expressed. In this thesis I use a truth-conditional approach to semantics, and I assume here that to give the truth-conditions of an utterance is to offer a characterization of the proposition expressed.

[7] A terminological note: in what follows, reference to the 'utterance of a sentence' should be understood as referring to *utterance of a sentence used to make an assertion*. Also, talk of 'the content of the

A second methodological remark concerns the way we obtain the linguistic data. The data concerns competent speakers' intuitions about the truth-value of assertions. But how do we know when a speaker is competent? Testing the hypothesis on a statistically significant number of normal subjects from a linguistic community may insure that their command of the language is representative for what we call 'competent speakers'. However, traditionally, semanticists have not been doing this, but rather have relied on *their own* intuitions about the truth-value of assertions with respect to given possible worlds. They have assumed that their intuitions are characteristic of the answer that other competent speakers would give to questions concerning the truth-value of sentences. But the semanticist's intuitions may different from the layperson's intuitions in that there is no guarantee that they are not theory laden. The semanticists' own theoretical leanings may influence her truth-value judgments, resulting in a biased data. This is a significant limitation of the empirical testing of semantic hypotheses. While I think there is no simple solution to this problem as long as we test semantic theories without appeal to the intuitions of a statistically significant number of laypersons, I think bias could be avoided by considering as data only those intuitions that are strong enough so that we can assume conformity among native speakers. Cases over which there is disagreement among theorists or where truth-value intuitions are rather weak should not count as reliable data.

Another important complication about data collection concerns indirect uses of language. A speaker may use the sentence 'I am very busy tomorrow' to indirectly convey that she is not able to make it to the party she has just been invited to. That is, a sentence may be used to convey an *implicature* (see Grice 1975). In that case, the utterance of the sentence expresses an indirect content. But it may also have an indirect force. A speaker may use the sentence 'Would you mind to help me with this?' not to *inquire* for a particular piece of information, but rather to indirectly *ask for help*. A speaker may utter 'I doubt that we can make it on time if we walk this slow' not with the intention to *express* a particular state of mind, but rather to *suggest* that they should walk faster. In these cases the relation between the linguistic meaning of the sentences, on the one hand, and the content and force of the utterances of sentences on the other, is indirect.

The distinction we need to introduce in order to tackle this problem is the one

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utterance' should be understood as implicit for *the content of the assertion made by uttering the sentence*, and the same for talk of 'the truth-conditions of the utterance'.

between semantics and pragmatics. One way to draw this distinction is the following: a semantic theory focuses on the *literal force* and the *literal content* of an utterance of a sentence. A pragmatic theory focuses on those uses of a sentence in which it has *non-literal*, or indirect, force or content.[8] When doing natural language semantics we are interested in *literal truth-conditions* (and the literal truth) of an utterance of a sentence. These are the truth-conditions that the linguistic meaning of the sentence uttered determines – or, in Grice's (1975: 25) words, the content closely related to the meaning of the words uttered. For the purposes of a semantic theory we need to put aside pragmatic phenomena such as metaphorical speech, unserious utterances, irony, pretence, and other cases that arguably involve indirectly conveyed contents. But the methodological problem is that this cannot always be easily done. We do not always have direct conscious access to the literal (semantic) content an utterance of a sentence carries. Sometimes intuitive judgments about the truth-value of utterances relative to possible worlds do not track the semantic content of utterances of sentences, but rather the result of semantic *and pragmatic* phenomena. For instance, a speaker may use the sentence 'I like some of your essays' with the intention to convey that she does not like them all. The latter is arguably an implicature, but truth-value intuitions are not clearly reliable in tracking the semantic content of the utterance of the sentence, as opposed to the pragmatically modified content. This is to be expected, given that competent speakers are good at recovering the contents speakers intend to convey, in the determination of which intervene semantic as well as pragmatic phenomena.[9] The upshot of this is that, when the semanticist looks at truth-value intuitions for linguistic data, she must be aware that it is not a semantic theory by itself that she is testing. Given that pragmatic facts may affect the perceived truth-conditions of an utterance of a

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[8] This is not the only way to draw the semantics-pragmatics distinction. Stalnaker (1974: 61) argues that there are two ways of drawing this distinction: "semantics, as contrasted with pragmatics, can mean either the study of *meaning* or the study of *content*. The contrast between semantic and pragmatic claims can be either of two things, depending on which notion of semantics one has in mind. First, it can be a contrast between claims about the particular conventional meaning of some word or phrase on the one hand, and claims about the general structure or strategy of conversation on the other. Grice's distinction between conventional implicatures and conversational implicatures is an instance of this contrast. Second, it can be a contrast between claims about the truth-conditions or *content* of what is said—the proposition expressed—on the one hand, and claims about the *context* in which a statement is made—the attitudes and interests of speaker and audience—on the other." It is the former distinction that I have in mind at this point.

[9] One author that emphasises this point is Kent Bach (2002: 32). He writes that language users' intuitions do not track semantic content (what is said), and we should not expect that they do: "seemingly semantic intuitions… are largely irrelevant to determining what is said. They are influenced by semantically irrelevant information, they tend to be insensitive to relevant distinctions, and they are likely to be biased in favor of understandings corresponding to things that people are relatively likely to communicate."

sentence, the theorist must be prepared to appeal to a theory of those pragmatic facts, which, in conjunction with the semantic theory, makes testable predictions. This complicates the picture significantly, as it means we must pay attention to the predictions that pragmatic theory makes in order to avoid mistaking a pragmatic effect as indication of a semantic fact.

§1.4. The desiderata of the semantic theory

So far, I have presented some motivations for the study of natural language semantics, and I have also discussed various general methodological points. But what should a determinate semantic theory with a particular formal apparatus look like? Arguably, for modelling different features of natural language different formal devices may be better suited. So we must first decide which are the particular theoretical desiderata that we want our semantic theory to achieve. This should offer us guidance and control: the theory is complete and adequate when the theoretical aims have been attained. The discussion that follows is not meant to exhaust the question concerning the desiderata of any semantic theory or to give a detailed account of each of the desiderata mentioned. Instead it is only an indication of the motivation for choosing a particular formal language.

I have already pointed out that one desideratum of a formal semantic theory for natural language is to assign meanings to the expressions of the language in such a way that the predictions it makes about the truth-conditions of utterances of natural language sentences correspond to competent speakers' intuitions. So a first desideratum that a semantic theory must meet is to assign correct truth-conditions to utterances of sentences.

A second desideratum concerns *compositionality*. I have said nothing so far about the relation between the meaning of simple expressions and the meaning of complex ones, including sentences. This relation has been traditionally characterized by appealing to the Principle of Compositionality, which is standardly formulated as the claim that the meaning of a complex expression is determined by the meaning of the simple expressions that form it and (the meaning of) the way in which they are combined. The motivation for holding this principle to be true is that it is part of an explanation of two linguistic phenomena: *productivity*, which consists in the fact that we can understand innumerable sentences we have never encountered before; and *systematicity*, i.e. the fact that there are "definite predictable patters among the sentences we understand" (Szabó 2007). The compositionality of natural language is usually considered an explanation of both these facts. Compositionality accounts for systematicity in that it explains the perceived systematic nature of complex linguistic expressions, by showing how we obtain complex expression with different, but related, meaning by combining the same expressions in different ways. On the other hand compositionality must be one of the ingredients of an account of productivity. If natural language were such that each complex expression had a meaning assigned to it independently of the meaning of the parts and the way they combine, the speakers needed to learn a potentially infinite number of complex expressions one by one. This would make it a lot more difficult (or impossible) to learn a language and to use it in communication as efficiently as we do. These are reasons to think compositionality is also an ingredient of the answer to Neale's Master Question quoted at the beginning (how can we achieve so much and so efficiently in communication?).

Now, the fact that a language is compositional is not in itself sufficient for explaining productivity and systematicity. A formal language may be compositional but have a great number of rules of composition – say, one for each complex expression. Such a language does not fulfil the requirement of productivity, as the competent speaker needs to acquire a potentially infinite number of rules in order to understand the meaning of all complex expressions that may be formed in that language. We might then wonder *how many* rules of composition a language should have in order to be learnable. In the case of natural language semantics, we might wonder how many rules of composition we should postulate for natural language in order to account for its productivity and systematicity. These are complex empirical question, which I put aside. Instead, I adopt in what follows a formal system that has a very small number of rules of composition (three, to be more precise), and so which is compositional in a way that intuitively complies with the above requirements.

A third desideratum concerns the *syntactic* rules for forming complex expressions out of simple ones. The formal language used here to represent the structure of natural language sentences must be syntactically adequate in the sense that it must take into consideration (at least to a certain extent) the results of syntactic theories of natural language. This means that the syntactic rules of the formal language must be *compatible* with the postulates of the correct syntactic theory for natural language. At the same time, the theorist must *avoid* "postulating syntactic relations that are unrecognized by correct syntactic theory." (Ostertag 2008) This we may call the desideratum of *syntactic adequacy* of the formal theory.

Although complying with all syntactic facts that modern syntactic theory postulates is too ambitious a desideratum, there are two syntactic facts that any formal theory of natural language must take into consideration. First, the syntactic rules must allow for those and only those complex expressions of natural language that are *grammatical*, or well formed. The theory must predict that those combinations that intuitively struck as malformed are not possible to obtain. While the theory must predict that 'Jane read the white book' is well formed, it must also predict that 'Jane read the white' is not, and neither is 'Jane read white book'. The theory should predict that these sentences are malformed. A second syntactic fact that must be considered is that of *syntactic ambiguity*. There are natural language sentences that have different readings, in the sense that competent speakers systematically judge them to literally express more than one proposition. Such an ambiguity is called *syntactic* when it does not come from the occurrence of a word that has more than one literal meaning. Instead, it is the result of a fact about the structure of the meaning of the sentence, as in the case of the ambiguous sentence 'Visiting relatives can be boring'. Intuitively, this phonetic form can be read in two different ways, i.e. it can receive two structurally different literal interpretations. A semantic theory must account for this fact.

In order to account for these two phenomena standard semantic theorizing distinguishes between different representations of natural language sentences. One such representation is called *logical form* (or LF). While there are many notions of logical form in linguistic literature, in what follows I rely on a formal framework that follows the main ideas of Heim and Kratzer (1998).[10] LF is a level of representation of natural language sentences different from *phonetic form* (or the superficial form) of sentences (PF for short). An LF is a perspicuous syntactic representation of a natural language sentence that is the input of semantic interpretation. The output of semantic interpretation is the proposition literally expressed by the sentence. With the help of

[10] The tradition of generative grammar is in the background of many semantic theories as construed in philosophy of language. Syntacticians in the tradition of the Government and Binding Theory distinguish between different levels of representation of natural language, which include Surface Structure, Logical Form (LF) and Phonetic Form (PF). According to this model (see Heim and Kratzer 1997: 185), PF is derived from S-Structure through stylistic and phonological rules. Semantic interpretation applies to LF, which is also derived from S-Structure through rules of transformation, in particular the rule called Quantifier Raising (QR). Here I only make use of the distinction between PF and LF, ignoring the details of the framework that will not be relevant in what follows.

postulating rules for forming LFs, we can predict what complex expressions are grammatical, or well formed, and what complex expressions are ungrammatical, or malformed, in natural language. With the help of LF we can also address the phenomenon of syntactic ambiguity. In natural language there is no one to one correspondence between the PF of a sentence and its LF. A sentence is syntactically ambiguous if it has one PF but various LFs, which have different semantic interpretations. Using this distinction, the semantic theory must predict syntactic ambiguity of those and only those complex expressions that are intuitively syntactically ambiguous in natural language.

To sum up, there are three important desiderata that the semantic theory should meet:

D1. The formal language should be syntactically adequate with respect to the syntax of natural language in the sense that it should correctly predict the wellformedness and syntactic ambiguity.

D2. The semantics for the formal language should be compositional.

D3. The semantics for the formal language should assign correct truth-conditions to utterances of sentences.

I now turn to introducing a formal language that is apt to achieve the desiderata mentioned above.

§1.5. The formal apparatus of the theory

Introducing a formal theory in which the LFs of natural language sentences are formed requires giving the *vocabulary* of the language, and the *syntactic rules* to build complex expressions out of simple ones. Desideratum D1 is relevant at this step. However, our main purpose here is semantic, not syntactic. The framework introduced in what follows, inspired in Heim and Kratzer (1998) and Fintel and Heim (2011), is not designed primarily to account for syntactic facts, but for semantic ones. In that sense, it leaves aside many complications that syntactic theory introduces. Nevertheless, as Heim and Kratzer (1998: 46-7) indicate, the framework is compatible with a wide range of approaches to syntax, which indicates that we are on the right track in what concerns accounting for desideratum D1.

The vocabulary of the language will be quite different from the vocabulary of classical logical systems, such as first order predicate logic. The syntactic categories of natural language include at least the following categories: *names*, *common nouns*, *verbs*, *adverbs*, *adjectives*, *determiners* (which can be quantifier determiners, demonstrative determiners, and possessive adjectives) and *prepositions* (where it is common practice to introduce also coordinating conjunctions such as ‘and’, ‘or’, ‘if…then’), and *complementizers* (or subordinating conjunctions, such as ‘that’, ‘until’, ‘since’). In what follows I will introduce only a fragment of natural language, containing only some of the categories and only a small number of lexical elements within each category. (I ignore, for instance, verbs with 3 arguments such as ‘compare’.)

The simple expressions of the formal language we introduce will be homophonic counterparts of natural language expressions, except for the case of aphonic expressions and brackets. The brackets are used as follows: each expression written between square brackets is a *simple* expression. On its left side its lexical category is indicated. The *complex* expressions of the language result from combining simple expressions. In characterizing the way the syntactic categories of the language combine linguists rely on a *typed language* approach. According to this approach, each syntactic category is assigned a syntactic type. The idea behind *typed languages* is to treat the language as having the syntax of *function* (also called *predicate*) and *argument*. If two expressions α and β combine to form a complex expression then one needs to occupy the position of the argument and the other that of the function. Each syntactic category of expressions has a syntactic type associated with it, which indicates what other expressions it can combine with, either as function or as argument. This allows us to have a mechanism that predicts which complex expressions of natural language are well formed, and which are not. This way we can achieve desideratum D1, in as much as it concerns the fact that expressions of LF must be well formed. For that we must make sure to assign the correct types to the expressions in the vocabulary.

There will be two kinds of syntactic types in our language: basic types and complex types. The *basic types* will be the following:

N: expressions of this type are called *names*;

CN: expressions of this type are called *common nouns*, and

S: expressions of this type are called *sentences*.

Expressions that have a basic type can only combine by being arguments of expressions that have the type of a function. *Complex* types are functions, and are represented as A/B, where B is the type of the argument of the function, and A is the type of the value of the function. This is a recursive rule, so A and B can themselves be complex types. If A is a complex expression, such as for instance C/D, we use parentheses to mark the complex type corresponding to A, as follows: (C/D)/B. And a similar rule applies to the case in which B is a complex expression.

Each complex expression that results from combining a pair of simple expressions (where one is a function and the other the argument) will be written between square brackets indicating with a subscript on the left side its syntactic category. Its type will be the value of the function applied to the argument. A complex expression is also called a *phrase structure tree* (as it can be represented as an inverted tree).[11] The two expressions that make up the complex expression will be written one next to the other, without any restriction regarding the order. That is, either the expression to the left, or the expression to the right can be the function that takes the other expression as argument.[12] So, we get in the language expressions such as the following (where the subscripts are explained below):

$[_S\ [_N \text{ Ann}]\ [_V \text{ sleeps}]]$

This is the representation in our language of the LF of natural language surface sentence 'Ann sleeps', that is, its LF.

What complex types do we need to introduce? The answer depends on the way syntactic categories combine in natural language. Consider the sentence 'Ann sleeps', resulting from the combination of a name with an *intransitive verb* (which is a 1-place predicate; that is, a function of one argument). Names (expressions of type N), can only combine as argument to form more complex expressions, so intransitive verbs needs to have the type of a function. The output of combining them is a sentence. Therefore we should treat intransitive verbs such as 'sleeps' as being of types S/N. *Transitive verbs* such as 'loves' are 2-place predicates. These are used to form sentences such as 'John loves Ann'. A similar line of reasoning as the one we followed in the case of intransitive verbs suggests that they should be assigned the type (S/N)/N.

A few words on complex expressions: an X phrase – where X can be noun, verb, preposition, adjective etc. – is a complex expression that contains an expression of type X and has the same syntactic type as X (for that matter X is called the *head* of the

[11] The tree is formed by *branches* and *nodes*. If α is the node $[\beta, \gamma]$, then β and γ are its *daughters*.

[12] For the sake of simplicity I ignore word order here. This constitutes a departure from desideratum D1 of predicting that only those sentences that are grammatical in English are well formed in LF. Expressions such as $[_S\ [_V \text{ sleeps}]\ [_N \text{ Ann}]]$ turn out to be well formed according to our syntactic rules, when in fact they are not well formed in English.

phrase). For instance, a *verb phrase* (VP) such as 'talks politely' is headed by a verb, the type of which is S/N, and so the type of the VP must be S/N as well. This way we predict that whatever expressions the verb combines with, the VP the head of which it is also combines with those expressions. Similarly, transitive VPs, such as 'loves passionately', have the type of transitive verbs, that is, (S/N)/N.

A VP could be made up of a verb and an *adverb*, as in 'talks politely'. As intransitive verbs such as 'talks' have type S/N, intransitive VPs such as 'talks politely' or 'types quickly' must have the type S/N as well. One solution is to see 'politely' as a function that takes 'talks' as argument and returns a VP of type S/N. So, adverbs like 'politely' and 'quickly' are expressions of type (S/N)/(S/N). In general, expressions such as these, that take a predicate of *n* arguments and return a predicate with the same number of arguments are sometimes called *predicate modifiers*: an adverb is a predicate modifier.

Prepositional phrases (PPs) such as 'in Paris' are also be predicate modifiers, as in 'walks in Paris'. This VP must have type S/N, as it combines with a name to form a sentence. So, PPs must have type (S/N)/(S/N), which allows them to combine with Vs such as 'walks', the type of which is S/N.[13] Finally, the preposition 'in' must have type ((S/N)/(S/N))/N, which I take to be the type of prepositions. (Notice that the type of the PP is not the type of the preposition, which means that they are not "phrases" in the same sense as the other phrases mentioned.)

Determiners such as 'every', 'all', 'some', 'five', 'both' etc., are used to form sentences such as 'Every student laughs.' A *determiner phrase* (or DP) is the name sometimes used for expressions of the form 'α β', where α is a determiner and β is a common noun, as for instance 'every student', 'most artists' etc. The DP combines with a verb to form a sentence. The type of the verb is S/N, which suggests that the type of the determiner phrase is either S/(S/N), or N. In the former case, since the type of 'student' is CN, that of determiners is (S/(S/N))/CN. In the latter case, the type of the determiner would be N/CN.[14] Either one of the options is good for our purposes here. I

[13] This means that, strictly speaking, we do not distinguish in our language between PPs and adverbs (and adverbial phrases such as 'very quickly') on the basis of the syntactic type of these expressions.

[14] A DP is a phrase that contains a noun, a determiner and, optionally, one or more modifiers, e.g. 'a beautiful flower'. If we define an X phrase as a complex expression headed by an X (and which has the syntactic type of X by definition), then this seems to be a misnomer in our framework. The type of a determiner is, as already mentioned, either (S/(S/N))/CN or N/CN, and this is not the type of a DP. Heim and Kratzer (1998: 89) also include in the syntactic category DP all phrases that show the same syntactic behavior as phrases that have an overt determiner (that is, proper names, pronouns and traces). But, again,

opt for the former option when introducing below the syntactic category of determiners (but I leave the discussion of the syntactic type of definite descriptions for the next chapter).

Adjectives combine with common nouns such as ‘breakfast’, to form NPs, such as ‘huge breakfast’. A noun phrase (NP) is a complex expression that is headed by a noun. As already noted, a CN can be the argument of a determiner (as in ‘a breakfast’), but so can NPs such as ‘huge breakfast’ (as in ‘a huge breakfast’). As the type of determiners is (S/(S/N))/CN, one option is then to assign to adjectives the type CN/CN. Adjectives occur also in VPs such as ‘is huge’. These predicates have type S/N, as they combine with a name to form a sentence, as in ‘Sahara is huge’. So, if adjectives have type CN/CN, then the type of the copula ‘is’ must be (S/N)/(CN/CN).[15]

The above considerations suggest some *prima facie* reasons – motivated by desideratum D1, in particular, wellformedness – to assign the syntactic types mentioned to the respective categories of expressions. In many cases there are other options that one can embrace concerning the syntactic types assigned to a category of expressions. Moreover, I have ignored many complications: the syntax of even a small fragment of English is actually much more complex, and introduces problems – such as problems of type mismatch between categories of expressions that do combine in natural language to form complex expressions – that are beyond the scope of this work. I leave aside these issues as they are not of great relevance to our project in semantics.

Consider now a formal language the vocabulary of which contains the following *simple expressions*. Other simple expressions will be introduced later of if necessary.

Expressions of type N:

a. a list of proper names (marked in LF as N): Ann, Sue, John…

b. a list of pronouns (marked as N): I, you, he, she…

c. a list of traces (marked as N): t_1, t_2, t_3…[16]

Expressions of type CN:

d. a list of common nouns (marked as CN): dog, human, bicycle…

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these expressions do not have the type of a determiner in our framework. Are DPs a subclass of *noun phrases*? Some authors, such as Dever (2012), take DPs to be NPs. A noun phrase (NP) is a complex expression that is headed by a noun. However, the type of an NP must be that of a noun, that is, CN, and the type of determiner phrases is not CN. However, this terminological issue is of little interest for our purposes.

[15] On the other hand, we also have constructions such as ‘is a huge breakfast’ and ‘is a dog’. One option is to take the copula to be ambiguous, having a different type when it occurs in such complex expressions than when it combines with an adjective.

[16] A *trace* is a phonologically null expression, the semantics of which is explained below.

Expressions of type CN/CN:

e. a list of adjectives (marked as A): nice, huge, red…

Expressions of type S/N:

f. a list of intransitive verbs (marked as V): walks, talks, runs…

Expressions of type (S/N)/N:

g. a list of transitive verbs (marked as V): loves, takes…

Expressions of type (S/N)/(S/N):

h. a list of adverbs (marked as AD): politely, rapidly…

i. a list of prepositions (marked as Prep): in, on, for, after…

Expressions of type (S/(S/N))/CN:

j. a list of determiners (marked as DET): some, every, most…

Expressions of type (S/N)/S:

k. a list of variable binders: λ_1, λ_2, λ_3…

Expressions of type S/S:

l. a list of sentential operators: it is not the case that

m. a list of complementizers (marked as C): that, whether

Expressions of type (S/S)/N:[17]

n. it is necessary that, it is possible that…

Expressions of type (S/S)/S:

o. a list of 2-place connective: and, or, if…then…

§1.6. The semantics for the language

The next step in devising the theory is to provide an interpretation for the expressions of the language, i.e. assign a semantic value to them. In a model-theoretic semantics the interpretation of the expressions is considered relative to a *model*. Our model is a structure defined as follows: M = $\langle W, R, D_e, C, T, P, I\rangle$, where *W* is a non-empty set of *possible worlds*, *R* is a binary relation of *accessibility* between worlds on *W*, and D_e is a non-empty *domain of objects*, *C* is a set of contexts (which I detail below), *T* is the set of integers (thought of as *moments of times*, common to all worlds), and P is a set of *positions* (common to all worlds). For simplicity we take all worlds to be accessible from all worlds, so the accessibility relation R will not play a significant

[17] See §5.7 below for why we need modal operators to have this syntactic type.

role in our semantics. We need to define a *meaning function* (or *interpretation function*) *I* that assigns a *semantic value* to each expression of the language. I follow Heim and Kratzer (1998) in taking the interpretation function to assign a semantic value to all expressions of the language (with one exception, that of the binder, as explained below).

The semantics for the language that we introduce is an *intensional semantics*. This means that we need to distinguish between two kinds of semantic values: intensions and extensions. The interpretation function assigns to the expressions of the language an *extension* relative to what David Kaplan (1989: 494) calls *circumstances of evaluation*. The latter are

> actual and counterfactual situations with respect to which it is appropriate to ask for the extensions of a given well-formed expression. A circumstance will usually include a possible state or history of the world, a time, and perhaps other features as well. (Kaplan 1989: 502).

Different kinds of circumstances of evaluation (i.e. arguments of intension function) are needed to model different linguistic phenomena (e.g. points of time for modelling certain temporal expressions). To avoid certain complications, it is sufficient for the present purposes to take the interpretation function to assign extensional semantic values to expressions only relative to possible worlds. That is, possible worlds are the only kind of circumstances of evaluation that I consider in the present framework. The extension of an expression α relative to a possible world w will be represented as $||\alpha||^w$.

Apart from extensions, the semantic framework assigns a different kind of semantic value to expressions, in particular, *intensions* (or *contents*, as Kaplan (1989: 500) calls them). The intension is a function from circumstances of evaluation (that is, from elements in *W* in our case) to extensions. For instance, the intension of a sentence will be a *function* from possible worlds to truth-values (which are the extensions of sentences). Given that expressions are assigned both intensions and extensions as semantic values, we need to introduce *two* interpretation functions, one that assigns an extension and one that assigns an intension to the same expression. I use $||\alpha||$ to refer to the extensional sematic value of α. Following Fintel and Heim (2011: 9) I use the symbol '¢' as a sub-index (i.e. $||\alpha||_{¢}$) to mark the intensional semantic value. I come back below to a discussion of intensional semantic values and why we need them.

Desideratum D2 requires that the semantic value of complex expressions be calculable from the semantic value of simple expressions following rules of composition. We need to introduce the composition rules that determine the semantic value of complex expressions from the semantic value of simple expressions and the way they combine. Let us first focus on extensional semantic values. Concerning the composition of extensions, I follow Heim and Kratzer (1998), according to whom there are three composition rules. The most important rule of composition makes use of an idea that originates with Frege: that of treating semantic compositional as *functional application* (Heim and Kratzer 1998: 13, 105). The idea is the following: if two expressions α and β combine according to the syntactic rules of the language in order to form a complex expression $[\alpha\ \beta]$, then the meaning of one of the expressions will be a function that can take as argument the meaning of the other expression.

The idea of semantic composition as functional application requires that we assign different types to extensional semantic values, in order to determine which pairs of them can combine as function and argument. Following Fintel and Heim (2011: 10), I introduce two kinds of basic (i.e. simple) extensional semantic values: extensions of type <e>, which correspond to individuals, and extensions of type <t>, which are truth-values. These are the only two basic types of extensions. Any other extensional semantic value is a complex one. A complex extension is represented as <σ,τ>, where σ and τ are semantic values. While basic semantic values (either extensional or intensional) can only be arguments, complex semantic values can be either arguments or functions. For instance, a semantic value of type <σ,τ> can take as argument a semantic value of type σ and map it to a semantic value of type τ.

Concerning intensions, the basic intensional semantic values are functions from elements in *W* to extensions of type <e>, and <t>, respectively. They are represent as <s,e> and <s,t> (and are basic types, although the notation suggests the contrary). Any semantic value of type <s,σ> is a complex intension. So the semantic *types* we end up with are the following:

i. <e> and <t> are semantic types.
ii. If σ and τ are semantic types, then <σ,τ> is a semantic type (an extensional one).
iii. If σ is a semantic type, then <s,σ> is a semantic type (an intensional one).
iv. Nothing else is a semantic type.

Consequently, we have the following hierarchy of semantic *values* that correspond to the semantic types introduced:

i. D_e, the domain of individuals.

ii. $D_t = \{0, 1\}$, the set of truth-values.

iii. If σ and τ are semantic types, then $D_{<\sigma,\tau>}$ is the set of all functions (and partial functions) from D_σ (or a subset of D_σ) to D_τ.

iv. If σ is a semantic type, then $D_{<s,\sigma>}$ is the set of all functions (and partial functions) from *W* (or a subset of *W*) to D_σ.

A note about the relation between syntax and semantics: the interpretation function assigns to the expressions of the language semantic values of appropriate types, such that it allows for semantic composition to go through. We have already assigned syntactic types to expressions, but the syntactic types assigned do not determine what semantic types expressions must have. Even if syntactically, say, two expressions α and β combine in such a way that α is the function (e.g. has type S/N) and β is the argument of that function (e.g. has type N), the semantic value of α may be an argument of the semantic value of β, which could be of a functional type. We might have in our system expressions of type N, CN, or S the semantic value of which is of functional type. These are theoretical options that need to be taken into considerations, and cannot be ruled out from the start by adopting a too restrictive view of semantic composition. This way we can keep syntactic theory and semantic theory relatively separated. Of course, they are not *independent*: syntactic theory needs to make sure our interpretation function takes as input only complex expressions that are well-formed. Only for those pairs of expressions that can combine to form a well-formed complex expression the question arises concerning the semantic values they must have in order to match each other, and so allow for semantic composition to go through.[18]

§1.7. The metalanguage

The semantic values of the expressions of the language must be represented in a metalanguage that allows for the treatment of composition as functional application. That is, it must give us the rules to calculate the value of combining, say, a semantic

[18] Heim and Kratzer (1998) do not assign syntactic types to expressions, deferring the question of syntactic rules to syntactic theory altogether. Expressions are classified in syntactic categories (NP, V, Adj etc) but they write that "syntactic category labels and linear order are irrelevant" (1998: 44) for semantics.

value of type <σ,τ> with one of type <σ>. This is the language of λ-calculus.[19] The language of λ-calculus contains, apart from the symbol λ and brackets, also lists of symbols that stand for the semantic values of the types introduced (below I use the letters from the end of the alphabet, x, y, z…, for semantic values of type <e>, and the letters f, g, h… for semantic values of type <e,t>). These are not the only symbols of the language of λ-calculus. I follow Heim and Kratzer (1998) in using this language in an informal way as a metalanguage for expressing semantic values, in the sense of combining λ- expressions with an informal characterization of semantic values.

The syntax of the language requires that each λ-expression formula have the following structure: λα:Φ.γ. The intended interpretation of these λ-expressions is such that they denote functions: α stands for any *argument* that the function may take, Φ is a *condition on the domain* from which α takes its values, and γ is the *value description*, i.e. it describes the value that the function returns for any α that satisfies the domain condition Φ. The function returns a value only for those arguments that satisfy the domain condition Φ. For instance, '$\lambda x{:}x{\in}D_e$. 1 iff x is green' (which, for simplicity is also written as '$\lambda x_{<e>}$. 1 iff x is green') is a function from elements in D_e to a truth-value: the function returns true (symbolized as 1) for those x in D_e that are green, and false (or 0) for those x in D_e that are not green. That is, the above λ-expression denotes a semantic value of type $D_{<e,t>}$. When this function is applied to a particular individual *o* in D_e, we write: $[\lambda x{:}x{\in}D_e.\gamma](o)$. In general, [λα:Φ.γ](ρ) is *the value* of the function λα:Φ.γ for the argument ρ. Thus, one virtue of λ-expressions allows distinguishing between the *expression of the function* and the *value of that function* for a particular argument. Calculating the value that the function returns for ρ eliminates the λ expression replacing it with its value for the argument given.[20]

I turn now to introducing the semantic value of different categories of expressions. First, we need to introduce the notion of an *assignment function*. An assignment function (or simply, an *assignment*) is a partial function from |N to D_e. It assigns precisely one object in D_e to any natural number starting with 1 until all the objects have been assigned to one number. For instance, assignment *a* assigns John to 1,

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[19] The calculus of λ-conversion is introduced in Church (1941).

[20] The rule for eliminating expressions is known as *β-reduction*. The other two syntactic rules of λ-calculus are *α-conversion*, which consists in allowing uniform substitution of all occurrences of a bound variable with another variable, and *η-conversion*, which allows two functions to be substituted one for the other if they are extensionally equivalent, i.e. assign the same values to all arguments. For details see Church (1941).

that is, $a(1)$ = John; it assigns Mary to 2, that is, $a(2)$ = Mary etc. (Later on we also introduce assignment functions for extensions of other types.) Each occurrence of an expression α in LF the interpretation of which involves an assignment will bare an index (e.g. α_i, where i is a natural number). The semantic value of the expression under an assignment *a* is symbolized as $||\alpha_i||^a$. The extension of the expression is the individual assigned to the index by the relevant assignment function. That is, if α is an expression whose extension is of type <e>, $||\alpha_i||^a = a(i)$.

We need to distinguish at this point between variable and constant expressions. A *variable expression*, or simply a *variable*, is an expression whose extension depends on a particular assignment (i.e. it is assignment dependent). This means that there are assignments *a* and *a'* such that $||\alpha||^a \neq ||\alpha||^{a'}$. A *constant* is an expression the extension of which does not depend on the assignment we choose. It is assignment independent, having the same semantic value under all assignments: if α is a constant expression, for any two assignments *a* and *a'*, $||\alpha||^a = ||\alpha||^{a'}$. In our language proper names will be constant expressions of type <e>. I follow Heim and Kratzer (1998: 111) in considering traces as variable expressions. That is, we have the following semantic rule for traces and pronouns: If α is a pronoun or a trace, *a* is an assignment and $i \in dom(a)$, then $||\alpha_i||^a = a(i)$.

Here is a list of some of the kinds of extensional semantic values the semantic theory assigns to the expressions of the language:

<u>Traces</u> (type N, semantic value of type <e>): $||t_i||^{a,w} = a(i)$, where $a(i) \in D_e$ and $i \in \mathbb{N}$

<u>Proper names</u> (type N, semantic value of type <e>): $||John||^{a,w}$ = John, where John $\in D_e$

<u>Common nouns</u> (type CN, the semantic value of type <e,t>):

$||woman||^{a,w} = \lambda x_{<e>}.1$ iff x is a woman in w

This is to be read as follows: the interpretation function assigns to 'woman' the following extension, relative to the assignment *a* and world w: a function that takes as argument an element from the domain of individuals D_e and returns 1 (true) iff that element satisfies the condition of being a woman at w; otherwise the function returns 0 (false). In this particular case the reference to an assignment is superfluous, as this does not play any role in determining the extension of 'woman'. However, I maintain the superscript for reasons of uniformity of notation.

<u>Intransitive verb</u> (verb of type S/N, the semantic value of type <e,t>):

$||walk||^{a,w} = \lambda x_{<e>}.1$ iff x walks in w

Transitive verbs (verbs of type (S/N)/N, the semantic value of type $<e,<e,t>>$):

$||\text{drink}||^{a,w} = \lambda y_{<e>}.[\lambda x_{<e>}.1 \text{ iff x drinks y in w}]$

Adverbs (of type (S/N)/(S/N), the semantic value of type $<<e,t>,<e,t>>$):

$||\text{politely}||^{a,w} = \lambda f_{<e,t>}.[\lambda x_{<e>}.1 \text{ iff } f(x) = 1 \text{ and x is polite in w}]$

Adjectives (of type CN/CN, the semantic value of type $<e,t>$):

$||\text{huge}||^{a,w} = \lambda x_{<e>}.1 \text{ iff x is huge in w}$

1-place connectives (of type S/S the semantic value will be of type $<t,t>$):

$||\text{not}||^{a,w} = \lambda f_{<t>}.1 \text{ iff } f = 0 \text{ in w.}$

2-place connectives (of type (S/S)/S, the semantic value will be of type $<<t, <t,t>$):

$||\text{and}||^{a,w} = \lambda g_{<t>}.(\lambda f_{<t>}.1 \text{ iff } f = g = 1 \text{ in w})$

§1.8. Context dependency

One important issue not addressed so far is that of accounting for the phenomenon of the context-dependency of the truth-conditions of sentences in natural language. The truth-conditions of a sentence such as ‘I am busy today’ depend on features of the context of utterance, such as the speaker and the day of the utterance.[21] One category of expressions that have received special attentions are *indexicals*, including personal pronouns, such as ‘I’, ‘you’ etc., adverbs such as ‘now’, ‘yesterday’, ‘here’, adjectives such as ‘actual’, ‘present’, and demonstrative pronouns such as ‘that’, and ‘this’.[22] These expressions are context-dependent, meaning that their extension is relative not only to a possible world and an assignment, but also relative to a context of

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[21] In what follows I take *utterances of expressions* to be the bearers of semantic values. I ignore some of the complications that may occur here. Kaplan (1989: 522, 546) takes a *sentence in a context*, rather than an utterance of a sentence to have a truth-value. The reason why Kaplan prefers *sentences-in-context* as bearers of semantic value is because the premises and the conclusion of an argument need to be evaluated with respect to the same context. But no two utterances are performed at the same moment of time, so no two utterances share the same context, with the result that arguments containing context-dependent expressions could not be valid. Kaplan connects the notion of *the content of an utterance of a sentence* with that of *the content of a sentence-in-context* by saying that “the content of a sentence in a context is, roughly, the proposition the sentence would express if uttered in that context” (1989: 522). Kölbel (2011: 98, fn.52) prefers to talk about *uses of a sentence* and *users of a sentence*, because of cases such as recorded messages or post-it notes, as discussed in Predelli (1998), where the user and the time of use might be distinct from the utterer and the time of utterance.

[22] There are various ways to define the term ‘indexical’, but here I follow Kaplan’s use of the term, which he introduces as follows: “What is common to the words or usages in which I am interested is that the referent is dependent on the context of use and that the meaning of the word provides a rule which determines the referent in terms of certain aspects of the context. The term I now favor for these words is ‘indexical’.” (1989: 490) Those indexical that require (at least on certain uses) an associated demonstration are called *demonstratives*, and those for which no demonstration is required are *pure indexicals*.

utterance. Kaplan (1989: 506, 544) argues that not only the extension of indexicals is context-dependent, but also their intension. That is, indexicals have different intensions on different contexts of use (while non-indexicals express the same content in all contexts). So, we need to relativize the semantic values of expressions, both extensions and intensions, to a *context of utterance*. We have already introduced the resources needed to do this. The structure *M* contains a nonempty set *C* of *contexts*. Any context c in *C* is a quadruple (c_A, c_T, c_P, c_W), such that c_A is an element of D_e, the agent of the context; c_T is an element of *T*, i.e. a moment of time; c_P is an element of *P*, i.e. a position; c_W is an element of *W*. These elements are sufficient to delimit a context of utterance of a sentence. The denotation of the context-dependent expressions can be given by reference to the context of utterance as follows:

Pronouns (referential NPs, of type <e>):

$||\text{I}||^{a,c,w} = c_A$

$||\text{you}||^{a,c,w} = x \in D_e$ and x is addressed by c_A in c_W at c_T

$||\text{she}||^{a,c,w} = x \in D_e$ and x is the salient female at C

$||\text{that}||^{a,c,w} = x \in D_e$ and x is the salient object in C

Indexical adverbs (Adv, syntactic type (S/N)/(S/N), semantic type <<e,t>,<e,t>>

$||\text{now}||^{a,c,w} = \lambda f_{<e,t>}.f$ at c_T

$||\text{here}||^{a,c,w} = \lambda f_{<e,t>}.f$ at c_P

$||\text{actually}||^{a,c,w} = \lambda f_{<e,t>}.f$ at c_W

An alternative is to treat pronouns as variables, as in Heim and Kratzer (1998: 111, 243). On this approach, their extension of which is given by an assignment function. Heim and Kratzer propose to "think of assignments as representing the contribution of the utterance situation." (1998: 243) This has several advantages. First of all, it allows giving the correct truth-conditions of utterances of sentences that contain various occurrences of the same pronoun, such as 'She is taller than she.' If we use the semantic value for 'she' introduced above, we get the incorrect result that this sentence is true iff *the salient female at C is taller than the salient female at C* (where C is the context of utterance of the sentence). Using the mechanism of indexation the LF of the above sentence is the following:

$[_S [_N \text{She}_1] [_{VP} [_{VP} \text{is taller than}] [_N \text{she}_2]]]$

The assignment function assigns different individuals to the two occurrences of 'she', as they bear different indices.

A second advantage of this approach is that it allows accounting for *anaphoric* uses, i.e. the use of a pronoun to refer to an individual already referred to by a previous occurrence of a pronoun, as in 'She typed on her computer.' Finally, if pronouns are variables, then the theory predicts that we can have bound uses of these variables. This indeed seems to be the case, as with the sentence 'Every student typed on her computer.' However, these issues will not play a significant role in the present work, and so I opt for the simple proposal outlined above. Moreover, for the purpose of simplifying notation I avoid in what follows to make reference to a context C in expressing the semantic value of an expression, unless this is indeed context-dependent.

§1.9. Binding

We should further distinguish between *bound* and *free* variables. A variable is *free* in a sentence if the extension of that sentence is assignment relative. For instance, consider the PF 'Ann loves her', which has the following LF:

$[_S [_{NP}$ Ann$] [_{VP} [_V$ loves$] [_{NP}$ her$]]]$

In order for the interpretation function to assign a semantic value to this sentence it must assign a semantic value to 'her'. In accordance with the above semantic rule for traces and pronouns, the extension of 'her' is the individual the assignment relative to which the sentence is interpreted assigns to the index 1.

Binding is a semantic operation that removes or reduces assignment dependency. If a complex expression contains one variable δ, by binding δ we create a larger expression that has δ as a constituent but is assignment independent. Binding is achieved by using *binders*, which we have already introduced in the vocabulary. A *variable binder* could be defined as follows: α is a variable binder iff for any expression $[\alpha\ \beta]$, β has an assignment-variable semantic value, and $[\alpha\ \beta]$ has an assignment-constant semantic value. In that case α eliminates the assignment dependency of expression $[\alpha\ \beta]$ (that is, it binds the free variable in β). A binder must always bind a variable, and is always co-indexed with the variable it binds. The co-indexing of binder and variable allows us to keep track the binding relations.

In the language I have introduced, variable binders are λ expressions[23] (not to be confused with the λ expressions of the λ-calculus used as a metalinguistic tool). The syntactic type of binders is (S/N)/S. Following Heim and Kratzer (1998: 114, 125), binders are *syncategorematic* expressions, that is, they are not assigned a semantic value of their own. They do not have an extension that combines by functional application with other extensions of appropriate types. Instead, they combine with the expressions that contain the variable they bind (a sentence), by a rule called Predicate Abstraction (PA for short). This is a different composition rule from FA, which gives the extension of the expression that results from combining a binder with a sentence.

Predicate Abstraction: If α is an expression whose immediate constituents (that is, a branching node whose daughters) are λ_i and γ, where λ_i is a variable binder, and $i \in |N$, then for any variable assignment a, $||\alpha||^{a} = \lambda x_{<e>}.||\gamma||^{ax/i}$.

Here $a^{x/i}$ is a *modified assignment*, i.e. an assignment that differs from assignment *a* only in that it assigns the object x from D_e to i. That is, $a^{x/i}(i) = x$, and for any other index $j \neq i$, $a^{x/i}(j) = a(j)$.

Compare this composition rule with that of functional application (FA, for short), which we can now express as in Heim and Kratzer (1998: 13):

Functional Application: If α is a complex expression composed of two simple expressions β and γ, then, for any assignment *a*, if $||\beta||^{a,w}$ is a function whose domain contains $||\gamma||^{a,w}$, then $||\alpha||^{a,w} = ||\beta||^{a,w}(||\gamma||^{a,w})$.

§1.10. Quantifiers

Given the topic of this study, which is the semantics of definite descriptions, it is important to take a close look at how quantifiers should be treated in our framework. It is useful to start by briefly mentioning Frege's treatment of quantifiers. Frege accepted in his first order logic only two quantifiers, the existential quantifier '∃' and the universal quantifier '∀'. The standard way to introduce the meaning of '∃' in a language of first order logic with an extensional semantics, relative to a model *M* = <*D*, *I*> (containing a domain of individuals *D* and an interpretation function *I*) is as follows:

Semantic rule for '∃': (∃x) Gx is true in *M*, relative to an assignment *a*, iff there

[23] I borrow this notion from Kölbel (2011). Instead of λ symbols co-indexed with bound variables, Heim and Kratzer (1998) use the corresponding natural numbers symbols as names of binders.

is an object o $\in D$ such that Gx is true in *M*, relative to an assignment *a** that assigns o to x and otherwise is just like *a*.

That is, ($\exists$x) Gx is true in *M*, relative to an assignment *a*, iff $|\ ||G||\ | \neq 0$ in *M* relative to an assignment *a**, that assigns o to x and otherwise is just like *a*. I abbreviate this condition as $|G| \neq 0$ (where this is to be read as in standard set theory notation: the number of elements of G is not 0). Using the same abbreviation, we can give the semantic rule for '$\forall$' as follows:

<u>Semantic rule for '$\forall$'</u>: ($\forall$x) Gx is true in *M*, relative to an assignment *a*, iff $|D \setminus G| = 0$.

Thus, $\exists$x(Gx) is true iff something (that is, some element in the domain) is G. The sentence says that G has the property of having a non-vacuous extension. And $\forall$x(Gx) is true iff everything (that is, every element in *D*) is G. It says that G has the property of including in its extension every element in the domain. Roughly speaking, Frege's quantifiers express properties of sets (or, more precisely, sets of sets). These quantifiers roughly correspond to the natural language quantifiers 'something' and 'everything'. This suggests that we could model the meaning of the latter two quantifiers in our framework as having the extension of a *set of sets*: 'something' denotes the set of all those sets that are not empty. The characteristic function of this set of sets is a function that takes any set to 1 (true) iff that set is not empty. So, it looks like the extension we assign to 'something' should be of type <<e,t>,t>.[24] Similarly, 'everything' denotes the set of all those sets that include every element in the domain. The characteristic function of this set takes any set to 1 iff that set includes all the elements in the domain. So we introduce in our language the counterpart of the two standard quantifiers of FOL:

$||\text{everything}||^{w,a} = \lambda f_{<e,t>}.1$ iff every $x \in D_e$ is such that $f(x) = 1$ in w

$||\text{something}||^{w,a} = \lambda f_{<e,t>}.\ 1$ iff some $x \in D_e$ is such that $f(x) = 1$ in w

The syntactic type of these quantifiers is S/(S/N), as they combine with a VP to form a sentence.

Let us go back to FOL for a moment. In FOL it is possible to express not only properties of sets (e.g., that a set is non-empty), but also *relations* between sets (see Sher 1991: 13-14; Westersthal 2011). For instance, if we want to say that two sets have

[24] For a discussion of the various reasons why this is the correct semantic type for QNP see, for instance, Heim and Kratzer (1998: ch.6) and Dever (2012: 62f). They discuss why we should not assign QNPs semantic values of type <e> or <e,t>.

a non-empty intersection, we could express this by using the standard quantifiers of FOL. '∃x(Fx and Gx)' says that *some F's are G*. This is the reason why Frege thought that the language of FOL does not require more than two quantifiers, in particular, '∃' and '∀'. But in FOL it is not possible to express, for instance, that *most F's are G* (see Sher 1991: 19-20; Neale 1990: 40). To avoid these limitations, Generalized Quantifier Theory (see Mostowski: 1957; Barwise and Cooper: 1981) was introduced as an extension of the language of FOL that generalizes the notion of a quantifier allowing for quantifiers with a different syntax to be introduced. While quantifiers such as '∃' or '∀' of FOL are *unary* (1-place) quantifiers, as they require only one open sentence (e.g. 'Fx') to form a new sentence, *binary* (2-place) quantifiers combine with two open formulae in order to form a well-formed formula; *tertiary* quantifiers combine with three open formulae, and so on. Unary standard quantifiers, but also binary and tertiary quantifiers are introduced below (in the left column) by specifying the truth-conditions of sentences in which they occur, as follows (in the right column, using the abbreviation mentioned above):

[∃x] (Gx)	$|G| \neq 0$
[∀x] (Gx)	$|D \setminus G| = 0$
[*some* x: Fx] (Gx)	$|F \cap G| \neq 0$
[*every* x: Fx] (Gx)	$|F \setminus G| \neq 0$
[*most* x: Fx] (Gx)	$|F \cap G| \geq |F - G|$
[*both* x: Fx] (Gx)	$|F \setminus G| = 0$ and $|F| = 2$[25]
[*exactly 5* x: Fx] (Gx)	$|F \cap G| = 5$
[*fewer* x: Fx (Gx)](Hx)	$|F \cap H| < |G \cap H|$

So far we have been looking at an extension of the language of FOL (with an extensional semantics) as suggested by Generalized Quantifier Theory. Let us turn back to natural language. In natural language we find many quantifiers, apart from 'everything' and 'something' that we discussed above: 'many', 'some', 'no', 'every' etc. We introduced these expressions in our language as determiners of syntactic type (S/(S/N))/CN. That is, they combine with CNs to form determiners phrases such as 'every student', 'some professors' and 'two frogs', the syntactic type of which is S/(S/N). These quantifiers are also known as *restricted quantifiers* (Abbott 2010: 42), because the CN they combine with restricts the set of objects that the quantifier

[25] As suggested in Neale (1990: 46).

quantifies over.[26] That means that the determiners mentioned differ semantically from quantifiers such as ‘everything’ and ‘something’ in that they do not express properties of properties, but *relations* between properties. A sentence of the form ‘Some F’s are G’ expresses a relation between the property that ‘F’ stands for and the property that ‘G’ stands for: in particular, that there are individuals in the extension of F that are also in the extension of G. That is to say that the extension of this quantifier is *a set*, the members of which are *pairs of sets*: in particular, all those pairs of sets such that their intersection is not empty. This set is characterized by a function from pairs of sets to truth-values. The function returns 1 iff the two sets it takes as arguments (e.g., F and G) have a non-empty intersection (i.e. $F \cap G \neq \emptyset$). Given that our functions (represented in the metalanguage by using the language of λ-calculus only take one argument at a time (and not pairs of arguments), we could rewrite this as a function that maps sets to a second function, which maps sets to truth-values.[27] This function maps any set F to a function from a set G to 1, and we finally get 1 iff the intersection of F and G is not empty. The semantic type of this function is <<e,t>,<<e,t>,t>>. So, applying GQT to our framework, we can define the following binary (restricted) quantifiers, the extension of which is of type <<e,t>,<<e,t>,t>>:

$||\text{some}||^{a,w} = \lambda f_{<e,t>}.[\lambda g_{<e,t>}.1$ iff some $x \in D_e$ such that $f(x) = 1$ in w is such that $g(x) = 1$ in w]

$||\text{every}||^{a,w} = \lambda f_{<e,t>}.[\lambda g_{<e,t>}.1$ iff every $x \in D_e$ such that $f(x) = 1$ in w is such that $g(x)=1$ in w]

$||\text{no}||^{a,w} = \lambda f_{<e,t>}.[\lambda g_{<e,t>}.1$ iff no $x \in D_e$ such that $f(x) = 1$ in w is such that $g(x) = 1$ in w]

It should be clear by now how this is to be read. For instance, the semantic value of ‘every’ is a function that takes as argument the characteristic function of a set of individuals, and returns a function from the characteristic function of a set of individuals to a truth-value: it returns 1 if every element in the former set is also an element in the

[26] There is a certain lack of clarity in the literature concerning the use of the term ‘quantifier’. Some – for instance Sher (1991) – use it to refer to the *determiner*, e.g. ‘every’, ‘some’ are quantifiers. Others – for instance, Barwise’s and Cooper (1981: 162) – take quantifiers to be *determiner noun phrases*, that is, determiner plus restrictor, e.g. ‘every student’. That is, expressions such as ‘every man’ and ‘every dog’ express different quantifiers. In what follows I opt for the former terminology, taking quantifiers to be determiners, not DNPs. I use *quantifier noun phrases*, or simply *QNPs* to refer to expressions such as ‘some students’.

[27] This procedure is called Schönfinkelazation, see Heim and Kratzer (1998: 29).

latter set, and 0 otherwise. The DNP 'every philosopher' characterizes the set of subsets of D_e which are such that the set that contains every philosopher is included in that set.

The treatment of quantifiers in natural language as generalized quantifiers is an important step towards reaching a unified account of quantifiers in natural language. But notice that there are two important differences between GQT as an extension of FOL and the treatment of natural language quantifiers given above. The first one is that both the standard quantifiers of FOL ('∃' and '∀') and Barwise and Cooper's (1981) generalize quantifiers (the quantifiers *some*, *most*, *every* etc. on the left column in the above list) are syncategorematic expressions. The interpretation function does not assign a particular semantic value to '∃' or the generalized quantifier '*some*'. Instead, what we get are specifications of the semantic values of *sentences* in which these quantifiers occur. We are given the truth-conditions for all sentences of the form '∃x(Φx)', and '[*some* x: Φx] (Γx)', respectively. As Abbott observes, this procedure is not adequate for natural language semantics: it constitutes

> an obstacle to a compositional analysis of English: we need a semantics which can assign an interpretation to every syntactic constituent type—an interpretation which can then combine with the interpretations of constituents which that type combines with, to yield the interpretation for the whole expression. (Abbott 2010: 80)

The strategy of using many rules of composition (such as the ones given above for '∃', '*some*' and so on) to interpret sentences in which certain expression occur (instead of assigning to these simple expressions semantic values, and introduce a small number of composition rules to calculate the semantic values of sentences), if employed at a large scale, may conflict with the reason why we postulated desideratum D2, that of compositionality (although not with D2 as such). We required that the language be compositional to account for productivity (learnability) and systematicity. But if the strategy of appealing to rules of composition is employed on a large scale – that is, introducing a large number of such rules – it becomes difficult to see how these facts could be explained (although not if it is employed on small scale and for a closed class of expressions, as Fintel and Heim (2011: 8) note). We avoid this problem if we treat composition as functional application, and assign a particular semantic value to each quantifier determiner, as I have done above.

The second difference between generalized quantifiers as introduced in a language of FOL and the quantifiers we have introduced in natural language is that FOL does not separate the issue of quantification from that of variable binding: every quantifier (both standard and generalized) is at the same time a variable binder. With respect to natural language we want to separate the idea of quantification from that of variable binding, because it is not clear that all natural language quantifiers are variable binders. Consider the following sentence:

1. Some students are polite.

We need not postulate any variable at all in the LF of sentence 1 in order to predict the right truth-conditions. Instead, its LF is the following:

[$_S$ [$_{DP}$ Some students] [$_{VP}$ [$_V$ are] [$_{Adj}$ polite]]]

The semantic type of quantifier NPs such as ‘some students’ is <<e,t>,t>. It combines with the VPs ‘are polite’, the type of which is <e,t>, and it returns a truth-value. However, other occurrences of quantifier NPs raise certain problems. For instance, QNPs occur in the object position of a transitive verb, such as in sentence 2:

2. John read every book.

If the semantic value of ‘every book’ is of type <<e,t>,t>, it does not combine with verbs such as ‘read’, the semantic value of which is <e,<e,t>>. One solution is to take the QNP to be ambiguous, having two semantic values of different types: one of type <<e,t>,t>, when it occurs in subject position; and one of type <<e,<e,t>>,<e,t>> when it occurs in object position (so that it can take the semantic value of a verb such as ‘read’ as its argument). We could go on to postulate that the ambiguity is located in the determiner.

Another solution does not posit an ambiguity, but relies on variable binding. It follows the strategy Frege implemented for FOL. In FOL we find no type mismatch because the quantifiers are always *sentential* operators. They never occur in object position (see Glanzberg (2006)). Instead, what occurs in object position is a variable that is bound by the quantifier, as in the following sentence:

$\forall$x(Book (x) → Read (John, x))

The same is true of an extension of the language of FOL that includes generalized quantifiers. The generalized quantifiers, such as the binary quantifier ‘*every*’, are also sentential operators:

[*every* x: Book x] (Read (John, x))

The apparatus of variable binding may solve the problem of quantifiers in object position in the case of the LF of natural language sentences as well (see Heim and

Kratzer (1998: 193f)). The idea is to replace the QNPs by a variable of type <e>, which then combines with the transitive verb ‘read’, of type <e,<e,t>>. The operation is characterized in syntactic theory as the result of applying a rule called Quantifier Raising (QR, for short), which predicts that quantifier phrases do not have at LF the position they occupy in surface form (PF). We are not interested here in the nature of this rule, but only in the way it affects the position of quantifiers in LF: they are *moved* from their original position and *adjoined* to a node S of the phrase structure tree. The movement leaves behind a variable of type <e>, called a *trace*. A trace is an aphonic element of type N. The trace then combines successfully with the transitive verb, the type of which is <e,<e,t>>. So, on this account QNPs never occur in object position in LF. Given that QR-ing of QNPs is mandatory whenever there is a type mismatch resulting from the occurrence of a quantifier in object position at PF, we avoid such mismatches.[28]

Now, traces cannot occur as free variables, but instead must always be bound. In order to get the right truth-conditions for the sentence the semantic value of the trace the QNP leaves behind must depend on the semantic value of the QNP they replace. The binding of a trace is achieved by a λ binder co-indexed with the trace. This variable binder will occupy the place in the sentence immediately after (i.e. below, in the phrase structure tree) the position where the QNP has landed. Variable binders are phonetically empty terms, the type of which is (S/N)/S. When combining with a sentence, they return an expression of type S/N which then combines with the quantifier phrase, the type of which is (S/(S/N)). The resulting LF for the sentence 2 is the following:

$[_S [_{DP}\text{ every book}] [\lambda_1 [_S [_N\text{ John}][_{VP}[_V\text{ read}] [_N\, t_1]]]]]$

Calculating the truth-conditions of 2 that result from interpreting this LF gives us the right prediction.

I have taken QNPs that are QR’ed to introduce variable binders that bind their trace. Is there variable binding other than that which results from QR-ing a QNP? This is an empirical question concerning natural language. We will see later on cases in which they do. What is important to note at this point is that our framework allows for

[28] Heim and Kratzer (1998: 260) adopt a very unconstrained view of QR, on which it is optional (not mandatory, although it is required in all cases of semantic type mismatch of the kind discussed); they postulate that QR can apply to QNP, but also to proper names and pronouns; also the QNP can adjoin to any node (not just S nodes). Other authors, e.g. Dever (2012: 67), take a different view: QR is mandatory, and each QNP must be moved from its original position and adjoined to an S node. Here I do not need to take a stand on the question of whether QR is mandatory for all QNPs, whether it applies to other expressions apart from QNPs, and whether they adjoin to nodes other than S.

this, but does not require it. In general, for the binder that a QNP introduces to bind a variable the two must be co-indexed. If a variable is not co-indexed with the binder, it will not be bound by it. This way – by the mechanism of co-indexing – we can keep separate the issue of whether an expression is a QNP and the issue of whether it introduces a variable binder that binds variables in the LF other than the trace of the QNP.[29]

§1.11. Intensions

So far I have talked mostly of extensions, but it's time to say something about intensions. Intensions are related to extensions in a systematic way. The intension of the expression α, under assignment *a*, is a function that assigns to each possible world w, an extension of α at w. We can represent it as follows: $||\alpha||_{¢}^{a} = \lambda w.||\alpha||^{a,w}$.

The type of the intensional semantic values introduced above is <s,σ>. When σ is a truth-value, the corresponding intension is a function from elements in *W* (possible worlds) to elements in D_t (truth-values). These are the intensions of utterances of full sentences. In what follows, I call these functions *propositions* (although see the discussion in section §1.2 concerning the different ways in which the notion of proposition is used). Intentions of type <s,e> are sometimes called *individual concepts*, and intentions of type <s,<e,t>> *properties*.

Why do we need intensions in our semantic framework? There are various reasons why we need a semantic theory that assigns intensional semantic values to expressions. First, in an extensional semantic theory expressions are assigned only an extensional semantic value. A sentence, for instance, is assigned a truth-value relative to the model considered. In an extensional framework nothing plays the role of circumstances of evaluation, so that the truth-value of a sentence is not sensitive to possible worlds, times, or other circumstances. Instead, the semantic value of sentences can be directly calculated from the semantic clauses assigning extensions to simple expressions and the rules for semantic composition. The truth-value of sentences can be arrived at through deduction, if we know the extension of the expressions that form the

[29] It is custom to talk about a QNP such as 'every diver' as *binding* a variable. This is not in accordance with the definition of binding introduced. To preserve this way of talking Heim and Kratzer (1998: 263) introduce a notion of *binding in the derived sense*: "A DP α semantically binds a DP β (in the derivative sense) iff β and the trace of α are (semantically) bound by the same variable binder."

sentence and the rules for semantic composition (Kölbel 2011: 78). If linguistic competence consists in knowledge of such an extensional semantics, understanding a sentence would entail knowing its truth-value. But this is not a realistic semantic theory for natural language: we do not know whether a sentence is true or false just by understanding it. Instead, in section §1.2 we have characterized linguistic competence as manifesting itself in the ability to assign *truth-conditions* to utterances of sentences, that is, those conditions under which the sentence is true. In an intensional semantic framework sentences are assigned intensions of type <s,t>, that is, functions from possible worlds to truth-values. These functions model the truth-conditions of utterances of sentences. From this perspective, understanding an utterance of a sentence does entail knowing its truth-value, but in having the ability to determine its truth-value relative to a given possible world when all the relevant facts are accessible to the subject.

A second reason for adopting an intensional semantic framework is the phenomenon of *intensional contexts*. Intensional contexts are expressions whose meaning does not enter into semantic composition together with the extension of the expressions they take as argument. Consider, for instance, expressions such as ‘possibly’ and ‘necessarily’. They have the syntactic type S/S, so they combine with sentences, forming complex sentences such as ‘Possibly S’ (where ‘S’ stands for a sentence). ‘Possibly’, or ‘it is possible that’, does not take as argument the truth-value of the sentence S at a world w. Instead, ‘possibly’ characterizes the *intension* of S, and so takes as argument a proposition. So, a plausible hypothesis about ‘possibly’ is that it has an extension of type <<s, t>, t>, for instance, the following (where ‘p’ is a variable in $D_{<s,t>}$, that is, as variable that receives as values functions from W to 1 and 0):[30]

$$||\text{Possibly}||^{a,w} = \lambda p_{<s,\,t>}.1 \text{ iff there is a } w' \in W \text{ such that } p(w') = 1$$

This clause assigns an extensional semantic value to the intensional operator, which takes as argument an intensional semantic value (a proposition). The result of applying the intensional operator to an intensional semantic value is an *extensional* semantic value (a truth-value). But this kind of composition as functional application has not been defined so far. We need to introduce the following intensional version of the rule of composition by functional application (IFA, for short), following Heim and Kratzer (1998: 308):

[30] The semantic value introduced here is only a first approximation. In chapter 5 I come back to modal operators and introduce a more sophisticated account of them.

Intensional Functional Application: If α is a branching node and $\{\beta, \gamma\}$ the set of its daughters, then, for any world w and assignment g: if $||\beta||^{w,a}$ is a function whose domain contains $||\gamma||_{¢}^{a}$, then $||\alpha||^{w,a} = ||\beta||^{w,a}(||\gamma||_{¢}^{a}) = ||\beta||^{w,a} (\lambda w.||\gamma||^{w,a})$.

Certain transitive verbs are also intensional context. Speech act verbs, such as 'says', and propositional attitude verbs, such as 'believes', do not express functions that take as argument the truth-value of the sentences they combine with. They are transitive verbs of syntactic type (S/N)/S. Their semantic value is not of type <t,<e,t>>, or otherwise we could make no difference between believing any two true propositions. What we believe are not truth-values, but propositions, i.e. semantic values of type <s,t>. So, their semantic values is of type <<s,t>,<e,t>>. For now we define only one propositional attitude verb and one speech act verb:

$||\text{believes}||^{a,w} = \lambda p_{<s,\, t>}.[\lambda x_{<e>}.1$ iff p(w') = 1 for all w' compatible with what x believes in w]

$||\text{says}||^{a,w} = \lambda p_{<s,\, t>}.[\lambda x_{<e>}.1$ iff p(w') = 1, for all w' compatible with what x says in w]

The recourse to intensions (i.e. semantic values of type $<s, \sigma>$) in our semantic framework is only *local* (see Fintel and Heim 2011: 12): intensional semantic values are introduced in the calculation of the truth-conditions of sentences only in case the sentence contains intensional contexts. All expressions have an intensional semantic value, but this does not enter into the calculation of the semantic value of sentences unless they are in the scope of an intensional operator. In the case of purely extensional contexts no recourse to intensions is needed. Only the *value* of the intensions of expressions relative to the circumstances of evaluation considered is needed in those cases.

Chapter 2: Theories of definite descriptions

§2.1. Introductory remarks

After having introduced the methodology as well as the formal framework I focus in what follows on the project that I am pursuing here, that of providing an account of the linguistic meaning of definite descriptions (DDs, henceforth). These are expressions that have the form 'the F', resulting from combining the determiner 'the' with a noun ('dog') or a noun and a modifier ('black dog'). From a semantic point of view, as Strawson (1950: 320-1) and others pointed out, we can distinguish between DDs that contain mass nouns (such as 'the money', or 'the gold in Zurich') and DDs formed with count nouns (such as 'the dogs'). With respect to the latter, one can make a further distinction between DDs in singular form and DDs in plural form. A complete theory of DDs has to account for all these kinds of DDs. However, I focus here only on DDs that contain count noun phrases in singular form, as they are the primary focus in the literature that I shall be discussing.

In this chapter I am discussing a few of the classical theories of DDs in restate them in our framework. For this purpose it is useful to separate various questions and see how the traditional theories answer them. I propose four questions:

i. What is the syntactic type of DDs, and that of the definite article, under a particular view?

I will not put much emphasis on the syntactic question, given that the purpose of the present inquiry is the semantics of DDs, and not their syntax. However, an adequate syntactic type must be assigned to DDs in order to allow for them to combine with the expressions they combine with in natural language.

ii. What is the type of the semantic value of a DD?

I separate the above question from the question about what semantic *values* DDs have, because it is possible in principle to have theories of DDs that assign to them different semantic values of the same type. We will see examples of such theories in what follows.

iii. Do DDs introduce binding operators?

In the framework introduced variable binding is achieved through introducing λ binding operators in the LF that are co-indexed with the variables in the sentence that they bind.

DDs are *not* binding operators. In the previous chapter, following Heim and Kratzer (1998), I subscribed to the view that all DPs – including DDs – are subject to QR in all cases in which there is a type mismatch. The question whether there is a type mismatch when a DD is the object of a transitive verb depends on the semantic type we assign to DDs (i.e. question (ii)). On the other hand, the question whether DDs introduce binding operators does not reduce to the question about type mismatch, given that binding operators might be needed to predict other phenomena.

iv. Do DDs of the form 'the F' have a defined semantic value for cases in which there is no unique F?

I discuss this question in more detail below, when addressing the Fregean theory.

These four questions are useful in reformulating classical theories of DDs in the limits of our framework. They are also methodologically useful at the next steps, when we put the different theories to test, as it allows distinguishing between different dimensions along which to test the hypotheses.

§2.2. Introducing the Russellian theory

I start by considering Russell's Theory of Descriptions, which was for a long time the standard account of DDs. I briefly present the theory before addressing the questions (i) to (iv) to see how we should answer them within our framework in a Russellian spirit. Russell's theory is usually formulated in standard FOL with identity as the claim that an utterance of a sentence of the form 'The *F* is *G*' has the following 'logical form':

1. $\exists x(Fx \wedge \forall y(Fy \rightarrow x=y) \wedge Gx)$

Given the standard interpretation of this sentence in FOL, (1) is true iff *there is exactly one F and every F is G* (or, as sometimes phrased, *there is an entity such that it is F, and nothing else is F, and it is G*).

Russell (1905, 1919) introduces his theory in terms of what he calls "propositional functions". A propositional functions is,

> an expression containing one or more undetermined constituents, such that, when values are assigned to these constituents, the expression becomes a proposition. . . . Examples of propositional functions are easy to give: "x is human" is a propositional function; (Russell 1919)

Given that here by 'proposition' Russell means a sentence[1], a propositional function is an expression such as 'is a human', that is, a predicate. Russell writes that the following three sentences "are implied by 'the author of Waverley was Scotch'" (Russell 1919: 213):

a. "x wrote Waverley" is not always false

b. "if x and y wrote Waverley, x and y are identical" is always true

c. "if x wrote Waverley, x was Scotch" is always true.

And he adds: "Conversely, the three together (but no two of them) imply that the author of Waverley was Scotch. Hence the three together may be taken as defining what is meant by the proposition "the author of Waverley was Scotch"." That is, the sentence 'The author of Waverley was Scotch' is true iff (a) the extension of the predicate 'wrote Waverley' is not vacuous, (b) it does not contain more than one element, and (c) every individual that is in the extension of this predicate is also in the extension of 'is Scotch'. The general form of (a), (b) and (c), expressed in the language of FOL, is the following:

a1. $\exists x(Fx)$

b1. $\forall x(Fx \rightarrow \forall y(Fy \rightarrow x=y))$

c1. $\forall x(Fx \rightarrow Gx)$

These sentences of FOL are true iff, respectively:

a2. There is at least one *F*.

b2. For every individual, if it is an *F*, then there is no other individual that is also an *F* (that is, there is at most one *F*)

c2. Everything that is *F* is *G*.

It can be easily proven that Russell's equivalence claim is correct: the existentially quantified sentence in (1) is logically equivalent to the conjunction of (a1), (b1) and (c1). So, the truth-conditions that the Russellian theory of descriptions assigns to sentences of form 'The F is G' can be alternatively expressed as a conjunction of three sentences. As Ludlow (2013: §2) notes, three conjuncts express what may be called, respectively, the *existential import*, the *uniqueness constraint*, and the *maximality condition*. The distinction between these three semantic components of the content of

[1] By 'proposition' Russell must mean here a linguistic entity, and in particular a *sentence*. This is suggested by the continuous repetition in Russell 1905 of expressions such as "the proposition 'Scott was the author of Waverley'", and from saying that meaning is being "assigned to every proposition in which [denoting phrases] occur". Similar expressions, such as "propositions in which this phrase occurs", abound in Russell 1919. This is how 'proposition' is defined in Russell (1918: 10): "A proposition, one may say, is a sentence in the indicative, a sentence asserting something, not questioning or commanding or wishing."

utterances of sentences of the form 'The F is G' will become methodologically important later on when we turn to evaluating the Russellian theory.

Concerning the nature of his inquiry, Russell writes that he is discussing the "interpretation" of DDs (Russell 1905: 479). This suggests that his aim in formulating the Theory of Descriptions is to give an account of the *meaning* of these expressions.[2] But, as Neale (1990) points out, "Russell is so very obviously concerned with the proposition expressed by a particular utterance rather than the more abstract notion of the linguistic meaning of sentence-types" (1990: 25). Russell (1905) does not seem to have a notion of the meaning of an expression-type or a sentence-type, as different from the meaning of an expression-token (or utterance of an expression). This is one of the main criticisms that Strawson advances against the Russell's theory of descriptions:

> confusion is apt to result from the failure to notice the differences between what we can say about these and what we can say only about the uses of types. We are apt to fancy we are talking about sentences and expressions when we are talking about the uses of sentences and expressions. This is what Russell does. (1950: 327)

If this is correct, then Russell is assigning propositions, or maybe truth-conditions, to sentences in context, or utterances of sentences, but does not seem to be worried about how exactly these propositions result from the meaning of expression-types. So, I take it that on Russell's view, (1) is a rendering of the truth-conditions of an utterance of a sentence of the form 'The F is G'. This semantic claim about the literal truth-conditions of utterances of sentences containing DDs is what I call henceforth "the Russellian theory of DDs": *an utterance of a sentence of the form 'The F is G' is true iff (1) is true*.

§2.3. The syntactic type of DDs on the Russellian theory

Let me go back to the list of questions introduced in the previous section. The first question concerned the syntactic type of DDs. Given the framework that I introduced in chapter 1, there are different syntactic choices that are intuitively

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[2] However, this is questionable: concerning proper names, Russell writes: "Common words, even proper names, are usually really descriptions. That is to say, *the thought in the mind of a person* using a proper name correctly can generally only be expressed explicitly if we replace the proper name by a description." (1912: 25, my emphasis) Later Russell (1957: 388) qualifies this, saying that when developing his theory of descriptions, "I was concerned to find a more accurate and analysed thought to replace the somewhat confused thoughts which most people at most times have in their heads." (1957: 388) These remarks raise doubts about whether Russell's aim was indeed to engage in an empirical study of natural language.

plausible. Thus, a DD could be classified as a name, and assigned the type N. They would turn out to be complex names, formed by combining the determiner 'the' with a CN. In that case, the natural choice is to assign the determiner the type N/CN. Another option is to classify DDs with DNPs, and assign to them the type (S/(S/N)), while assigning the determiner the type (S/(S/N))/CN. There are other options, but these two are especially plausible, as DDs have a syntactic behaviour similar to that of determiner phrases, but also similar to that of names. Consider for instance that the definite determiner 'the' takes positions that standard quantificational determiners occupy, such as in the following sentences:

2. Every/One/No/*The* student studies philosophy.
3. I've talked to some/many/five/*the* students.

On the other hand, intuitively, DDs are used in positions in which proper names, demonstratives and other expressions of category N appear:

4. I like *the movie we saw yesterday*/that movie/it/'Snatch'.

Does Russell suggest which way we should answer the syntactic question? Russell's (1919: 209) distinction between the superficial or *grammatical form* of a sentence and its real, or *logical form*, may be relevant at this point. Is there any correspondence between Russell's distinction and the threefold distinction I have introduced, between PF (or phonetic form, the superficial form of natural language expressions), LF (or logical form, the syntactic structure of natural language expressions), and the semantic value of a natural language expression (expressed in our framework with the help of language using λ expressions)? It is not at all clear that there is. However, I did take Russell's theory about the "logical form" of sentences containing DDs to be a claim about the *truth-conditions* of (utterances of) sentences containing DD': an utterance of a sentence of the form 'The F is G' is true iff (1) is true. Russell uses the language of FOL as a metalanguage for this purpose (while contemporary semanticists usually use λ calculus for the same purpose). If this is correct, when he talks about "logical form", Russell is concerned with the truth-conditions of natural language sentences, and not with their LF.

As a side point it is worth mentioning that, according to Russell, the "logical form" of a sentence is not only a representation of the truth-conditions of the sentence, but also of the structure of the *proposition* expressed by that sentence. In Russell (1903) he introduces a conception of structured propositions, which he sometimes calls ‘propositions’ or ‘facts’,[3] and which he takes to be the denotation of sentences. The constituents of structured propositions are what he calls *terms*. Terms are of two kinds: *particulars* (individuals), and *universals* (properties and relations). Later, Russell (1912, 1918/2010) changed his mind about whether *particulars* can become part of the propositions we express and entertain, but he always admitted *universals* as constituents of propositions.[4] However, given that the framework introduced in the previous chapter does not make use of structured propositions (thus ignoring the motivations for introducing such entities), I turn a blind eye to Russell’s structured propositions, and taken his “logical form” to be a representation of the truth-conditions of natural language sentences. Consequently, I take denotation of sentences (that is, their semantic value) to be truth-values and not structured entities.

What about Russell’s concept of “grammatical form”? What does his “grammatical form” correspond to in our framework, if anything? Russell (1919) insists that the logical form cannot always be read off of the grammatical form. Those who take grammatical form as a sure guide to the analysis of the proposition expressed are prone to commit mistakes, he claims. This suggests that Russell’s notion of grammatical form is closer to that of superficial form (or PF), and not to LF. Indeed, PF is sometimes misleading with respect to the intended interpretation of a natural language sentence. Ambiguous sentences, for instance, have the same PF but different truth-conditions. If this is so, then it seems that Russell’s distinction between grammatical and logical form corresponds roughly to a distinction between PF, on the one hand, and the truth-conditions of (or the proposition expressed by) a natural language sentence, on the other hand, leaving out the notion of LF.

Now, if Russell does not have a notion corresponding to that of LF it is difficult to know what syntactic category in LF he would assign to DDs. However, some of his remarks may suggest an answer to this question. Russell says DDs are “denoting phrases”, a category of expressions that he introduces by examples:

> By a ‘denoting phrase’ I mean a phrase such as any one of the following: a man, some man, any man, every man, all men, the present King of England, the

[3] As mentioned, Russell’s terminology is not always very clear. Usually Russell uses ‘proposition’ to mean sentence, see n.2 above. However, in other places he uses ‘proposition’ to refer to the denotation of a sentence, for instance in his formulation of the principle of acquaintance: “Every proposition which we can understand must be composed wholly of constituents with which we are acquainted.” Russell (1912: 40)

[4] See also the fragments quoted in footnote 2, which also raise doubts that Russell’s project is one in truth-conditional semantics for natural language.

> present King of France, the center of mass of the solar system at the first instant of the twentieth century, the revolution of the earth round the sun, the revolution of the sun round the earth. Thus a phrase is denoting solely in virtue of its *form.* (Russell 1905: 479)[5]

In comparing sentences containing denoting phrases with sentences containing proper names, Russell observes that they are similar yet different in form. He writes that logicians of the past

> have not known what differences in grammatical form are important. 'I met Jones' and 'I met a man' would count traditionally as propositions of the same form, but in actual fact they are of quite different forms: the first names an actual person, Jones; while the second… is obviously not of the form 'I met *x*,' (Russell 1919: 209).

One way to understand this is as follows: at the superficial/grammatical level DDs and other denoting phrases are in the same category with names; however, at the level of logical form (i.e. contribution to truth-conditions) they are to be analysed quite differently from genuine names. They are not what he calls "logically proper names", i.e. expressions that stand for an individual. The meaning of a logically proper name is the object it stands for, so that there cannot be a genuine proper name that does not denote any object (cf. Russell 1918/2010). But a denoting phrase is meaningful even if it does not denote anything. There is a syntactic and a semantic thesis here. The semantic thesis is that a denoting phrase is meaningful even if it does not denote anything, a possibility that Russell denies to genuine proper names. The syntactic thesis (the one that concerns us at this point) is that a denoting phrase belongs to the syntactic category N (is a name). This suggests that we should treat Russellian DDs as expressions of syntactic type N. If the definite article forms a name by combining with a noun, then we should then take 'the' to have the syntactic type N/CN.

Russell's concept of a propositional function helps him makes this point. A propositional function is a predicate, such as 'is happy'. This unary predicate combines with a name to form a sentential expression. However, there is a further option: that the predicate combine with a denoting phrase such as 'everything', or 'some student', or 'the king of France', to form a sentence. These expressions stand in positions in which

[5] Here by 'form' Russell must mean superficial, or *grammatical* form, as he did not yet mention logical form in the text.

genuine proper names appear in the phrase, but are to be analysed differently.[6] The contrast that Russell draws between denoting phrases and genuine proper names is then one that shows at the semantic level, not at the grammatical level. At the grammatical level they are both names.

I want to tentatively suggest that we can find in Russell yet another reason to opt in favour treating DDs as names, and that is the use that he makes of the inverted iota symbol, which Whitehead and Russell introduce it in *Principia Mathematica* (1910: 31). In a standard semantic for first order logic, the inverted iota symbol combines with an atomic formula Fx, where x is a free variable, to form the symbol (ιx)(Fx). This expression then combines with, for instance, a unary predicate symbol G to form the sentence G(ιx)(Fx). The expression (ιx)(Fx) occupies the position of a name – to which a predicate is applied – and is to be read as "the x which satisfied Fx". G(ιx)(Fx) has the form of a predicate applied to an argument, but in fact it is equivalent to (1). Although this is a representation of the "logical form" of sentences containing them, and *not* of their "grammatical form", Russell's intention might have been to show how what looks like a name in natural language may actually be a quantifier phrase. This might be the reason why Russell introduced his inverted iota symbol.[7] It fits in well with Russell's doctrine that DDs are not proper names, and do not stand for individuals, although they look like names.

An alternative to treating DDs as names is to be found in Neale's (1990; 1994) presentation of the Russellian theory. Neale (1994: 587) takes the LF of 'Every man snores', after QR-in the QNP 'every man', to be:

$[_S\ [_{NP}$ every man$]_1\ [_S\ t_1\ [_{VP}$ snores$]]]$

He argues that the above LF can then be mapped in a straightforward way to a sentence of a language (which functions as our metalanguage for expressing the semantic value)

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[6] One of Russell's main points concerning DDs is that they do not stand for individuals, i.e. are not of type <e>. Believing they do leads us to absurd metaphysical consequences: "It is argued, e.g. by Meinong, that we can speak about 'the golden mountain', 'the round square', and so on; we can make true propositions of which these are the subjects; hence they must have some kind of logical being, since otherwise the propositions in which they occur would be meaningless. In such theories, it seems to me, there is a failure of that feeling for reality which ought to be preserved even in the most abstract studies." (Russell 1919: 209)

[7] This is what one might naturally say in reply to Kaplan's (1970: 281) observation that it is not clear why Russell introduces the inverted lambda notation to begin with: "such a notation, rather than providing a useful and succinct means of expression for investigating logical relations, would tend to obscure the logical form of the sentence and obfuscate the issues in question. This, of course, is exactly what definite descriptions of English are said (by Russell), to do but still he introduces them into *Principia Mathematica*."

of FOL extended to include generalized quantifiers:

$[every_3 \text{ man } x_3] (\text{snores } x_3)$

The same should be done for DDs, Neale (1990: 45) argues. That is, the LF of ‘The man snores’ is:

$[_S [_{NP} \text{the man}]_1 [_S t_1 [_{VP} \text{snores}]]]$

The interpretation of this LF is obtained if we take ‘the’ to be a generalized quantifier. The above LF is true iff

$[the_3 \text{ man } x_3] (\text{snores } x_3)$, where *the* is a generalized quantifier.

I come back and add further details in the next section about Neale’s proposal to recast Russell’s theory within the theory of generalized quantifiers. But now I am only interested in the syntactic aspect of it. According to Neale, QNPs such as ‘every man’, ‘the man’ etc. adjoin to a sentential expression, and so are of type S/S. Variable binding is taken care of by taking all QNPs to be binders.[8] The definite article combines with a CN, such as ‘man’ to form a QNP such as ‘the man’, of type S/S. The natural option then is to take ‘the’ (and the other binary quantifiers) to have type (S/S)/CN. This is different from the hypotheses about the syntactic type of DDs we have discussed above. However, notice that the difference results from the particular treatment of binding that Neale opts for. Variable binding (such as binding of the trace t_1 in the above LF) is realised in Neale’s framework by QNPs, and not by independent aphonic syntactic elements, as in Heim and Krazer (1998). The framework introduced in chapter 1 takes the latter option. So, on the present framework, the LF of ‘The man snores’ (after QR-ing the DD) is:

$[_S [_N \text{the man}] [\lambda_1 [_S [_N t_1] [_V \text{snores}]]]]$

If this LF is to be syntactically correct, given that the type of the variable binder λ is (S/N)/S, the DD must have the syntactic type N or (S/(S/N)). These are indeed the options we considered so far.

The advantage that Heim and Krazer’s treatment of binding offers, but which Neale’s treatment does not, is that it allows separating quantification from variable binding. On the former treatment λ binders are introduced whenever a QNP is QR’ed, but, on the present view, this is only required in special circumstances, and therefore, quantification does not always require binding. However, the essential benefits of treating natural language quantification by appealing to Generalized Quantifier Theory

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[8] May (1987) also treats QNPs as sentential operators, as well as variable binders.

is independent of the treatment of binding (as discussed in chapter 1), and so our favourite treatment of binding does not affect it.

To sum up, I have discussed above the question of the syntactic type DDs should be assigned on the Russellian theory. I have opted for treating DDs as names, arguing that this is in the spirit of Russell's argumentation. However, the decision over what syntactic type to assign to DDs should not influence in any significant way the following development of the argumentation. This must be so in as much semantic theory must be kept relatively separated from syntactic theory. The Russellian and the Fregean, or any other alternative theory considered in what follows, do not disagree on syntactic facts about DDs, but on semantic ones. Therefore, although the question of the syntactic type of the definite article should be carefully considered, no syntactic decision that we make at this point should *a priori* favour one semantic theory of the ones discussed over another.

§2.4. The semantic value of DDs on the Russellian theory

Before addressing question (ii) on our list, concerning the type of semantic value of DDs, we should first address a question that is logically prior to this one, i.e. whether on the Russellian account DDs *have* a semantic value at all. This is relevant to ask in view of what Russell calls "the principle of the theory of denoting": "that denoting phrases never have any meaning in themselves, but that every proposition in whose verbal expression they occur has a meaning." (Russell 1905: 480).[9] If DDs are denoting phrases, and denoting phrases do not have "any meaning in themselves" then we should not be tempted to assign a semantic value to DDs on the Russellian view.

The "principle of the theory of denoting" is Russell's solution to a puzzle he discusses in 'On Denoting'. It is not the place here to enter into details, but briefly, the problem is how to explain the puzzling fact that DDs such as 'the king of France', which are *grammatically* names, still have a meaning although they do not name anything. According to Russell (1905: 482f), the proposals available at that moment (such as Frege's or Meinong's) took DDs to be *semantically* genuine names (in the sense of the semantic claim that their meaning is the object named), but ran into problems that he thinks could be avoided. Armed with his distinction between

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[9] See also: Russell (1919: 211) and Whitehead and Russell (1910: 69).

grammatical and logical form, Russell's solution is to say that DDs, and denoting phrases in general, belong to the grammatical category of names, but semantically they are not genuine names (i.e. logically proper names). This eliminates the worry concerning the meaning of sentences containing non-denoting DDs, as these expressions are not semantically names (their meaning is not the individual denoted).

But why does Russell say that a denoting phrase, including DDs, do not have a "meaning in themselves"? For Russell the denotation of predicates such as 'is red', 'is shinning' etc is a *universal* (that is, a property or relation). These are expressions a denoting phrase can combine with to form a complete sentence. So why not say that the meaning (i.e. semantic value) of a denoting phrase is a function from a property to a truth-value? For instance, the "logical form" of 'every man' could be seen as denoting:

$[every_3 \text{ man } x_3] (\_\ x_3)$

Here, the '_' slot is to be interpreted as an argument position, which is to be filled by a property. The obvious reason is that this is not a well-formed formula. Russell's claim that DDs and other denoting phrases do not have a meaning in isolation should be understood on the background of Russell's overall approach to natural language, and in particular, the fact that Russell uses a language of FOL as a metalanguage for giving the semantics of natural language expressions. In the standard semantics for FOL quantifiers are not assigned a semantic value directly, but instead it is sentential expressions in which these quantifiers occur that are assigned a semantic value. The interpretation function assigns truth-conditions to all sentences of the form $\exists x(\Phi x)$, and $\forall x(\Phi x)$. In this respect, quantifier expressions are different from the names of FOL, in that the latter are assigned a semantic value "in isolation", and not by way of assigning a semantic value to whole sentences in which they occur. Given Russell's choice of FOL as a metalanguage in which to express the truth-conditions of sentences containing DDs, the claim that DDs "do not have meaning is isolation" follows immediately from his view that DDs are to be analysed at the level of "logical form" as quantifier phrases, as this is how quantifier phrases are interpreted in FOL. This idea is maintained is Neale's presentation of the theory that I have discussed above.

However, FOL is not essential to Russell's theory of DDs. Instead, the essential aspect of it is that the truth-conditions of sentences of the form 'The F is G' are the ones outlined above. I shall regard Russell's claim that DDs do not have meaning in isolation as originating in the framework within which he was describing the meanings of DDs, and thus as not being an essential part of his theory of DDs. We can recast the

Russellian theory of DDs in the present framework, in which all expressions are assigned a semantic value, and still not depart significantly from Russell's intentions. This is what I am going to do below.

Going back to question (ii), we need to inquire for the semantic type of DDs on a Russellian treatment. As argued above, on a Russellian theory of DDs they are syntactically names, and semantically quantifier expressions. The LF of 'The man snores' is:

$[_S [_N \text{the man}] [_V \text{snores}]]$

According to Neale (1990, 1994), this LF is true iff [*the* man] (snores), where *the* is a generalized quantifier.[10] In turn, the semantic value of the binary quantifier *the* is captured by the following clause:

[*the* x: Fx](Gx) is true in *M*, relative to an assignment *a*, iff there is exactly one object o $\in D$ in *M* such that Fx is true *M*, relative to an assignment *a** that assigns o to x and otherwise is just like *a*, and Gx is true in M relative to the same assignment *a**.

Using the abbreviation introduced in the previous section, this can be written as follows:

[*the* x: Fx](Gx) is true iff $|F| = |F \cap G| = 1$, or:

[*the* x: Fx](Gx) is true iff $|F| = 1$ and $|F - G| = 0$ (Neale's formulation)

As Neale (1990: 44) points out, the Russellian hypothesis about the truth-conditions of sentences of the form 'the F is G' can also be expressed in the theory of generalized quantifier as the claim that (where the quantifiers *some* and *every* have been defined in chapter 1):

[*the* x: Fx](Gx) ≡ [*some* x: Fx] ([*every* y: Fy](y=x∧Gx))

So, Neale presents the Russellian theory of DD as the hypothesis that the determiner 'the' is a binary quantifier the semantic value of which is given by the above clause. Formulating Russell's theory in a framework of generalized quantifiers results in

> an explanation of where the Theory of Descriptions fits into a more general theory of natural language quantification, a theory that treats determiners like 'every', 'some', 'all', 'most', 'a', 'the', 'which', and so on, as members of a unified syntactical and semantical category. (Neale 1990: 46)

[10] This is not exactly Neale's proposal presented in the previous section. Neale takes DDs to be variable binders, but I have argued against this option. However, this is in the spirit of Neale's proposal, in as much as it treats DDs as QNPs, and it gives the semantics of QNPs by appealing to Generalized Quantifier Theory.

Russell’s original formulation, Neale thinks, “truly obliterates the relationship between semantical structure and surface syntax” (1990: 44).

Neale’s formulation of the Russellian theory is indeed more perspicuous than Russell’s original formulation. One virtue of treating the definite article as a binary generalized quantifier is that it offers a unified account of quantifiers in natural language. The implementation of GQT in the present framework has yet further important advantages (discussed in section §1.10). If, following Neale’s proposal, we treat DDs as generalized quantifiers, then we should assign to the definite article the same type of semantic value we have assigned to other binary generalized quantifiers, such as ‘every’, ‘no’, and so on. This is <<e,t>,<<e,t>,t>. Given that the semantic type of CNs is <e,t>, that of DDs will then be <<e,t>,t>.

Question (iii) concerns the issue of whether DDs are variable binders or not. The simple answer is straightforward: in the present framework variable binding and quantification are treated separately, as already explained in chapter 1, so no DD itself is a variable binder. Are we departing from Russell’s position in taking this view about variable binding? What we should say is similar to what we said in relation to the issue of DDs having no “meaning in isolation”: I take it that it is not an essential part of Russell’s proposal that DDs are always, in all occurrences, binding operators. Instead, this is a consequence of Russell’s use of FOL to express the “logical form” of sentences containing DDs, as quantification is essentially related to variable binding in FOL. In the present framework QR is not mandatory, and therefore DDs do not always introduce a variable binder.

Nevertheless, the option of introducing a variable binder must be available for DDs, as for any DP. This is required not only in order to solve the mismatch problem in the case of DDs in argument position of transitive verbs, but also to generate the syntactic ambiguities (whether correctly or not) that Russell (1905: 490) argues his theory predicts for sentences such as 5:

5. The present King of France is not bald.

Russell says DDs can have here either a *primary* or a *secondary* occurrence in 5, resulting in two different readings of the sentence. According to Russell (1905: 490), these readings are: *there is a unique king of France and it is not bald*, and respectively, *it is not the case that there is a unique king of France, and he is bald*. If we QR the DD in 5 and adjoin it to different S nodes, we obtain two distinct LFs, as follows:

5.1. $[_S [_N [_{Det}\text{ the}] [_{CN}\text{ king of France}]] [\lambda_1 [_S\text{ not } [_S [_N t_1] [_{VP}\text{ is } [_A\text{ bald}]]]]]]$

5.2. $[_S$ not $[_S$ $[_N$ $[_{Det}$ the] $[_{CN}$ king of France]] $[\lambda_1$ $[_S$ $[_{NP}$ $t_1]$ $[_{VP}$ is $[_A$ bald]]]]]]

This is a promising result, if we are looking to get two distinct readings for sentence 5. (It is, of course, a different question whether sentence 5 is indeed ambiguous, as Russell claims to be.) We will see later on that the Russellian theory combined with the mechanism of QR-ing and variable binding allows us not only to predict that the PF in 5 corresponds to two different LFs, but also that the truth-conditions of 5.1 correspond to the former of the two (alleged) readings mentioned, while the truth-conditions of 5.2 correspond to the latter (alleged) reading. So, I take DDs on the Russellian view to be subject to QR, as any DP is, and to introduce variable binders as a result of this.

Finally, consider question (iv). When no individual satisfies uniquely the description, this is sometimes called an *improper*: an improper description is such that no object fulfils it (i.e. it is *non-denoting* or *empty*) or more than one object does (i.e. it is *incomplete*). Russell is explicit about taking sentences containing improper DDs to be *false*, and not truth-valueless.[11] This follows from the truth-conditions that he assigns to sentences of the form 'The F is G': any sentence of this form is true iff (1) is true. In particular, if a DD is empty, the falsity of 'The F is G' is guaranteed by its existential import; when more than one individual satisfy the predicate 'is F', it is guaranteed by the uniqueness condition.

We are now in the position to formulate the Russellian theory of DDs. As argued above, 'the F' has the syntactic type N, and the definite determiner 'the' as having type N/CN. The semantic value of the definite article has type <<e,t>,<<e,t>,t>: it takes as argument a property, i.e. a function of type <e,t>, and it returns a function of type <<e,t>,t>, which is a function from a property to a truth-value. It can be represented as follows (the convention being that 1 and 0 stand for *true*, and respectively, *false*; 'f' and 'g' are variables of type <e,t>, so they return a truth-value for each element in D_e):

$||\text{the}||^{a,w} = \lambda f_{<e,\ t>}.[\lambda g_{<e,\ t>}.1$ iff there is a unique $x \in D_e$ such that $f(x)=1$, and $g(x)=1]$

We might formulate this by using the symbolism of FOL in the metalanguage:

$||\text{the}||^{a,w} = \lambda f_{<e,\ t>}.[\lambda g_{<e,\ t>}.(1 \text{ iff } \exists x(f(x)=1 \wedge \forall y(f(y)=1 \rightarrow y=x) \wedge g(x)=1)]$

Notice that the determiner operates on the *extensions* of the predicates it combines with, as it is the case with the other quantifiers introduced in the previous section. Therefore,

[11] For instance Russell (1957: 388-389) writes: "For my part, I find it more convenient to define the word "false" so that every significant sentence is either true or false."

its extension is not dependent on the possible world considered (although the extension of the sentences in which it occurs is). It is also not assignment dependent. Nevertheless, I maintain the superscripts a and w for reasons of uniformity.

In order to see the predictions this theory makes for a simple sentence containing a DD in subject position, consider sentence 6:

6. The glass is empty.

Its LF is the following:

$[_S\ [_N\ [_{Det}\ \text{the}]\ [_{CN}\ \text{glass}]]\ [_{VP}\ \text{is}\ [_A\ \text{empty}]]]$

I use the stipulation in Heim and Kratzer (1998) concerning the meaning of ‘is’ as being a “vacuous” semantic value of type <<e,t>,<e,t>>:

$||\text{is}||^{a,w} = \lambda f_{<e,\ t>}.f$

The semantic value of a CN is of type <e,t>, so for ‘glass’ it is the characteristic function of the class of all glasses in w:

$||\text{glass}||^{a,w} = \lambda x_{<e>}.\ 1 \text{ iff x is a glass in w}$

In that case, the extensions of ‘the glass’ on the Russellian theory is:

$||\ [_N\ [_{Det}\ \text{the}]\ [_{CN}\ \text{glass}]]\ ||^{a,w} =$

$= ||\text{the}||^{a,w}\ (||\text{glass}||^{a,w}) =$

$= \lambda f_{<e,t>}.[\lambda g_{<e,\ t>}.1 \text{ iff there is a unique } x \in D_e \text{ such that } f(x) = 1, \text{ and } g(x)=1]$ $(\lambda z_{<e>}.1 \text{ iff x is a glass in w}) =$

$= \lambda g_{<e,t>}.1 \text{ iff there is a unique } x \in D_e \text{ such that x is a glass in w, and } g(x)=1.$

Finally, we obtain the truth-conditions for 6:

$||[_S\ [_N\ [_{Det}\ \text{the}]\ [_{CN}\ \text{glass}]]\ [_{VP}\ \text{is}\ [_A\ \text{empty}]]]||^{a,w} =$

$= [\ ||\text{the}||^{a,w}(||\text{glass}||^{a,w})\ ]\ (||\text{is}||^{a,w}(||\text{empty}||^{a,w})) =$

$= [\ ||\text{the}||^{a,w}(||\text{glass}||^{a,w})\ ]\ ([\lambda f_{<e,t>}.f](\lambda x_{<e>}.1 \text{ iff x is empty in w})) =$

$= [\ ||\text{the}||^{a,w}(||\text{glass}||^{a,w})\ ]\ (\lambda x_{<e>}.\ 1 \text{ iff x is empty in w}) =$

$= [\lambda g_{<e,t>}.\ 1 \text{ iff there is a unique } x \in D_e \text{ such that } f(x)=1, \text{ and x is a glass in w}]$ $(\lambda x_{<e>}.\ 1 \text{ iff x is empty in w}) =$

$= 1 \text{ iff there is a unique } x \in D_e \text{ such that x is empty in w, and x is a glass in w}$

The sentence ‘The glass is empty’, relative to a world w, is true iff *there is a unique glass in w that is empty in w*.

§2.5. The Fregean theory of DDs

I turn now to the Fregean theory of DDs, and again go through the four questions designed to help us formulate the theory in the current framework.

Frege (1892: 36) writes that a DD is a "compound proper name constructed from the expression for a concept with the help of the singular definite article". Elsewhere, Frege (1891: 140) writes that 'the capital of the German Empire' "obviously takes the place of a proper name and stands for an object". These remarks answer our question concerning (i) the syntactic type of DDs on the Fregean view: we should put them in the category of type N. The obvious option is then to treat the singular definite article as of type N/CN.

Concerning question (ii), about the semantic type of DDs, the fragments quoted above are also relevant. For Frege, a DD is "a proper name, whose referent is thus a definite object (this word taken in the widest range), but no concept and no relation" (Frege 1892: 27). If the referent of a DD is an object, then we should assign a DD a semantic value of type <e>. That is, DDs belong to the class of expressions sometimes called *singular terms*, or *singular referential expressions*.

Frege's theoretical framework for doing semantics introduces a further complication that is not present with Russell, namely that it is *bidimentional*. In Frege (1892) we read that, when everything goes well, linguistic expressions have a both a *sense* and a *referent*. The sense of a "proper name" (i.e. singular term) "is grasped by everybody who is sufficiently familiar with the language". However, comprehensive knowledge of the referent is unattainable (Frege 1892: 27). This suggests that the linguistic meaning of expressions, that which speakers cognize, is the sense, and not the referent. This conclusion is also emphasised by Frege's observation that,

> It may perhaps be granted that every grammatically well-formed expression representing a proper name always has a sense. But this is not to say that to the sense there also corresponds a referent… The expression "the least rapidly convergent series" has a sense; but it is known to have no referent… (Frege 1892: 28)

If every meaningful expression always has a sense, but not always a referent, then a meaningful expression is one that "expresses a sense" (Frege 1892: 31), and not one that happens to have a referent. So isn't the *sense* of DDs a better candidate for their semantic value than the referent on the Fregean account of DDs? If it is, then the expression cannot have a semantic value of type <e>, that is, an individual.

The answer is straightforward: on the present framework expressions have *two* kinds of semantic values. Apart from an *extensional* semantic value, they also have an *intensional* semantic value. If the extensional semantic value of an expression Φ, represented as $||\Phi||^{a,w}$, is of type <e>, then the intension is a function from possible to elements of type <e>, of the form: $\lambda w.||\Phi||^{a,w}$. The extension is the value of that function for a given possible world. So our framework introduces a distinction along the lines of Frege's distinction between sense and reference (although different from it in various respects). Frege's characterization of what it is to grasp the sense of an expression roughly corresponds to grasping the intension (or content) of the expression, and not its extension. Thus, the notion of grasping the *sense* of, or understanding, (an utterance of) a sentence is closer to that of capturing its truth-*conditions* (its intention), and not its truth-*value* (its extension at a possible world). Similarly, grasping the sense of an utterance of a DD corresponds to knowing its intension, a function of type <s,e>. However, in an extensional context it is not the intention, but the extension relative to the world of the context, that is relevant for predicting the truth-value of an utterance of a sentence, which is then tested against the competent speakers' truth-value judgements.

If the extension of DDs is an element of type <e>, we should assign the definite article a semantic type <<e,t>,e>, given that 'the' takes as argument a CN, the semantic value of which is of type <e,t>, and returns an object. Syntactically, the Fregean and the Russellian theory are alike – they are both expressions of type N – but semantically they are quite different: while for Russell DDs are to be analysed as quantifier expressions, for Frege DDs are semantically singular terms, in the same way in which most other names are analysed (including proper names, referential pronouns, etc.). This explains why Russell insists on the fact that the grammatical form of DDs can easily mislead the theorist into subscribing to an incorrect semantic analysis of DDs, while Frege is less worried about this potential danger.

There is no indication – as far as I know – that Frege takes DDs to be binding operators. However, the framework that I introduced allows for treating names, as well as any other NPs, as being subject to QR, which introduces a binding operator. The syntactic type of the binding operator is S/N, so it can combine with expressions of type N. Therefore, the framework introduced allows for a version of the Fregean theory on which DDs introduce binding operators.

Finally, question (iv) addresses the issue whether improper DDs have a defined semantic value on the Fregean view. Again, we must distinguish intensions from extensions. As we have seen, Frege writes that there are DDs that do not have a referent, but only a sense. One such DD is "the least rapidly convergent series", which does not have a referent as a matter of necessity. But the same is true for DDs that might have had a referent, but they happen not to have one, such as 'the king of France'. An apparent complication to this view is suggested by Frege's observation that a DD

> must actually always be assured of reference, by means of a special stipulation, e.g. by the convention that 0 shall count as its reference, when the concept applies to no object or to more than one. (1892: 41 n.9)

However, this suggestion seems rather odd: taking 0 to be the reference of improper natural language DDs implies that, for instance, an utterance of 'The satellite of the Moon is a number' is true iff 0 is a number, and so it would come out true! But a more careful reading of Frege reveals that his intention expressed in the passage quoted is not to suggest that the improper DDs *in natural language* refer to 0. Instead, he is making a positive proposal for how to build a language for mathematical reasoning. The purpose of this stipulation is to avoid having in such a language sentences that have a sense but no referent:

> A logically complete language (*Begriffsschrift*) should satisfy the conditions, that every expression grammatically well constructed as a proper name out of signs already introduced shall in fact designate an object, and that no new sign shall be introduced as a proper name without having a referent assured. (Frege 1892: 41)[12]

Concerning natural languages, Frege writes that they "have the fault of containing expressions which fail to designate an object (although their grammatical form seems to qualify them for that purpose)" (Frege 1892: 40). These failures of reference arise "from an incompleteness of language" (Frege 1892: 41). He is speaking here both of *empty* DDs (that no object fulfils) and of *incomplete* DDs (that are true of more than one object). There are the cases in which the predicate from which a "complex proper name" is built does not apply "to one and only one single object". In such cases a reference cannot be assigned to the complex proper name.

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[12] Apparently, Russell takes Frege's proposal to be an actual intent of analysing DDs in natural language, although, he thinks, an unsatisfactory one: "But this [Frege's] procedure, though it may not lead to actual logical error, is plainly artificial, and does not give an exact analysis of the matter." (Russell 1905: 484)

What is the effect of this on the extension of the sentence in which the DD occurs? Frege (1892: 33) argues that the reference of a sentence is a truth-value, but admits the possibility that there be sentences that lack a referent:

> sentences which contain proper names without referents will be of this kind. The sentence "Odysseus was set ashore at Ithaca while sound asleep" obviously has a sense. But since it is doubtful whether the name "Odysseus," occurring therein, has a referent, it is also doubtful whether the whole sentence has one. (Frege 1892: 32)

The same is true of sentences containing improper DDs: the compositional calculation of the reference of a simple sentence containing an improper DD does not have a truth-value.

This latter aspect of the semantics of DDs must be predicted by our implementation in the present framework of Frege's theory of descriptions. It marks an important difference with the Russellian view of DDs: the two theories diverge on the issue of whether DDs, and the complex expressions in which they occur, have a defined extensions when there is no F or there is more than one F. In Frege's words, DDs introduce a *presupposition*: "If anything is asserted there is always an obvious presupposition that the simple or compound proper names used have referents." (Frege 1892: 40)

Other authors have defended similar claims, including, famously, Strawson, which is why the theory is sometimes known as 'Frege-Strawson'. He writes that,

> when we utter the sentence ['The king of France is wise'] without in fact mentioning anybody by the use of the phrase, "The king of France", the sentence doesn't cease to be significant: we simply *fail* to say anything true or false because we simply fail to mention anybody by this particular use of that perfectly significant phrase. It is, if you like, a spurious use of the sentence, and a spurious use of the expression (Strawson 1950: 331)

In such cases, he writes, "the question of whether the sentence was true or false simply doesn't arise". Frege's and Strawson's theories are similar in that, in both cases, if no unique individual satisfied the predicate 'is an F', then the DD 'the F' does not have a referent.[13] Moreover, concerning sentences of the kind 'The F is G' they coincide in admitting that a third option is possible, apart from truth and falsity. If the DD does not

[13] One difference is terminological: Strawson talks of *statements*, and not of propositions, or thoughts expressed. But, as Neale (1990: 55 n.23) observes, Strawson takes talk of the *statement* made by uttering a sentence as equivalent to talk of *the proposition expressed* by such utterances (cf. Strawson 1950: 326).

have a referent, the sentence is neither true nor false. However, Frege's and Strawson's theories are not equivalent, as Strawson is concerned with an aspect of language that plays no important role in Frege's theory, namely, the contextual dependency of the contextual dependency of the referent. This topic will be discussed in more detail in the next chapter, but I will briefly explain Strawson's idea here.

The important distinction that Strawson (1950) introduces, and which, arguably, was not clearly made before, concerns the difference between the properties of expression-types and those of expression-tokens. "Meaning", he writes, "(in at least one important sense) is a function of the sentence or expression; mentioning and referring and truth or falsity, are functions of the use of the sentence or expression." And he add that, "To give the meaning of an expression is to give *general directions* for its use" (Strawson 1950: 327) That is, meaning is a property of expression-types, and not of expression-tokens. Having a referent, and having a truth-value, is a property of an expression-token, and sentence-token, respectively. It is only on an occasion of use that one can consider the question of whether the expression has a referent, or the sentence a truth-value. Strawson uses this distinction to show that the problem that Russell addresses – how to explain the fact that DDs such as 'the king of France' are meaningful, although they have no reference – is a pseudo-problem. An expression can be meaningful, even if on an occasion of use it does not have a referent. Whether a DD has a referent or not depends on the features of the context of use:

> When we begin a sentence with "the such-and-such" the use of "the" shows, but does not state, that we are, or intend to be, referring to one particular individual of the Species "such-and-such". *Which* particular individual is a matter to be determined from context, time, place and any other features of the situation of utterance. (Strawson 1950: 331-2)

The dual distinction between, on the one hand, the linguistic meaning, as a property of expression-types, and on the other, reference as a property of expression-tokens seems to parallel Frege's distinction between sense and reference. However, Frege's sense and Strawson's linguistic meaning are not to be equated. In the framework introduced here we see that they correspond to two different notions: while Frege's sense is closer to the notion of an intensional semantic value (the truth-conditions, in the case of a sentence), Strawson's notion of linguistic meaning is closer to Kaplan's (1989) notion of *character*: a function from contexts of use to intensions. It is questionable that we find in Strawson (1950) a notion equivalent to a Fregean sense, or an intension. From the fragments quoted above, it becomes clear that Strawson is concerned with the contribution of the context of utterance in determining the extension of an expression. But intensions, as functions from possible worlds to extensions, make no room for contextual-dependency. I come back to a discussion of these issues in the next chapter.

How should we implement in our framework the idea that proper DDs have a semantic value of type <e>, but improper DDs do not have a semantic value? DDs are complex expressions formed by combining a CN of type <e,t> with the definite article, of type <<e,t>,e>. The CN has a semantic value independently of whether the DD is proper or not, so it is the definite article that may help us model Frege's presupposition. In particular, the meaning of 'the' is a function that takes a function of type <e,t> as argument, and returns an element of type <e> as value. We may design this function in such a way that it *does not* return any value at all for cases in which the condition is not fulfilled. On the other hand, if the presupposition is satisfied then 'the F' has as semantic value the unique object in the domain that satisfies the presupposition. That is, we may take the semantic value of DDs to be a *partial function* (as in Heim and Kratzer (1997: 80)). A partial function of type <<e,t>,e> is a function that is not defined on all elements in $D_{<e,t>}$, but only for a subset of $D_{<e,t>}$. That is, the domain of a partial function of type <<e,t>,e> is a subset of $D_{<e,t>}$.[14] For elements that are not in that subset the function is not defined, so it returns no value. The semantic value of the definite article can then be modelled as partial function in the language of λ calculus as follows:

$||\text{the}||^{a,w} = \lambda f \in D_{<e,t>}$ and there is exactly one $x_{<e>}$ such that $f(x) = 1$.the unique $y_{<e>}$ such that $f(y) = 1$

This might be expressed as well as follows:

$||\text{the}||^{a,w} = \lambda f \in D_{<e,t>} \wedge \exists x(f(x)=1 \wedge \forall y(f(y)=1 \rightarrow y=x))$.the unique $y_{<e>}$ such that $f(y) = 1$

The semantic value of the definite article is a function that takes as argument only those functions of type <e,t> that fulfil the condition that there is exactly one $x \in D_e$ such that the function takes x to 1, and returns that individual $x \in D_e$ for which the condition is

[14] When defining the partial function I take its *domain* to be a subset of $D_{<e,t>}$, and not the entire $D_{<e,t>}$. Alternatively, one can take the domain of the function to be $D_{<e,t>}$, and describe it as a function that is not defined for some elements in its domain. The difference in using 'domain' one way or another is only terminological. I chose the former option because it is in line with the terminology of λ-calculus introduced above, where Φ in "$\lambda\alpha{:}\Phi.\gamma$" is the *domain condition*, i.e. the condition that an element must fulfil in order to belong to the domain the function. Yet another option, which I ignore here, is to define the function on the entire $D_{<e,t>}$ such that when the condition is not fulfilled it returns a third truth-value, different from 1 and 0.

fulfilled.

Assuming the same semantic value for ‘is’ and ‘glass’ as above, the semantic value of ‘the glass’ is the following:

$|| [_N \text{ the } [_{CN} \text{ glass}]] ||^{a,w}$

$= ||\text{the}||^{a,w} (||\text{glass}||^{a,w}) =$

$= [\lambda f \in D_{<e,t>}$ and there is exactly one $x_{<e>}$ such that f(x) = 1.the unique $y_{<e>}$ such that f(y) = 1] ($\lambda x_{<e>}$. 1 iff x is a glass in w) =

= there is exactly one $x_{<e>}$ such that x is a glass in w. the unique $x_{<e>}$ such that x is a glass in w

If the condition for the DD to have a semantic value is not fulfilled, the semantic value is undefined. In that case the compositional calculation of the semantic value of the sentence as functional application breaks down, because the function that takes the semantic value of the DD as argument is not provided with an argument. In that case we say that the sentence is *uninterpretable*. To see how this works, consider again the sentence ‘The glass is empty’. The LF of which will now be represented as follows:

$[_S [_{NP} \text{ The } [_{CN} \text{ glass}]][_{VP} \text{ is } [_A \text{ empty}]]]$

The syntax is the same as on the Russellian theory: the DD ‘the glass’ is of type N, while the predicate ‘is empty’ is of type (S/N), and so this time the VP takes the DD as an argument. But semantic composition is different: on the Russellian view the semantic value of the DD has the function role and takes the predicate ‘is empty’ as an argument, while on the Fregean view it is the other way round. We obtain the following semantic value for the sentence:

$||[_S [_{NP} \text{ The } [_{CN} \text{ glass}]][_{VP} \text{ is } [_A \text{ empty}]]]||^{a,w}$

$= [||\text{is}||^{a,w}(||\text{empty}||^{a,w})] (||\text{The}||^{a,w}(||\text{glass}||^{a,w}))$

$= [[\lambda f_{<e,\, t>}.f](\lambda x_{<e>}$. 1 iff x is empty in w)] $(||\text{The}||^{a,w}(||\text{glass}||^{a,w}))$

$= [\lambda x_{<e>}$. 1 iff x is empty in w] $(||\text{The}||^{a,w}(||\text{glass}||^{a,w}))$

At this point there are two options: either there is exactly one $x_{<e>}$ such that x is a glass in w, and in that case the semantic value of the sentence is:

$= [\lambda x_{<e>}$. 1 iff x is empty in w] (there is exactly one $x_{<e>}$ such that x is a glass in w. the unique $x_{<e>}$ such that x is a glass in w)

= there is exactly one $x_{<e>}$ such that x is a glass in w.1 iff the unique $x_{<e>}$ such that x is a glass in w is empty in w,

If there is no unique glass in w, and in that case the semantic value of ‘The glass’ is undefined.

The DD is the argument of the verb above, but also in more complex sentences, such as ‘The F loves the G’. Their LF on the Fregean theory will be (assuming no QR of the DDs):

$[_S\ [_N \text{The } [_{CN} \text{girl}]][_{VP} \text{loves } [_N \text{the } [_{CN} \text{boy}]]]]$

The semantic type of a TV such as ‘loves’ is <e,<e,t>>, and the semantic type of the two DDs is <e>. So semantic composition goes through. We cannot say the same if we consider the Russellian theory, which takes the DD to have a semantic value of type <<e,t>,t>. Thus, we get a type mismatch when calculating the value of the VP. This requires QR-ing the second DD, the result being:

$[_S\ [_N \text{the } [_{CN} \text{boy}]]\ [\lambda_1\ [_S\ [_N \text{The } [_{CN} \text{girl}]][_{VP} \text{loves } [_N t_1]]]]]$

We do not get a type mismatch between the DD in subject position and the VP because the former has type <<e,t>,t> and the latter <e,t>, so functional application goes through. More complex sentences will be considered later on when considering different types of linguistic environments relevant to testing the hypotheses considered.

§2.6. Other theories of DDs

To sum up, I have presented the Russellian and Fregean theories considering different aspects: their syntactic type, the type of their semantic value, whether they are binding operators or not, and whether their semantic value is a partial function or nor. Given these four dimensions of analysis, it becomes clear that the two theories discussed above are only a small fragment of all the possible options, and even of the options that are available in the literature on the topic. It would take too long and it is probably unnecessary for me to introduce all the possible options, but I mention in what follows some of the preeminent options that will be considered later on. Alternatives will also be considered along the way, as possible improvements of the existent theories that might account better for the range of linguistic data considered at a certain point.

Concerning question (iv), there is the option of agreeing with the Fregean that DDs introduce a presupposition, but at the same time assign a semantic value of a different type. We may choose to assign to a DD a semantic value of type <e>, or agree with the Russellian in treating DDs as generalized quantifier NPs of type <<e,t>,t>. Almost all the options that will be considered in what follows take one of these two options.[15] Any of these options may be combined with taking a stand on whether DDs introduce a binding operator or not.

A further distinction that may be helpful in characterizing alternative theories, consider the fact that the Russellian truth-conditions for sentences of the form 'The F is G' can be expressed as a conjunction of three sentences as follows:

$$\exists x(f(x)=1 \wedge \forall y(f(y)=1 \rightarrow y=x) \wedge Gx) \equiv$$

$$\exists x(Fx) \wedge \forall x(Fx \rightarrow \forall y(Fy \rightarrow x=y)) \wedge \forall x(Fx \rightarrow Gx)$$

As already noted, the latter three conjuncts that the Russellian theory postulates are known as the *existential import* of DDs, the *uniqueness constraint*, and the *maximality condition*. In a sense, the Russellian and the Fregean theories are the extremes along a spectrum of possibilities: in the former case *both* existence and uniqueness are part of the semantic value of DDs, while introducing *no* presupposition; in the latter case existence and uniqueness are both presupposed, but not part of the semantic content. There are many options available in between. Alternatives may be conceived if we take only one of them to be presupposed and the other asserted, drop one or both of them altogether, or take both of them to be asserted as well as presupposed. Variations of the Russellian theory result from eliminating some of these conditions from the semantic content of DDs. For instance, Szabó (2000: 30) and Ludlow and Segal (2004: 421) propose to eliminate the uniqueness constraint from the content of sentences containing DDs. As a result, a sentence of the form 'The F is G' is true *iff at least one F is G*. In our framework, this quantificational theory of DDs could be formulated by assigning the following semantic value to the definite article:

$$||\text{the}||^{a,w} = \lambda f_{<e,\, t>}.[\lambda g_{<e,\, t>}.(1 \text{ iff there is an } x_{<e>} \text{ such that } f(x)=1 \text{ and } g(x)=1)]$$

While in both cases one of the main motivations for eliminating uniqueness constraint from the semantic content of DDs is to get a unified account of definite and indefinite descriptions, Szabó and Ludlow and Segal disagree on whether uniqueness features in any way in an account of DDs. Szabó (2000) follows Heim (1983) in taking uniqueness to be pragmatically generated, and relevant in an explanation of how we manage our mental files. Ludlow and Segal (2004: 424), on the other hand, give up uniqueness altogether and argue that the definite article carries a conventional implicature that the object under discussion is *given* in the conversational context.

A different theory of DDs is generated if we eliminate not only uniqueness, but

[15] One notable exception is Fara (2001), who takes DDs to be 1-place predicates, that is, to have the type <e,t>. This theory may be later considered also.

also the existential import of DDs from their semantic content, maintaining only the maximality condition as part of the semantic value of sentences of the form 'The F is G'. Such is the theory presented in Barwise and Cooper (1984: 169). According to the authors, DDs are generalized quantifiers, the semantic value of which they formulate using the theory of generalized quantifiers in the extensional version:

[the x: Fx](Gx) is true iff $\|F \setminus G\| = 0$,	if $\|F\| = 1$, and
is undefined,	otherwise.

That is, 'The F is G' has the following truth-conditions: if there is exactly one F, the sentence is true *if whatever is F is G*; otherwise, *it is undefined*. The same observation made about Neale's formulation of Russellian descriptions as generalized quantifiers applies here too: the semantic type of the definite article will be the same as for the Russellian theory, <<e,t>,<<e,t>, t>>, while its syntactic type could be either N/CN, or (S/(S/N))/CN. An important difference between the Russellian theory and the Barwise and Cooper proposal is the introduction of a presupposition – in Frege's sense – of existence of uniqueness. If the presupposition is not fulfilled the DDs does not have a semantic value. The meaning of 'the' can then be given as follows:

$||\text{the}||^{a,w} = \lambda f_{<e,t>}$ and $\exists x(f(x)=1 \wedge \forall y(f(y)=1 \rightarrow y=x)).[\lambda g_{<e,t>}.1$ iff $\forall x(f(x)=1 \rightarrow g(x)=1)]$

That is,

$||\text{the}||^{a,w} = \lambda f_{<e,t>}$ and there is a unique $x_{<e>}$ such that f(x)=1.[$\lambda g_{<e,t>}$.1 iff whatever x is such that f(x) =1 it is also such that g(x)=1]

This hypothesis about the semantic value of DDs will play an important part in the forthcoming discussion. It shares with the Fregean theory an important feature, that of treating DDs as partial functions that are defined only for those worlds where uniqueness and existence are fulfilled. But it also shares with the Russellian theory the fact that it is a quantificational theory, assigning a meaning of type <<e,t>,t> to DDs.

Chapter 3: Incomplete definite descriptions

§3.1. The phenomenon of incompleteness

One of the most intuitive of all the objections to the Russellian theory is due to Strawson (1950: 332-3). The Russellian theory fails, Strawson argued, because the uniqueness constraint is usually not fulfilled by utterances of sentences containing DDs, and so the theory makes obviously false predictions. Suppose that, upon arriving at the classroom where the class is supposed to take place, I realize that the door is locked. I utter with surprise sentence 1.

1. The door is locked.

On the Russellian theory of DDs, as it was introduced in the chapter 2, this utterance of 1 is true iff *there is a unique door in the actual world and it is locked*. Given that there is more than one door in the world the prediction of the theory is that my utterance is *false*. But this is wrong: there is a strong intuition that 1 is *true*. DDs that give rise to this problem are known as *incomplete DDs*, as opposed to *complete DDs*, such as 'the inventor of the pen', or 'the Spanish prime minister in 2014'. The above problem only affects Russell's theory as applied to incomplete DDs, and not when it is used to analyse complete DDs. For this reason it is known in the literature as the *incompleteness problem*.[1]

Although the incompleteness problem is usually discussed in the literature in relation to the Russellian theory, it is a problem for all the theories we introduced above. Consider the Fregean theory and the B&C theory. On both of them the semantic value of a DD is a partial function that is not defined for worlds relative to which there is no unique individual that satisfies the description. On both of them sentence 1 has a truth-value only in case there is a *unique door in the world of evaluation*. Given that there are many doors in the actual world, both theories predict that sentence 1 is *truth-valueless*, which is intuitively incorrect. By hypothesis the relevant door is locked, and so the sentence is intuitively judged as true. In conclusion, although the Russellian theory, the Fregean and the B&C theory make *different* predictions about to the truth-value of the

[1] Russell (1957: 385) replies to Strawson that he was only dealing with complete DDs such as 'the king of France in 1905'. These are both complete as well as context-independent, or, in Russell's words, "descriptive phrases from which egocentricity is wholly absent".

utterance of 1, they all make incorrect predictions. That is, all these theories have an incompleteness problem.

I focus in what follows on the Russellian account of DDs, and then come back to a discussion of the other theories. In discussing Strawson's objection to the Russellian theory based on the incompleteness problem, Neale (1990: 94-95) makes the following observation: if we treat DDs as the Russellian does, then the definite determiner is a quantifier; but, he notes, the incompleteness of DDs is an instance of a more general phenomenon that affects all quantifiers. Neale writes: "the problem of incompleteness has nothing to do with the use of definite descriptions *per se*; it is a quite general fact about the use of quantifiers in natural language." (1990: 95) Consider sentence 2 uttered at the end of a party.

2. Every bottle is empty.

And consider a simple theory of the quantifier 'every', according to which its semantic value is the following:

$$||\text{every}||^{w,a} = \lambda f_{<e,t>}.[\lambda g_{<e,t>}.1 \text{ iff every x such that f(x) =1 is such that g(x) =1}]$$

The semantic value we obtain for the utterance of 2 is that it is true iff *every bottle in the world is empty*. The utterance of 2 comes out false, as there are many bottles that are not empty. But this is incorrect; if, by hypothesis, every bottle *at that party* is empty, the utterance 2 is intuitively true. It is not false just because there is an empty bottle somewhere else in the world. It is false only if there is an empty bottle among those present at that party. So, the simple theory for the quantifier 'every' we introduced above makes false predictions. This example illustrates Neale's claim that the incompleteness problem affects quantifiers in general, and not only the Russellian theory of DDs.

The generalized version of the problem of incompleteness is known in the literature as that of Quantifier Domain Restriction (QDR, for short). When quantifiers are treated from the perspective of Generalized Quantifier Theory, they express relations between sets of individuals (or properties relative to possible worlds). The individuals in those sets belong to D_e. So we need to find a way to *restrict* the domain D_e to a contextually salient subdomain, such that, relative to *that* domain – e.g. the objects at the party, for the utterance of sentence 2 – the semantic theory predict intuitively correct truth-conditions.

If the incompleteness problem for DDs (at least when we consider the Russellian theory) is an instance of the more general problem of QDR, it is relevant to consider the best theory of QDR available in the literature when addressing the former problem. I will not discuss in what follows all the approaches to QDR available in order to justify my choice. Instead, I directly choose one popular approach, the one developed in Stanley and Szabó (2000a). Stanley and Szabó's proposal is both a syntactic and a semantic approach, in the sense that it postulates syntactic constituents at the level of the LF of natural language sentences containing quantifiers. Before entering into the details of the proposal, I briefly consider a couple of pragmatic approaches to QDR. Looking at the problems the pragmatic approaches face will be useful for pointing out certain advantages that the Stanley and Szabó proposal has.

§3.2. Pragmatic approaches to QDR

A distinction should be made between semantic and pragmatic accounts of QDR. What pragmatic accounts of QDR have in common is that the restriction of the domain of quantification is not the contribution of the semantic value of the quantifier or other expressions in the LF of the sentence. QDR is an effect on the interpretation of utterances of sentences that is not explained by postulating particular semantic values for the expressions in the sentence.

According to a family of pragmatic approaches – the neo-Gricean approaches – QDR is not part of the literal truth-conditions of the sentence. The literal truth-conditions of 2 predict that the sentence is *false* (as there are non-empty bottles in the world). But the utterance *seems true* because the communicated content is true (even though the semantic content is not). Let us look at one neo-Gricean approach in more detail.

Kent Bach (1994, 2000, 2004) is a proponent of a neo-Gricean theory of QDR. Introducing all the methodological and terminological aspects of his approach to QDR would require too much space, so I simply summarize here the main points. According to Bach, the literal truth-conditions of 2 are such that the sentence is true iff *every bottle in the world is empty*. The semantically determined truth-conditions of the sentence do not correspond to its *intuitive* truth-conditions. The *literal* proposition is false, but this is not the proposition *communicated*. The later is the output of a pragmatic mechanism that takes as input the semantic content. The result of this process is the proposition conveyed (or, at least which the speaker intends to convey), in particular, that every bottle *at the party* is empty. Bach calls the latter proposition an "impliciture", indicating that it is a variant of Grice's notion of implicature.[2]

In its fundamental tenets, Bach's approach to QDR is Gricean, along the lines of the Gricean approach to implicature.[3] Applied to DDs (Bach 2004: 220-223), the idea is that the literal truth-conditions of 1 (on the Russellian theory) are: 1 iff *there is a unique door in w and it is locked.* Given that this proposition lacks relevant specificity (Bach 2004: 223), and assuming that the speaker is rational and observes the Gricean maxims, the literal proposition is "completed" to the proposition intuitively conveyed, that the door *of this classroom* is locked.

One worry with approaches along these lines is methodological: as Stanley and Szabó point out, "The obvious disadvantage is that one has to abandon ordinary intuitions concerning the truth or falsity of most sentences containing quantifiers." (2000a: 240) Bach admits that this is a consequence of his theory, but denies that this *prima facie* implausible claim is problematic at all (e.g. Bach 2002).[4] I will not discuss his arguments here, because it would take us too far away from our purposes. However, I consider that this implication of Bach's theory – all things being equal – is undesirable. Of course, no semantic theory can (and should) respect *all* truth-value intuitions as concerning semantic content. But if truth-value intuitions are the main source of data for testing semantic hypotheses, then there must be very good reasons for rejecting a kind of truth-value judgements that competent speakers *systematically* make (as is the case with the judgment that the utterance of 1 is true). I doubt that Bach has compelling reasons to conclude that these truth-value judgements are *not* semantically relevant. His arguments are rather aimed to support the claim that they *need* not be.

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[2] As Bach writes, these are cases in which "the speaker is not being fully explicit. Rather, he intends the hearer to read something into the utterance, to regard it as if it contained certain conceptual material that is not in fact there. The result… is what I call *conversational impliciture*." (1994: 126) The difference between a conversational implicature and a conversational impliciture is the following: "In implicature one says and communicates one thing and thereby communicates something else in addition. Impliciture, however, is a matter of saying something but communicating something else instead, something closely related to what is said." (1994: 126)

[3] It is also Gricean in as much as Bach subscribes to Grice's claim that semantic content (or 'what is said') is "closely related to the conventional meaning of the words (the sentence) [the speaker] has uttered" (Grice 1989b: 25). This is what Bach (2002) calls the Syntactic Correlation Constraint.

[4] For instance, Bach (2002: 23) writes: "People's spontaneous judgments or 'intuitions' provide data for semantics, but it is an open question to what extent they reveal semantic facts and should therefore be explained rather than explained away. Since, as I am suggesting, they are often responsive to non-semantic information, to what is implicit in what is said but not part of it, they should be treated cautiously." Concerning the particular case of incomplete DDs, he writes: "intuitively, one has no sense that there is any false proposition in the air. But there is an explanation for this: as soon as one hears (or reads) ['the door' in sentence 1], because of its obvious incompleteness one… never actually computes the proposition expressed by the sentence in which it occurs." (Bach 2004: 222-223)

However, not all pragmatic theories have this undesirable consequence. Recanati's (1993, 2004) pragmatic approach to QDR does not reject the relevance to semantic theorizing of the competent speakers' judgments that the utterances of 1 and 2 are true in their respective contexts. As with Bach's approach, I will not go into a detailed presentation of Recanati's framework, but only mention one of his methodological principles. According to his Availability Principle, "What is said must be intuitively accessible to the conversational participants (unless something goes wrong and they do not count as 'normal interpreters')." (2004: 21) Recanati claims that normal interpreters are conscious of 'what is said' (i.e. "the truth-conditional content of the utterance" (2004: 4)), and rejects the claim that we are conscious only of 'what is communicated' (which may include, apart from the literal truth-conditions of the utterance, also what is implicated, as the neo-Gricean approach proposes). This imposes a constraint on any theory of what is said: such a theory fails if it assigns to an utterance of a sentence truth-conditions that do not pass the test of normal competent speakers' pre-theoretical truth-value judgments. But the truth-conditions of an utterance of a sentence, in Recanati's framework, are not simply the result of the compositional computation of the *literal meaning* of the constituents of the sentence (i.e. "the meaning that is linguistically encoded, or that which results from saturating the linguistically encoded meaning" (2004: 27)). In other words, according to Recanati, the truth-conditions of an utterance of a sentence do not result from combining (what *we* called so far) *the semantic values* assigned to expressions relative to contexts. The determination of these truth-conditions is not only the business of semantics. Instead, the truth-conditions of the utterance of a sentence are affected also by 'primary pragmatic processes'. These pragmatic processes are characterized as *free* (in the sense they are not encoded in the semantic values assigned to individual expressions of the language), *local* (or pre-propositional, in the sense that they take as input and modify the non-propositional semantic content of an expression), and *sub-personal* (not to be explained as resulting from conscious inferences that the hearer makes).

According to Recanati (1993: 248; 2004: 23f, 126-127), QDR is the output of a primary pragmatic process that takes as input the *literal* semantic value of the QNP and give as output its *derived* (modified) semantic value (2004: 27). With respect to the utterance of sentence 2, a primary pragmatic process takes as input the semantic value of 'every bottle' and gives as output the enriched content *every bottle at the party*. A similar explanation, Recanati (2010: 44-45) argues, is the enrichment of incomplete

DDs into complete ones. Given that the output of the pragmatic process of free enrichment contributes to the (derived) semantic content of the sentence, Recanati's account of QDR is *semantic*. But it is a *pragmatic* account at the same time, in the sense that free enrichment is optional, that is, not determined by the linguistic meaning of the words used (i.e. by the semantic value assigned to the quantifier or any other expression in the sentence). Free enrichment provides a completion of incomplete DDs, affecting the truth-conditions of utterances of sentences but without there being anything in the meaning of the expressions uttered that requires QDR. Finally, as a pragmatic account, it is not Gricean, among other things, because Recanati does not appeal to Gricean inferential derivations in characterizing primary pragmatic process, but instead to cognitive subpersonal explanations. He describes them as "associative processes, governed solely by accessibility considerations" (Recanati 2004: 49).

Recanati's approach to QDR has much in common with what Neale (1990) calls 'the explicit' approach to QDR in general, and to incomplete DDs in particular. According to Neale, on this approach "the descriptive content is "completed" by context" in the following sense: "a particular utterance of 'the table' might be elliptical for (e.g.) 'the table *over there'*." (Neale 1990: 95)[5] The completion of the description is truth-conditionally relevant, but not determined by linguistic meaning, in Neale's view.

A theory along the lines of Neale's or Recanati's approach to QDR avoids the problem of postulating counter-intuitive truth-conditions to sentences, as we have seen that Bach's approach does. However, Stanley and Szabó (2000a) argue, it faces the problem of failing to account for the phenomenon of *quantified contexts*. Consider the following sentence:

3. In most of John's classes, he fails exactly three Frenchmen. (Stanley and Szabó 2000a: 243)

On one salient reading of the sentence, an utterance of 3 is true iff for most x such that x is a class of John's, he fails exactly three Frenchmen *in x*. That is, the implicit restriction of the second quantifier (i.e. 'three Frenchmen') is an element that the first quantifier

[5] Stanley and Szabó (2000a: 233) attribute to Neale (1990) what they call the "the syntactic ellipsis theory", according to which the extra descriptive material is the contribution of an element in the sentence that is present at LF, but not at PF. That is, at the level of LF, the incomplete DD 'the F' (e.g. 'the door') is to be analysed as if the speaker had uttered a complete DD (e.g. 'the door of this classroom'). Neale (2000: 293) rejects having defended such a view. As Neale explains, he was proposing a *non-syntactic* but *semantic* approach (in the sense that it does affect the determination of truth-conditions), which does not involve ellipsis in the sense that "material (e.g. words or phrases) present at one level of syntactic representation is deleted by some sort of syntactic process in the course of deriving a further ('surface') level of syntactic representation." (Neale 2000: 287)

(i.e. 'most of John's classes') quantifies over, that is, a class of John's. This is easily explained as a case of variable binding, and we will see below that there are ways to implement this mechanism within our semantic framework. But it is difficult to see how a pragmatic theory is prepared to deal with this data. As Stanley and Szabo note,

> the pragmatic approach does not posit any quantifier domain variable associated with the quantifier 'three Frenchmen'. According to the pragmatic approach, the only reading of [3] is one on which the second part of the sentence is completely unrelated to the first part of the sentence. (2000a: 243)[6]

On a pragmatic approach, whatever is the restriction on the second quantifier in sentence 3, it does not vary with the objects the first quantifier quantifies over, that is, classes of John's. According to Stanley and Szabo (2000a: 242) quantified contexts pose "an insurmountable difficulty for pragmatic approaches". They suggest the right solution to QDR must be semantic.

§3.3. The syntactic variable approach

I have discussed so far the incompleteness problem that the Russellian theory – as well as other theories of DDs – face. It has been argued in the literature on DDs that, in the case of the Russellian theory, this is an instance of the more general problem of accounting for QDR. I have mentioned a number of difficulties that pragmatic accounts of QDR face.[7] What about a semantic account of QDR?

Probably the most widely discussed semantic proposal is the one developed in von Fintel (1994: 30) and Stanley and Szabó (2000a: 253). According to this proposal, the LF of a natural language sentence containing a quantifier phrase has a variable that is not realized phonologically, that is, it is not present at PF. This variable is responsible for QDR. To be more precise, the authors mentioned do not postulate at the level of LF a simple individual variable (of type <e>), but a more complex expression, which is constituted by two variables: a variable 'f' of semantic type <e,<e,t>>, and variable 'i' of semantic type <e>. The reason why the authors postulate a complex variable has to do with the phenomenon of quantified contexts, which I discuss below. The value of

[6] According to Recanati (2004: 111-112) there are alternative ways in which a pragmatic theory of QDR could predict the relevant reading of 3.

[7] Elbourne (2008) and Elbourne (2013: 172-190) provide various arguments against pragmatic approaches to QDR. The latter argues for a syntactic variable approach combined with situation semantics.

both variables is provided by the context. The value of ‘f’ is a function that maps an object onto a set of individuals. The value of ‘f’ takes as argument the value of ‘i’, and maps it to a set of individuals that constitutes the restricted domain of the quantifier.

There are different ways in which this idea could be implemented syntactically. The solution Stanley and Szabó (2000a: 251) adopt for associating variables with quantifier expressions in LF is to have both ‘f’ and ‘i’ “*co-habit* a node” with the CN that occurs in the quantifier phrase. The LF corresponding to an utterance of sentence 2 is the following:

4. $[_{S}\ [_{DP}\ [_{DET}$ Every$]\ [_{CN}$ bottle, f(i)$]]\ [_{VP}$ is empty$]]$[8]

According to Stanley and Szabó (2000a: 253), the interpretation of the node in which ‘f(i)’ occurs in sentences such as 4 is the intersection of the denotation of ‘bottle’ and the denotation of ‘f(i)’, after the context has supplied the values to the variables. In their own formulation the extensional semantic value of the node can be given as follows (where ‘c’ above is an assignment determined by the context):

$||\text{bottle, f(i)}||^{c} = ||\text{bottle}|| \cap \{x: x \in c(f)\ (c(i))\}$

If the context assigns to ‘i’ the individual *this room*, and to ‘f’ the extension of the relation of *being inside* (relative to the world of evaluation), then the value of ‘f(i)’ will be *the class of objects that are inside this room* (relative to the world of evaluation). And this restricts the domain of objects we are quantifying over.[9]

But how do we obtain this semantic value for the node $[_{CN}$ bottle, f(i)$]$ in our present framework? In the framework we are working with here, each expression is written between square brackets indicating on its left side its syntactic category. The interpretation function assigns semantic values to *simple* expressions relative to possible worlds, assignments and contexts. The simple expressions in this framework are the

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[8] Another alternative possibility, proposed by von Fintel (1994: 30), the variables ‘f(i)’ cohabit the same node with the quantifier determiner, and not the noun. On this option, the LF of sentence 2 is:

a. $[_{S}\ [_{DP}\ [_{DET}$ Every, f(i)$]\ [_{CN}$ bottle$]]\ [_{VP}$ is empty$]]$

There are several reasons why it is preferable to place the restriction in the same node with the nominal, and not the determiner: one of them has to do with correctly accounting for cross-sentential anaphora (Stanley and Szabó 2000a: 257); another has to do with accounting for the context-sensitivity of comparative adjectives (Stanley 2002: 380); finally, the latter alternative makes false predictions concerning superlatives (Stanley 2002: 374). I stick in what follows to Stanley and Szabó’s nominal restriction proposal. However, this option is not without problems, see Kratzer (2004).

[9] Strictly speaking, what ‘f(i)’ does is add a further restriction to the nominal that plays the role of the restrictor of the quantifier determiner. As Stanley writes, “According to this theory of quantifier domain restriction, it is due to the fact that each nominal co-occurs with variables whose values, relative to a context, together determine a domain. Thus, if it is right, ‘quantifier domain restriction’ is a misleading label; better would be ‘nominal restriction’.” (Stanley 2002: 373) Maybe an ever better term would be ‘nominal completion’.

ones that inhabit a node. The semantics assigns a semantic value to each node, i.e. to a series of symbols that has an opening bracket on its left and a closing bracket on its right, and contains no brackets. Therefore, [$_{CN}$ bottle, f(i)] is a simple expression in our framework. Its semantic value cannot be calculated compositionally from the semantic value of 'bottle' and that of 'f(i)', as Functional Application does not apply to elements inside a node.

There are different solutions we could appeal to in order to implement Stanley and Szabó's proposal in our semantic framework. One is to introduce a new semantic value for nodes such as [$_{CN}$ bottle, f(i)]. This could be the following:

$||\text{bottle, f(i)}||^{w,a} = \lambda x_{<e>}$.x is a bottle and is *a*(f) (*a*(i)) in w

This is a different semantic value from the one we introduced for CN's in the first chapter, which is the following:

$||\text{bottle}||^{w,a} = \lambda x_{<e>}$.x is a bottle in w

There are two different expressions in the LF that correspond to the superficial expression 'bottle'. The interpretation function assigns to each of them its own semantic value. This means that 'bottle' turns out to be ambiguous, instantiating a kind of syntactic ambiguity, given that there are two expressions that have the same superficial form. In a sense, this is also a semantic ambiguity, given that 'bottle' sometimes expresses the concept *bottle*, but at other times it is a context-dependent expression, expressing the concept of *being a bottle standing in this relation to this object.*[10]

A further problem with the Stanley and Szabó proposal concerns the cases of complete QNPs, for which no domain restriction is needed. Consider sentence 5:

5. Every bottle in this room is empty.

The QNP 'every bottle in this room' in 5 is complete. Now, if the node in the LF of 5 corresponding to the occurrence of 'bottle' is always [$_{CN}$ bottle, f(i)], containing the complex variable 'f(i)', then the theory faces a problem: the theory relies on the context

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[10] An alternative solution is to the variables co-habit a node with the CN is to consider the possibility that 'f(i)' occupies its own node. On this hypothesis, the LF of sentence 2 might look like this:

a. [$_S$ [$_{DP}$ [$_{DET}$ Every] [[$_{CN}$ bottle] [f(i)]]] [$_{VP}$ is empty]]

It is not be possible to calculate the value of the node [[$_{CN}$ bottle] [f(i)]] by Functional Application, because both [$_{CN}$ bottle] and [[f(i)]] are of type <e,t>. But we could calculate it using the rule Predicate Modification, which is introduced in Heim and Kratzer (1998: 65-8) precisely to cope with cases of type mismatch of this kind.

The benefit of this proposal is that it does not require that we introduce a new semantic value for the CN 'bottle', as below, which makes the expression ambiguous. However, Stanley and Szabó (2000a: 255) reject this option: "Our worry is not that such a syntactic justification is impossible to provide. It is rather that, without compelling reasons, one should not place such a burden on syntactic theory." Given that my aim here is simply to implement in our framework the Stanley and Szabó proposal, I will not choose this alternative, which the authors explicitly reject.

to supply a value to both ‘f’ and ‘i’, but it is not clear what these values could be in the case of 5. Apparently, the context does not supply any value *at all* to the variables. Bach (2000) raises this issue as an objection to the Stanley and Szabó proposal. He considers sentences such as ‘All <men, f(i)> are mortal.’ and writes:

> So, there must be a contextual domain restriction in these cases, even though it is a restriction without a difference… Although this is a limiting case, the value of the domain variable must still be contextually provided. Otherwise, the sentence would not express a proposition at all. (2000: 274)[11]

The nominal is already complete, in the sense that the intuitively correct truth-conditions are obtained without any further implicit completion. But on Stanley and Szabó's original proposal (which does not involve postulating any ambiguity, but takes the variable to be always present in the node), a contextual value to the variable must be provided.

A possible solution to this problem is to assign a default value for the variable in such cases, one that gets us the intuitively correct truth-conditions. One such default value could be:[12]

$||\text{bottle in this room, f(i)}||^c = ||\text{bottle in this room}||^c \cap \{x: x=x\}$

But the problem is implicitly solved on our ambiguity view. Our theory allows for the node that the quantifier determiner combines with to be either $[_{CN}$ bottle], or $[_{CN}$ bottle, f(i)]. The latter occurs *only* in those contexts in which the nominal of the quantifier needs to be contextually completed in order to predict the correct truth-conditions for the sentence. So, the ambiguity view accounts for those cases in which no contextual restriction of the quantifier is needed to predict the intuitively correct truth-conditions.

§3.4. The syntactic variable approach to incomplete DDs

Going back to DDs, let us look at how this theory applies to incomplete DDs. Consider again sentence 1, repeated here as 6. On the present approach, the LF of 6 is 7:

6. The door is locked.
7. $[_S\ [_N\ [_{DET}$ The] $[_{CN}$ door, $f_{1.1}(i_1)$]] $[_{VP}\ [_V$ is]$[_A$ locked]]]

[11] In their reply to Bach’s criticism of their proposal, Stanley and Szabó (2000b) do not address this objection.
[12] Of course, this still does not solve our previous problem concerning the compositional calculation of the value of the node.

On the Russellian theory of DDs these are quantifier expressions, and so the present approach to QDR covers incomplete DDs as well. Some observations are needed concerning the implementation of this proposal in our framework. We postulated in the first chapter that each variable must have an index, so let us use (as up to now) natural numbers as indices for variables of type <e>, and rational numbers such as 1.1, 1.2, 1.3 and so on for variables of type <e,<e,t>>, as in 7.[13] For the relevant utterance of 1/6 we obtain the following semantic values, for the Russellian theory of DDs:

$||[_{CN}$ door, $f_{1.1}(i_1)]||^{w,a}$ =

= $\lambda x_{<e>}$.1 iff x is a door and is a(1.1) (a(1)) in w =

= $\lambda x_{<e>}$.1 iff x is a door and belongs to this room in w.

Next, we get:

$||[_N [_{DET}$ The] $[_{CN}$ door, $f_{1.1}(i_1)]]||^{w,a}$ =

= $||\text{the}||^{a,w}(||[_{CN}$ door, $f_{1.1}(i_1)]||^{w,a})$ =

= $[\lambda f_{<e,t>}.[\lambda g_{<e,t>}$.1 iff there is a unique $x_{<e>}$ such that f(x)=1, and g(x)=1]]($\lambda x_{<e>}$.1 iff x is a door and belongs to this room in w) =

= $\lambda g_{<e,t>}$.1 iff there is a unique $x_{<e>}$ such that x is a door and belongs to this room in w, and g(x) = 1

And so,

$||[_S \ldots]||^{w,a}$ =

= $||[_N [_{DET}$ The] $[_{CN}$ door, $f_{1.1}(i_1)]]||^{w,a}(||[_{VP} [_V$ is]$[_A$ locked]]$||^{w,a})$ =

= $[\lambda g_{<e,t>}$.1 iff there is a unique $x_{<e>}$ such that x is a door and belongs to this room in w, and g(x)=1]($\lambda x_{<e>}$. 1 iff x is locked in w) =

= 1 iff there is a unique $x_{<e>}$ such that x is a door and belongs to this room in w, and x is locked in w.

In the given context there is a unique door, and so the utterance of 1/6 considered is predicted to be true. This means that the Russellian theory combined with the Stanley and Szabó approach to QDR solves the incompleteness problem, as it predicts the intuitively correct truth-value for the utterance of 1/6.

What about the other theories considered? On the Fregean theory, for instance, DDs are not quantifier expressions. Their semantic type is <e>, and not <<e,t>,t>, as that of quantifier phrases. However, this does not pose a problem for applying the

[13] This complication of the notation is needed because an assignment assigns values to the *indices* that variables have, so variables of different semantic type should not bear the same index. Otherwise, they would receive the same value.

syntactic variable theory of QDR to DDs. After all, what the theory does is posit an unpronounced variable at the level of LF that affects the interpretation of the CN. As Stanley (2002: 373) points out (see fn. 9 above), we should talk of *nominal* restriction (or maybe, completion) instead of *quantifier domain* restriction, as it is not the domain that is restricted, but the nominal that is completed. If this is what the theory is about, then it should be possible to apply it to expressions other than quantifiers. Indeed, this strategy is applicable to incomplete DDs when analysed as the Fregean proposes, although they are out not quantifiers on this approach. We get the following semantic value:

$||[_N [_{DET} \text{The}] [_{CN} \text{door}, f_{1.1}(i_1)]]||^{w,a} =$

$= ||\text{the}||^{a,w}(||[_{CN} \text{door}, f_{1.1}(i_1)]||^{w,a}) =$

$= [\lambda f_{<e,t>}$ and there is exactly one $x_{<e>}$ such that $f(x)=1$.the unique $y_{<e>}$ such that $f(y)=1](\lambda x_{<e>}.1$ iff x is a door and belongs to this room in w) =

= there is a unique door that belongs to this room in w. the unique door that belongs to this room in w.

Again, the utterance of 1/6 is predicted to be true in the context of utterance, which is intuitively correct. So, combining the Fregean theory with the syntactic variable approach to QDR also solves the incompleteness problem.

Finally, on the B&C theory DDs are quantifier phrases, and the definite article is the same as for the Russellian theory, <<e,t>,<<e,t>, t>>. However, this proposal shares with the Fregean theory the treatment of the definite article as introducing a precondition for the DD to have a semantic value at all. We obtain the following semantic value for the DD:

$||[_N [_{DET} \text{The}] [_{CN} \text{door}, f_{1.1}(i_1)]]||^{w,a} =$

$= ||\text{the}||^{a,w}(||[_{CN} \text{door}, f_{1.1}(i_1)]||^{w,a}) =$

$= [\lambda f_{<e,t>}$ and there is a unique $x_{<e>}$ such that $f(x)=1.[\lambda g_{<e,t>}.1$ iff every $x_{<e>}$ such that $f(x)=1$ is such that $g(x)=1]](\lambda_{<e>}.1$ iff x is a door and belongs to this room in w) =

= there is a unique $x_{<e>}$ such that x is a door and belongs to this room in w. $[\lambda g_{<e,t>}.1$ iff every $x_{<e>}$ such that x is a door and belongs to this room in w is such that $g(x)=1]$

The truth-conditions of the sentence are the following:

$||[_S \ldots]||^{w,a} =$

$= ||[_N [_{DET} \text{The}] [_{CN} \text{door}, f_{1.1}(i_1)]]||^{w,a}(||[_{VP} [_V \text{is}][_A \text{locked}]]||^{w,a}) =$

= [there is a unique $x_{<e>}$ such that x is a door and belongs to this room in w. [$\lambda g_{<e,t>}$.1 iff every $x_{<e>}$ such that x is a door and belongs to this room in w it is also such that g(x)=1]]($\lambda x_{<e>}$.1 iff x is locked in w) =

= there is a unique $x_{<e>}$ such that x is a door and belongs to this room in w.1 iff every $x_{<e>}$ such that x is a door and belongs to this room in w is such that it is locked in w.

Again, these truth-conditions are fulfilled in the context of utterance, so the utterance of 1/6 is true. We get the same conclusion as with the other theories: the Stanley and Szabó approach to QDR helps solve the incompleteness problem that the B&C theory, as it did for the other theories considered.

In conclusion, the syntactic variable theory of QDR does account for the use of incomplete DDs on the various theories considered. It correctly predicts the intuitive truth-conditions by completing the description with contextually determined properties. In the next section, I turn to the phenomenon of quantified contexts, which pose a problem for the pragmatic accounts of QDR.

§3.5. Accounting for quantified contexts

Both von Fintel (1994: 31) and Stanley and Szabó (2000a: 250) argue that it is necessary to postulate a *complex* variable of the form 'f(i)' precisely in order to account for this phenomenon. Consider again sentence 3, repeated here as 8.

8. In most of John's classes, he fails exactly three Frenchmen.

The authors maintain that the syntactic variable approach to QDR makes the correct predictions concerning the intuitive truth-conditions of 8 on the reading we are interested in explaining. On this reading, 8 is true iff *for most x such that x is a class of John's, he fails exactly three Frenchmen in x.* Now, the first quantifier makes salient a certain set of individuals that it quantifies over, those that are *classes of John's* (in the educational sense). The quantifier 'three Frenchmen' is implicitly completed to *three Frenchmen in a class of John's*. Therefore, it is not sufficient to posit in the LF of the second quantifier a variable for individuals that are classes of John's (i.e. the individual variable 'i' cannot do the job by itself). We need to postulate also a variable that, in the context, gets the value *being in* (relative to the world of evaluation). This is the variable 'f', of semantic type <e,<e,t>>.

Let us now see what semantic value the theory predicts for sentences with quantified contexts. Instead of quantifiers such as ‘most’, ‘three’ and ‘every’, I consider here a sentence involving a DD, such as 9.[14] On the approach to quantifiers along the lines of Generalized Quantifier Theory we adopted in the chapter 1, both the determiner ‘every’ as the determiner ‘the’ (assuming the Russellian theory) are binary quantifiers. Keeping this in mind it is easy to see that if the syntactic variable approach to QDR accounts for quantified contexts involving ‘every’, it must do the same when we replace ‘every’ with ‘the’.

9. Every student answered the question.

Consider a scenario in which each student receives only one question on her exam, but not all of them receive the same question. In this scenario, the salient reading of the sentence is one on which it is true iff *every student in this class answered the question she or he was asked*. This is an instance of the phenomenon of quantifier contexts. Now, the LF of 9 is 10. It results from applying QR to the two quantifiers: we need to QR the first quantifier in order to introduce the variable binder λ_2; and we need to QR the DD because it occurs in object position.

10. $[_S [_N [_{DET}$ Every$] [_{CN}$ student, $f_{1.1}(i_1)]] [\lambda_2 [_S [_N [_{DET}$ the$] [_{CN}$ question, $f_{1.2}(i_2)]]$ $[\lambda_3 [_S [_N t_2] [_{VP} [_V$ answered$] [_N t_3]]]]]]]$

In order to get the right reading it is important that the first λ binder binds the variable i_2. We obtain this by co-indexing the binder and the variable.[15] Let us now calculate the extension of 10 step by step. First, we get:

$||[_{CN}$ student, $f_{1.1}(i_1)]||^{w,a} = \lambda x_{<e>}.1$ iff x is a student and is a(1.1) (a(1)) in w =

= $\lambda x_{<e>}.1$ iff x is a student and is *in this class* in w

$||[_{CN}$ question, $f_{1.2}(i_2)]||^{w,a} = \lambda x_{<e>}.1$ iff x is a question and is a(1.2) (a(2)) in w =

= $\lambda x_{<e>}.1$ iff x is a question and a(2) is *asked* x in w

Second, let us calculate the semantic value of the embedded sentence:

$||[_S [_N t_2] [_{VP} [_V$ answered$] [_N t_3]]]||^{w,a} =$

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[14] This is a version of the sentence ‘Everyone answered every question’, which Stanley (2002: 369) discusses in relation to the phenomenon of quantified contexts. I have replaced ‘every question’ with a DD.

[15] Suppose that the variable ‘i_2’ is *not* co-indexed with any binder, as in the following alternative LF for 9:

$[_S [_N [_{DET}$ Every$] [_{CN}$ student, $f_{1.1}(i_1)]] [\lambda_3 [_S [_N [_{DET}$ the$] [_{CN}$ question, $f_{1.2}(i_2)]] [\lambda_4 [_S [_N t_3] [_{VP} [_V$ answered$] [_N t_4]]]]]]]$.

In that case i_2 is not bound, so the only interpretation available for i_2 is one in which a contextually determined assignment assigns a value to it. In that case, the nominal of the DD is completed to *questions I am asked*, or *questions John is asked*, etc, depending on the value of a(2).

$= [[\lambda x_{<e>}.[\lambda y_{<e>}.1 \text{ iff x answered y in w}]](||t_3||^{w,a})](||t_2||^{w,a}) =$

$= [\lambda x_{<e>}.1 \text{ iff x answered a(3) in w}](||t_2||^{w,a}) =$

= 1 iff a(2) answered a(3) in w

Third, we use Predicate Abstraction to compute the value of the binder expression:

$||[\lambda_3 [_S \ldots]]||^{w,a} =$

$= \lambda x_{<e>}.||[_S \ldots]||^{w,ax/3} =$

$= \lambda x_{<e>}.1 \text{ iff a(2) answered x in w}$

Let us consider the Russellian theory of DDs. In that case we get:

$||[_S [_N [_{DET} \text{ the}] [_{CN} \text{ question, } f_{1.2}(i_2)]] [\lambda_3 [_S \ldots]]]||^{w,a} =$

$= [[||\text{the}||^{w,a}](||\text{question, } f_{1.2}(i_2)||^{w,a})](||[\lambda_3[_S \ldots]]||^{w,a}) =$

$= [[\lambda f_{<e,t>}.\lambda g_{<e,t>}.1$ iff there is a unique x such that f(x)=1, and g(x)=1]($\lambda x_{<e>}$.1 iff x is a question and is asked to a(2) in w)]($\lambda x_{<e>}$.1 iff a(2) answered x in w) =

= [$\lambda g_{<e,t>}$.1 iff there is a unique x such that x is a question and a(2) is asked x in w, and g(x)=1]($\lambda x_{<e>}$.1 iff a(2) answered x in w) =

= 1 iff there is a unique x such that x is a question and a(2) is asked x in w, and a(2) answered x in w

Next, we get:

$||[\lambda_2 [_S \ldots]]||^{w,a} =$

$= \lambda y_{<e>}.||[_S \ldots]||^{w,ay/2} =$

= $\lambda y_{<e>}$.1 iff there is a unique x such that x is a question and y is asked x in w, and y answered x in w

And finally we obtain:

$||[_S [_N [_{DET} \text{ Every}] [_{CN} \text{ student, } f_{1.1}(i_1)]] [\lambda_2 [_S \ldots]]]||^{w,a} =$

= [[$\lambda f_{<e,t>}.\lambda g_{<e,t>}$.1 iff every x such that f(x)=1 is such that g(x)=1]($\lambda x_{<e>}$.1 iff x is a student and is in this class in w)]($\lambda y_{<e>}$.1 iff there is a unique x such that x is a question and y is asked x in w, and y answered x in w) =

= 1 iff every x such that x is a student and is in this class in w is such that there is a unique z such that z is a question and x is asked z in w, and x answered z in w.

This is a cumbersome formulation of the truth-conditions corresponding to the relevant reading of sentence 9. The predicted truth-conditions correspond to the intuitive truth-conditions. Therefore, the syntactic variable approach to QDR combined with the Russellian theory of DDs makes the right predictions concerning the phenomenon of quantified contexts.

What about the other theories? Let us go back to the step where we calculated the value of the description, and consider the Fregean theory, instead of the Russellian. We obtain:

$||[_S [_N [_{DET}$ the$] [_{CN}$ question, $f_{1.2}(i_2)]] [\lambda_3 [_S \ldots]]]||^{w,a} =$

$= [||[\lambda_3[_S \ldots]]||^{w,a}] (||[_N [_{DET}$ the$] [_{CN}$ question, $f_{1.2}(i_2)]]||^{w,a})) =$

$= [\lambda x_{<e>}.1$ iff a(2) answered x in w](there is a unique x such that x is a question and a(2) is asked x in w. the unique x such that x is a question and a(2) is asked x in w) =

= there is a unique x such that x is a question and a(2) is asked x in w.1 iff a(2) answered the unique x such that x is a question and a(2) is asked x in w.

Next, we get:

$||[\lambda_2 [_S \ldots]]||^{w,a} =$

$= \lambda y_{<e>}.||[_S \ldots]]||^{w,ay/2} =$

$= \lambda y_{<e>}.$[there is a unique x such that x is a question and y is asked x in w.1 iff y answered the unique x such that x is a question and y is asked x in w.]

This semantic value of type <e,t> is a partial function, in particular, a function from possible worlds that is defined only for those worlds in which there is a unique question that y is asked. We could write this function as follows (eliminating variable x from the formulation):

$\lambda y_{<e>}$ and there is a unique question that y is asked in w.1 iff y answered the unique question y is asked in w

Finally we obtain:

$||[_S [_N [_{DET}$ Every$] [_{CN}$ student, $f_{1.1}(i_1)]] [\lambda_2 [_S \ldots]]]||^{w,a} =$

$= [[\lambda f_{<e,t>}.[\lambda g_{<e,t>}.1$ iff every x such that f(x)=1 is such that g(x)=1]]($\lambda x_{<e>}.1$ iff x is a student and is in this class in w)]($\lambda y_{<e>}$ and there is a unique question that y is asked in w.1 iff y answered the unique question y is asked in w) =

$= [\lambda g_{<e,t>}.1$ iff every x such that x is a student and is in this class in w is such that g(x)=1]($\lambda y_{<e>}$ and there is a unique question that y is asked in w.1 iff y answered the unique question y is asked in w) =

= there is a unique question that y is asked in w.1 iff every x such that x is a student and is in this class in w is such that x answered the unique question y is asked in w

Finally, a similar calculation shows that the B&C theory also predicts the correct truth-conditions for the utterance of sentence 9. I will not go through the steps of the calculation, as they must be familiar by now. The resulting truth-conditions are the following:

> there is a unique question that y is asked in w.1 iff every x such that x is a student and is in this class in w is such that x answered *every* question y is asked in w.

To sum up, we started with the observation that the incompleteness problem for DDs affects not only the Russellian theory, but also the Fregean and B&C theories introduced in the previous chapter. I have argued that the syntactic variable approach to QDR offers a solution to the incompleteness problem. The solution is equally applicable to the various theories of DDs introduced. Therefore, the argument in this chapter does not offer a reason to favour one theory of DDs among the various ones discussed. Its upshot is merely negative: it shows there are no reasons to favour one theory over the others when it comes to solving the incompleteness problem.

In the last section of this chapter I discuss a different problem related to incompleteness. This is known as "the underdetermination problem", and it is a problem that affects not only theories of incomplete utterances of DDs, but also any account of QDR, including the Stanley and Szabó theory. I present the problem at this point, but its relevance to our discussion of theories of DDs will become clear only in the next chapter, where I introduce a partial solution to this problem.

§3.6. The underdetermination problem

Consider again sentence 2 ('Every bottle is empty.'). What is the property that restricts the domain of quantification? We have assumed so far that it is the property of *being at that party* (the relevant party in the context of utterance). But there are other equally plausible alternatives: if the party takes place in a particular room, an equally relevant property is that of *being in that room*. The context does not constrain us to choose one of these restrictions over the other. So we get two different equally plausible restrictions of the quantifier in 2. On the former one, the utterance of 2 is true relative to w iff every bottle *at that party* in w is empty in w; on the latter one, the same utterance is true relative to w iff every bottle *in that room* in w is empty in w. The truth-conditions are different: there are possible worlds relative to which the truth-value of the utterance of 2 is different on one option than on the other. Consider a world w' in which the party takes place in two rooms of the house, instead of just one room; in one room all bottles are empty, but in the other there is one full bottle left. Relative to w' the utterance of 2 is predicted to be *false* on the first option (with the at-the-party restriction), but true on the second (with the in-that-room completion).

The underdetermination problem is the problem of finding a strategy to determine in a systematic way the property that restricts the domain of quantification. The pragmatic accounts of QDR discussed above (the neo-Gricean, but also Recanati's approach) do not offer a satisfactory solution to this problem. They predict that it is *the context* that must supply the completion. However, Stanley and Szabó (2000a: 237-238) argue, in most cases there are many plausible candidates for the completion that are plausible in the context of utterance.[16] This means that there are worlds relative to which these theories do not make clear predictions concerning the truth-value of the utterance of the sentence. A pragmatic theory such as the ones discussed does not assign precise truth-conditions to the utterance of 2.

A version of this problem affects a pragmatic account of the completion of incomplete DDs. In discussing sentence 1 ('The door is locked.'), we assumed that the relevant completion in the context of utterance leads to the following truth-conditions: the utterance of 1 is true iff the door *of this classroom* is locked. But there are equally salient completions, such as: *belonging to classroom A2* (assuming this is the name of the classroom), or *in front of me*, or *that I am looking at right now*, or *that is closest to me* etc. Each of them is an equally relevant and salient completion of the description in the context of utterance. But, depending on the completion we choose, the utterance of 1 has different truth-conditions, as there are possible worlds in which I (the speaker) am in front of room A1 at the time of the utterance, not A2, or in which the door is not in front of me at the time of the utterance, but on my left etc. With respect to those worlds the different options for completion determine different truth-values for the utterance of 1.

Concerning DDs, Wettstein (1981), Reimer (1992) and others have argued that Neale's (1990) explicit approach to the incompleteness problem for DDs fails for the

[16] Stanley and Szabó (2000) discuss the underdetermination objection mainly in relation to the "the syntactic ellipsis theory" of QDR, which is how they interpret Neale's explicit approach to QDR.

same reason.[17] It is not clear that the context selects precisely one particular completion among the various plausible alternatives. As Wettstein points out, no matter how plausible a hypothesis about the unpronounced descriptive material that completes the DD may be, there is also the possibility that the speaker rejects that that is what she meant:

> 'Although I meant to refer to that table' our speaker might well reply, 'I don't think I meant to refer to it as the table in room 209 of Camden Hall at t_l as opposed to, say, as the table at which the author of *The Persistence of Objects* is sitting at t_l. (1981: 247)

It does not help at this point to postulate that the completion be the one that *the speaker has in mind* when uttering the sentence. As Wettstein notes,

> Surely it is implausible in the extreme to suppose that in fact one of these descriptions captures what the speaker intended but that we cannot, even with the help of the speaker himself, come to know which description that is. (1981: 247)

The problem goes even deeper, for even in those cases in which the speaker does have in mind a particular completion of the description, it is necessary that the audience also have that same completion in mind in order for communication to be successful. Arguably, if the audience does not grasp the proposition the speaker intends to convey, communication is not successful.[18] And, at least in the cases discussed above, it is not at all clear that the audience could grasp the completion the speaker has in mind (assuming she does have a particular one in mind).

Does the syntactic variable approach provide a solution to the underdetermination problem for QDR in general, and for incomplete DDs in particular? Consider again sentence 1/6 ('The door is closed.'). The approach to incompleteness considered here restricts the range of possible completions to those that have a certain structure, the one that corresponds to the complex variable 'f(i)'. The complete DDs cannot be, for instance, the *black* door, the *main* door, the *usual* door, because such completions could not result from assigning values to 'f' and 'i'. For the same reason it cannot be the door *you and I are looking at*, or *the door that is to the left of the main*

[17] See Stojanovic (2002) for a defence of Neale's explicit strategy against the objection that it cannot solve the underdetermination problem.

[18] Buchanan and Ostertag (2005: 889) argue that the solution to the underdetermination problem is to reject the assumption that "successful linguistic communication requires the hearer to identify a proposition uniquely intended by the speaker."

entrance and to the right of that big window. Such completion cannot be the contribution of 'f(i)' to the nominal because than one individual is referred to. The completion must have the structure of a relation of type <e,<e,t>> combined with a type <e> semantic value.

However, there are various salient completions that have this structure, and result from assigning contextual values to the variables. A possible completion is the door *belonging to A2* (assuming this is the name of the classroom), where 'f' contributes the property *belonging to*, and A2 is the value of 'i'. But an equally salient completion is the door *in front of me*, or the door *that I am looking at*, or the door *that is closest to me*, or the door *pointed at by me* etc. Again, there is no reason to suppose that the context picks out a particular completion among the various options available. Therefore, contrary to what Stanely and Szabó suggest, the indeterminacy problem the underdetermination problem is not a special problem for the pragmatic accounts discussed. Their syntactic variable approach faces exactly the same problem. However, as I argue in the next chapter, the latter account helps eliminate the problem for a large class of uses of DDs.

Chapter 4: The referential/attributive distinction

§4.1. The phenomenon

In this chapter I discuss the data concerning the two uses of DDs, a topic that any theory of DDs must address. The distinction between the two uses was introduced in Donnellan's classical article "Reference and Definite Descriptions" (1966). There, Donnellan writes:

> I will call the two uses of definite descriptions I have in mind the attributive use and the referential use. A speaker who uses a definite description attributively in an assertion states something about whoever or whatever is the so-and-so. A speaker who uses a definite description referentially in an assertion, on the other hand, uses the description to enable his audience to pick out whom or what he is talking about and states something about that person or thing. (1966: 285)

He adds that in the case of the referential use "the definite description is merely one tool for doing a certain job – calling attention to a person or thing", while in the case of attributive uses the description, he writes, "might be said to occur essentially".[1] Later on in the article Donnellan makes it clear that the distinction applies not only to assertive utterances, but also to questions, imperatives and other kinds of utterances.

In one of Donnellan's scenarios – slightly modified here – someone is drinking a martini at the annual party of the local Teetotalers Union. In this context the chairperson utters sentence 1:

1. The man drinking a martini will be expelled.

If the chairperson utters 1 having a particular person in mind which she identified in the context, and moreover has the intention to direct the addressee's attention to *that* person, and of whom the speaker intends to say that he will be expelled, the use of the DD 'the man drinking a martini' is *referential*, in conformity with the above characterization of referential uses. But now suppose that all the information the chairperson has is that *someone* is drinking martini at that party. In that case the speaker

[1] Donnellan also adds that with referential uses "the speaker presupposes of some *particular* someone or something that he or it fits the description" (Donnellan 1966, 288) and that "The distinguishing characteristic of a referential use is the existence of an entity the speaker wants to talk about and in relation to which he chooses a description as a means of referring to it." (Donnellan 1968, 205)

uses the DD *attributively*, to assert that *whoever* is that man drinking a martini, he will be expelled from the union.[2]

However, for a use to be attributive it needs not be the case that speaker is ignorant about who or what satisfies the description uniquely. As Donnellan notes, "whether or not a definite description is used referentially or attributively is a function of the speaker's *intentions* in a particular case" (1966: 297, my emphasis). A speaker may use the above DD attributively even if she knows who the martini drinker is, and "has in mind a particular person". Suppose the drinker is in a different room, or simply the chairperson does not want to reveal the person's identity, or draw the addressee's attention towards the person who broke the party rules. She may only want to convey the thought that measures will be taken against the drinker, whoever he is. In that case the DD is used attributively, although the speaker knows whom the DD denotes in the context. On the other hand, if the speaker *intends* her audience to think about a particular person, the use is referential, even if the addressee is not able to identify, or pick out the referent in the context: "I can be referring to a particular man when I use the description "the man drinking a martini," even though the people to whom I speak fail to pick out the right person or any person at all." (Donnellan 1966: 295)

The distinction that Donnellan draws has much intuitive force. However, it also requires further clarification. Characterizations of it in terms of having (versus lacking) the *intention to talk about* a particular individual illuminate the distinction only to a certain extent. Donnellan writes: "The distinguishing characteristic of a referential use is the existence of an entity the speaker wants to talk about and in relation to which he chooses a description as a means of referring to it." (Donnellan 1968: 205) Under this characterization, it is not always clear where attributive uses end and referential uses begin. Consider again the *attributive* use of 1 discussed above, where the speaker knows who is the person in question, but does not want to draw the audience's attention to her. Is this a referential or an attributive use? In a sense, the chairperson does have the intention to *talk about* a particular individual, i.e. the martini drinker, even if she does not intend the addressee to identify the man. And she does *have someone in mind* when she utters the sentence, although she does not intend the addressee to know whom she

[2] Donnellan also discusses cases of misdescription, i.e. cases in which the speaker has in mind and intends to talk about an object that does not satisfy the DD she uses. I ignore here these uses as I take it that they are not semantically relevant. This claim deserves a more elaborate discussion. However, the view that cases of misdescription are to be explained as a pragmatic phenomenon, and are not semantically relevant, is standard in the literature.

has in mind. This suggests the use of the DD should count as *referential*, and not attributive. On the other hand, she does not use the description *as a tool* in order to pick out an individual she has independently identified. Instead, she uses the description to talk 'about' whoever satisfies the description uniquely. This suggests it is an attributive use, and not a referential one.

Problems such as these suggest that Donnellan's distinction needs to be made with more precision, instead of relying heavily on the notion of 'talking about' or 'having in mind'. One way of making this distinction precise is to appeal to the framework of *structured propositions*. This is a framework in which propositions are construed not as sets of truth-conditions, or functions from possible worlds to truth-values – the definition we have been working with – but as structured entities, having objects and properties as constituents. Roughly, a *singular* proposition is a proposition that has an object as a constituent, while a *general* proposition is one that involves only properties and relations. This framework is primarily used to capture intuitions of *singularity* of content. Some of our propositional attitudes (such as beliefs, doubts, hopes etc.), it is argued, exhibit a certain directness and aboutness that lacks in other cases. My thought that *this computer* [the one I am working on right now] *is slow* is different in this sense from my thought that *every Nobel Prize winner is an authority in his or her field*, or my thought that *the inventor of the keyboard* (whoever she or he is) *was a genius*. The proposition that I entertain about my computer exhibits a strong sense of aboutness that lacks in the other cases. This is explained in terms of structured propositions: that proposition is singular (contains as a constituent my computer), while the others are general. Such a view is usually paired with the idea that entertaining a singular proposition presupposes being in a special "acquaintance" relation to the object. Many authors – including Kaplan (1969), Burge (1977), Bach (2010), Recanati (2010), Salmon (2010) – argue that genuine reference requires that the subject be in causal-perceptual relation to the object she is thinking about.

This framework is sometimes used to clarify the distinction between referential and attributive uses of DDs. When the DD in a sentence such as 1 is used referentially the proposition that the speaker intends to convey is a singular proposition. In order to entertain and convey such a proposition the speaker must be in position to do so, and so the acquaintance condition (or any similar condition that a theory imposes) must be fulfilled. The acquaintance condition is specified in such a way as to distinguish between those cases in which a speaker is in position to entertain a singular proposition, and those cases in which she is not. In cases in which the speaker uses the DD attributively the content of her communicative intentions is general, which does not involve deploying an acquaintance relation with a particular object. Thus, we no longer rely on intuitions about 'having in mind' or 'thinking about' in making the distinction, but rather replace these intuitions with a theory of acquaintance (or any alternative to it).

Much of the literature on the referential/attributive distinction assumes the framework of singular propositions. The discussion focuses mainly on the semantic relevance of this distinction. In his formulation of the distinction, Donnellan does not present it specifically as a semantic distinction, but as one concerning two *uses* that a DD may be put to. However, if this is interpreted as the claim that the semantic content of an utterance of a sentence of the form 'The F is G' is *singular* when the DD used referentially, this contradicts the predictions of the Russellian analysis of such utterances.[3] The Russellian analysis of utterances of such sentences, in a framework of structured propositions, predicts that the contribution of the DD to the structured proposition literally expressed is never an object. The proposition expressed is a general proposition (at least not singular with respect to the object denoted by the description, which is not a constituent of the proposition).

A respectable series of authors – including Grice (1969), Kripke (1977), Neale (1990), Bach (2007a, 2007b) – argue that referential uses do not pose a threat to the Russellian analysis, as the distinction is a matter of pragmatics.[4] The semantic analysis of both referential and attributive uses is the same, and the proposition literally expressed is given by the Russellian analysis. The difference between the two uses is that utterances of sentences containing DDs used referentially introduce a *conversational implicature*, the content of which is the singular proposition about the individual the speaker has in mind, to the effect that *that* individual is so-and-so. Considering again an utterance of 1 where the DD is used referentially, the literal content is given by the Russellian theory, and it is the general proposition that *there is a unique man drinking a martini and every man drinking a martini will be expelled*. But

[3] I have in mind here a version of the Russellian theory formulated within the framework of singular propositions. Such a theory would nevertheless coincide with our formulation in chapter 2 in what concerns the predicted contribution of a DD to truth-conditions.

[4] Donnellan already made a suggestion in this sense when writing that "Perhaps we could say that the sentence is pragmatically ambiguous: the distinction between roles that the description plays is a function of the speaker's intentions.)" (1966: 297) However, it is not clear that the word 'pragmatic' is to be understood here in the way we have introduced it above, i.e. in opposition to 'semantic'. It may be that by 'pragmatic' Donnellan meant that the speaker's *intentions* play a role in determining whether a use is referential or attributive.

this does not coincide with the content the speaker intends to convey. Following Grice (1975), a conversational implicature is not part of the semantic content, but part of what the speaker intends or expects (1975: 35) the audience to grasp from the utterance of the sentence. The addressee can calculate the conversational implicature by relying on the semantic content of the utterance of the sentence as well as on general principles of rationality and cooperativeness that apply to situations of communicative interchange. According to Grice, an implication of an utterance of a sentence is a conversational implicature only if it fulfils certain conditions. One of them is *derivability*: "The presence of a conversational implicature must be capable of being worked out; for even if it can in fact be intuitively grasped, unless intuition is replaceable by an argument, the implicature (if present at all) will not count as a conversational implicature;" (Grice 1975: 31). Neale (1990: 78) calls this the Justification Requirement. He uses the general derivation schema Grice (1989: 30-31) proposes and applies it to the particular case of the referential use of DDs. The derivation is meant to justify the conclusion that the speaker intends to convey more than what her utterance literally expresses. The latter is, on the Russellian theory, the proposition that *there is a unique man drinking a martini and every man drinking a martini will be expelled*. In particular, the speaker intends to convey also an implicature, the content of which is the singular proposition that *John Smith* (the unique man drinking a martini in the room) *will be expelled*. The derivation relies on the assumption that the speaker is observing the Maxim of Relation (Be relevant) and the Maxim of Quality (Do not say what you believe to be false; do not say that for which you lack adequate evidence). The idea is the following: on the assumption that she is observing the Maxim of Quality she must have evidence for her assertion. But in the context of utterance it is not plausible to suppose that she has general grounds for this belief. She must have singular grounds, i.e. the belief that a particular man will be expelled. Both speaker and addressee know (and know that the other knows) that John Smith is the individual that satisfies the description uniquely in the context. So, given the Maxim of Relation, the grounds for the speaker's assertion must be that *John Smith will be expelled*.

An alternative to this *pragmatic* account of referential uses treats both attributive and referential uses as *literal* uses of the DD, i.e. as uses of the DD that make a different contribution to semantic content. This is implemented by treating DDs as *ambiguous*, having two independent linguistic meanings, one that is deployed in attributive uses and one that is deployed in referential uses. That is, depending on whether the DD is used referentially or attributively, the semantic content of the utterance of the sentence is a singular proposition, or a general proposition, respectively. This view was first proposed by Peacocke (1975: 116; 122), but no extended argumentation in favour of it is offered there. More recent proponents include Reimer (1992, 1998) and Devitt (2004, 2007a, 2007b). These authors suggest placing the ambiguity in the definite determiner. As Devitt puts it, "the idea is that 'the' is ambiguous, having both a quantificational meaning that yields attributive definites and a referential meaning that yields referential definites." (Devitt 2007a: 10) The attributive meaning of 'the' is the Russellian one. Concerning the referential meaning, Reimer writes:

> My view... is that a referential utterance of the form *The F is G* expresses a singular proposition provided the intended referent satisfies the linguistic meaning (the 'sense') of the definite description: provided it is the (contextually) unique F. In cases where this is not met, a singular proposition may well be *communicated*, but no proposition (singular or general) will be *literally expressed*. (Reimer 1998: 93)

This view, according to which an utterance of a sentence containing a referentially used DD literally expresses a singular (or object-dependent) proposition, is known as *Referentialism*.

On the Referentialist view the contribution to the proposition literally expressed by an utterance of a sentence containing the DD is the object that uniquely satisfies the description. On this view, DDs are what Kaplan (1989) calls a *directly referential* singular expressions. The idea of direct reference is also present in Devitt's (2007a: 22) and Reimer's (1992: 93) Referentialism. According to Devitt genuine reference is not purely descriptive. Instead, the subject deploys a causal-perceptual relation that links her to the object referred to. This contributes to uniquely identifying the individual that is the referent of the DD. Devitt writes:

> There is a semantic convention of using 'the F' to refer to x which exploits both a causal-perceptual link between the speaker and x and a meaning of 'F' … A speaker expressing a singular thought about a certain object participates in the referential convention and thus exploits the causal-perceptual link to that object; a hearer participates in the referential convention and thus takes account of clues to what has been thus exploited. (2007a: 22)

§4.2. A version of Referentialism for our framework

The framework we adopted for discussing the semantics of DDs in this thesis is not that of structured propositions, and so, it does not allow for the distinction between singular and general propositions. In our framework propositions are sets of possible worlds (or, alternatively, the characteristic functions of those sets, which are functions from worlds to extensions), and do not have constituents. The Gricean account of referential uses, as well as the semantic thesis of Referentialism, only makes sense, as formulated above, within this framework. Therefore we should consider whether it is possible to reconstruct these proposals within our framework, and if is, to what extent the result departs from the original proposals.

On the other hand, the methodology that we adopted in this thesis is one that relies on truth-value intuitions. Intuitions of singularity are not part of this methodology as such. But the referential/attributive distinction is mostly discussed in terms of intuitions of singularity. So a further question we need to consider concerns the data: is it possible to "translate" these intuitions of singularity vs. generality into truth-value judgments? If this is not possible, then it is questionable that the distinction has any theoretical relevance from our point of view.

I start with the former question: could we reconstruct Referentialism within our framework? Our framework only relies on *flat propositions*, i.e. propositions that do not have constituents. We cannot make sense of the idea of a singular expression being directly referential, as that presupposes that the semantic value of such an expressions is an object. But it is a consequence of Referentialism that a referential DD has a *constant* extension, one that does not vary with the possible world considered. In Kripke's (1980) terminology, such an expression is a *rigid designator*. According to Referentialism, referential DDs are rigid designators. As Kaplan (1989: 495-497) notes, direct reference and rigid designation are different notions.[5] A description such as 'the actual inventor of the wheel' on a Russellian interpretation of it (and assuming the contribution of 'actual' to the semantic value is that it picks out the actual world) *is* a rigid designator: it picks out the inventor of the wheel in the actual world independently of what world of evaluation we consider. However, on the Russellian theory this DD is not a directly

[5] For instance, he writes: "The semantical feature that *I* wish to highlight in calling an expression *directly referential* is not the *fact* that it designates the same object in every circumstance, but the *way* in which it designates an object in any circumstance" (Kaplan (1989: 495)

referential term, because it does not contribute to the proposition literally expressed an object, but a combination of properties.[6] The distinction between direct (genuine) reference and rigid designation is lost in a framework of flat propositions, as Kaplan (1989: 497) notes. So we should not expect to reconstruct *this* aspect of the Referentialist proposal within our framework. However, we can reconstruct Referentialism within our framework as taking DDs to be rigid designators.

A second feature that Referentialism assigns to referential DDs concerns the way the denotation of the description is picked out. On this view, the denotation of the DD is the *intended referent* that satisfies the description (Reimer 1998: 93). Or, as Devitt puts it, the speaker uses the DD *to refer to* an object exploiting a causal-perceptual link (2007a: 22). For instance, a referential use of 'the cat' refers to the individual that, on the one hand, is a cat, and on the other is the individual the speaker intends to refer to. Let us call in what follows *Referentialism* the view that the definite article is *ambiguous*, one special meaning of it being the referential one, characterized by the following two features:

(i) referential DDs are rigid designators, and

(ii) the denotation of a referential DD is the individual the speaker intends to refer to.

Let us see whether we can devise such a semantic hypothesis within our framework. First of all, notice that none of the theories discussed in the pervious chapters constitute a good candidate for such a view, because they fail on account (i). This is obviously so for the Russellian theory, but the same is the case for the Fregean theory and the B&C theory. On the Fregean theory the semantic value of the DD 'the cat' is the following:

$||\text{the}||^{w} = \lambda f \in D_{<e,t>}$ and there is a unique $x_{<e>}$ such that $f(x)=1$.the unique $x_{<e>}$ such that $f(x)=1$

The extension of the definite article combines with the *extension* of the CN of the DD relative to the possible world considered. But the extension of the CN of the DD is not constant, but varies with the possible world considered:

$||\text{cat}||^{w} = \lambda x_{<e>}.1$ iff x is a cat in w

And so, we get:

$||\text{the cat}||^{w,a} =$

[6] The example that Kaplan (1989: 494) gives of a DD that is rigid but not directly referential is: 'the n[(Snow is slight $\wedge$ $n^2 = 9$) $\vee$ ($\neg$Snow is slight $\wedge$ $2^2 = n + 1$)]'.

= there is a unique $x_{<e>}$ such that x is a cat in w.the unique cat in w

This is not rigid, as there are at least two worlds w_1 and w_2 such that $||\text{the cat}||^{w1} \neq ||\text{the cat}||^{w2}$. One suggestion at this point might be to rigidify the DD by introducing in the specification of the extension a reference to the world of the context.

$||\text{the}||^{w} = \lambda f \in D_{<e,t>}$ and there is exactly one $x_{<e>}$ such that f(x)=1 *in* c_W.the unique $y_{<e>}$ such that f(y)=1 in c_W.

However, this also fails to give us the right result. On this assumption the extension of the DD turns out to be the following:

$||\text{the cat}||^{w}$ =

= [$\lambda f \in D_{<e,t>}$ and there is a unique $x_{<e>}$ such that f(x) = 1 in c_W.the unique $y_{<e>}$ such that f(y) = 1 in c_W]($\lambda x_{<e>}$.1 iff x is a cat in w)

= there is a unique $x_{<e>}$ such that x is an F *in* c_W *in w*.the unique x such that x is an F *in* c_W *in w*

This does not make any sense, as there is a conflict between the requirement that the F be evaluated relative to a world w and the requirement that we choose the unique F in c_W. We get similar results for the B&C theory: none of the two capture the modal aspect of DDs on the Referentialist view, i.e. the fact that they are rigid designators.

A more promising option is to construe the extension of the DD similar to that of indexicals. In fact, Reimer (1992: 93-94) explicitly takes the referential meaning of DDs to be that of an indexical, and refers to Kaplan (1989) for the standard treatment of indexicals. Just as an indexical such as ‘I’ or ‘now’ serve to pick out a particular individual, or, respectively, an instance of time, so, on the Referentialist proposal, the DD when used referentially serves to pick out an individual, the one that fulfills the description and is the intended referent. Let us then formulate the following hypothesis:

$||\text{the F}||^{a,w,c} = \{x \in D_e \mid$ x is the unique individual such that: x is an F and c_A intends to refer to x$\}$

We could express this semantic vale of type <e> by appealing to a semantic precondition, as follows:

$||\text{the F}||^{a,w,c}$ = there is a unique $x_{<e>}$ such that: x is an F and c_A intends to refer to x. x

This is a partial function defined only for those contexts in which there is an object that satisfies both conditions: it is an F, and it is what the speaker (i.e. agent of the context) intends to refer to. If the speaker referent does not fulfill the condition of being an F, then that utterance of the DD does not have a semantic value. This takes care of the suggestion in the above quote from Reimer (1998: 93) that, on the Referentialist proposal, the DD has a denotation only "provided the intended referent… is the (contextually) unique F."

This semantic value for 'the F' fulfills both requirements (i) and (ii): on the one hand, on this account the DD turns out to be rigid, as its denotation does not depend on the possible world of evaluation considered. On the other hand, it fulfills (ii), which requires that the denotation of the description be the individual the speaker intends to refer to.

The question that the above semantic hypothesis might raise concerns the concept of a speaker *intending to refer* to an object. As we have seen, Devitt (2007a: 22) adds further clarifications to the notion, by pointing out that the speech act of intending to refer to an object is grounded in a causal-perceptual relation to the object. This means that the object that the DDs refers to is not picked out from the context of utterance through a purely descriptive mechanism. Instead, Referentialism allows for speaker intentions to play an effective role in determining the semantic value of the DD.

§4.3. The truth-conditional data from referential uses

The second question that I suggested above is whether it is possible to find data concerning the difference between referential and attributive uses that is relevant to our methodology, i.e. data concerning truth-value judgments. That is to say, does the distinction between referential and attributive uses have any relevance to the discussion of the semantics of DDs within the framework for truth-conditional semantics we are assuming here? One way to approach this question is to see whether the Referentialist proposal introduced above makes correct predictions for paradigmatic cases in which DDs are used referentially (those that conform to Donnellan's initial characterization). Moreover, in order to subscribe to Referentialism we should find that neither the Russellian theory, nor any other of the theories discussed so far account correctly for this data, or for any other data that Referentialism accounts for.

Consider again an utterance of sentence 1 (repeated here as 2) such that the DD is used referentially:

2. The man drinking a martini will be expelled.

One small complication we encounter here is that the DD in 2 is incomplete. I argued in the previous chapter, in §3.3, that a satisfactory solution for the Russellian is to embrace the Stanley and Szabó mechanism for QDR. Assuming the DD is completed with the property of *being in this room*, the truth-conditions of the utterance of 2 on the Russellian theory are the following:

$||[_S \ldots]||^{a,w} =$

$= 1$ iff there is a unique $x_{<e>}$ such that x is a man drinking a martini in this room in w, and x will be expelled in w.

Assuming the speaker of 2 does have the intention to refer to a particular individual (i.e. the use is referential), the Referentialist predicts the following:

$||$the man drinking a martini$||^{a,w,c}$ = there is a unique $x_{<e>}$ such that: x is a man drinking a martini and c_A intends to refer to x. x

The truth-conditions for 2 on the Referentialist analysis are:

$||[_S \ldots]||^{a,w} =$

$= [||[_{VP}$ will be expelled$]||^{a,w}](||$the man drinking a martini$||^{a,w,c}) =$

$= [\lambda x_{<e>}.1$ iff x will be expelled in w](there is a unique $x_{<e>}$ such that: x is a man drinking a martini and c_A intends to refer to x. x) =

= there is a unique $x_{<e>}$ such that: x is a man drinking a martini and c_A intends to refer to x.1 iff x will be expelled in w

As expected, one difference between the two analyses of an utterance of 2 where the DD is used referentially is that the DD is rigid on the Referentialist analysis, but not on the Russellian analysis. If we consider the evaluation of the utterance of 2 relative to possible worlds other than the actual one, then, on the Referentialist proposal, it turns out true iff the *actual* man drinking a martini will be expelled. On the Russellian proposal, its truth-value relative to a non-actual world depends on whether the martini-drinker *in that world* will be expelled.

The two theories make different predictions. But is it indeed possible to appeal to truth-value intuitions to decide which is correct? Some authors have claimed that this difference in truth-conditions does not have an effect on competent speakers' intuitions. Schoubye (2012; see also Schoubye 2011: 143-144) writes:

> Notice that on Devitt and Reimer's proposed analysis, the truth conditions of (an unembedded occurrence of) 'the F is G' with 'the F' used referentially will quite generally be extensionally equivalent to the truth

> conditions of 'the F is G' with the description used attributively. (2012: 522-523)

The only difference between the Referentialist and the Russellian truth-conditions shows when we consider possible worlds *other* than the world of the context. They are not equivalent if we consider non-actual possible worlds of evaluation. However, a significant methodological problem occurs here, which Schoubye also mentions. Heim (2011) puts it in the following terms:

> But what difference in linguistic behavior, if any, corresponds to this technical difference? Truth-value judgment tasks cannot distinguish the two cases. In making such judgments, speakers contemplate whether a given sentence would be true if the world in which it was uttered had such and such properties. The same imagined world serves as both utterance world and world of evaluation, and therefore the difference between indexical and widest-scope non-indexical meanings is systematically neutralized. (2011: 1016)

Truth-value judgements relative to non-actual possible worlds cannot be used to test the theories, because speakers tend to evaluate the sentence as if uttered in the counterfactual context. I have already pointed out this in the discussion concerning the methodology we should adopt in §1.2: the question for the evaluation of an utterance relative to non-actual circumstances of evaluation is easily confused with a different one, i.e. the question for the evaluation of a non-actual utterance of the same sentence relative to *its* context of utterance.

So, utterances of sentences in which DD occur unembedded always get the same truth-value relative to the context of utterance, independently of whether the DD is used referentially or attributively. Let us then go on to consider utterances of sentences in which DD occur embedded in intensional contexts, such as modal operators, as in 3 and 4:

3. The first person on the Moon might have been a Russian.
4. It might have been the case that the teacher of Alexander did not teach Alexander.

Sentence 3 has two readings. When the DD in 3 is used referentially, and the sentence is used to express a singular thought about Neil Armstrong, the utterance of 3 has different truth-conditions than when the DD is used attributively. In the former case an utterance of 3 says, roughly, that the actual first person to arrive on the Moon might have been French, i.e. that Neil Armstrong might have been French. In the latter case the sentence is used to express the thought that a Russian astronaut (no one in particular) could have arrived on the moon before the Americans did. So we can find a difference between the two readings not only in terms of intuitions about the singularity or generality of the thought expressed, but also in terms of truth-value judgments. In order to determine whether the utterance of 3 is true on the former reading, one has to consider the conditions under which Neil Armstrong could have had the Russian nationality. In order to evaluate 3 under the latter reading one has to consider whether it is indeed possible (given the contextually available evidence) that the Russians made it to the Moon before the Americans did.

Sentence 4 also has two readings, and the two readings correspond to different truth-conditions. If the DD is used referentially, to pick out Aristotle, then the utterance of 4 is *true*: Aristotle might not have taught Alexander. If the DD is used attributively, an utterance of 4 says that it is a counterfactual possibility that the teacher of Alexander, whoever she or he is, did not teach Alexander. On this reading the sentence is necessarily *false*: whoever is the teacher of Alexander in a world w teaches Alexander in w.

Sentences such as these suggest that the referential/attributive distinction could be made relevant to the semantics of DDs even if we decide to focus exclusively on truth-conditions. The next question we should ask is whether these differences in truth-value judgements depending on whether DDs are used referentially or attributively constitute a challenge for the Russellian theory. In particular, is it the case that the Russellian theory is not capable of correctly predicting the truth-conditions of the above sentences on the referential use, so that we need to appeal to Referentialism? The Russellian aims to account for the data by appealing to the scope ambiguity of sentences such as 3 and 4. The notion of scope ambiguity was already discussed briefly in §2.4. I discuss in more detail the readings that sentences in which DDs enter into scope relations with modal operators in §5.7 below. Here I only indicate how the Russellian account of 3 and 4 goes. Take sentence 4: given that there is no type mismatch in 4, QR-ing the DD is optional, which means that we systematic get two LFs for sentences: one results from leaving the DD in its initial position, and the other results from QR-ing the DD, as follows:

4.1. $[_S$ [it might have been the case that] $[_S[_N$ the teacher of Alexander] $[_{VP}$ did not teach Alexander]]]

4.2. [$_S$ [$_N$ the teacher of Alexander] [[λ_1] [$_S$ [it might have been the case that] [$_S$ [$_N$ t_1] [$_{VP}$ did not teach Alexander]]]]]

The utterance of 4 on the 4.2 disambiguation is the one that corresponds to the referential reading of 4. I skip here the steps of the calculation of the truth-conditions of 4.2 (but see the discussion of 28.2 in §5.7 to see how this should go), and I will not go into the question concerning the exact analysis of the modal operator 'it might have been the case that'. The result is roughly the following:

$||[s\ldots]||^{w,a} =$

= 1 iff there is a unique $x \in D_e$ such that x is a teacher of Alexander in w, & $\exists w' \in W$ (w' ≠ w & x did not teach Alexander in w')

Considering now the LF 4.1 the predicted truth-conditions are the following (again, see §5.7 for details):

$||[s\ldots]||^{w,a} =$

= 1 iff $\exists w' \in W$ (w' ≠ w & there is a unique $x \in D_e$ such that x is a teacher of Alexander in w', & x did not teach Alexander in w')

Relative to the actual world the utterance of 4 is predicted to be true on the 4.2 disambiguation, but false on the 4.1 disambiguation. The calculation of the semantic values of the utterance of 4 on the two disambiguations for the Fregean and the B&C theories also predict different truth-conditions for the two LFs of 4. For instance, with the B&C theory we get the following for 4.2 (again, see the details in §5.7):

there is a unique $x \in D_e$ such that x is a teacher of Alexander in w.1 iff every x such that it is a teacher of Alexander is such that $\exists w' \in W$ (w' ≠ w & x did not teach Alexander in w')

For the 4.1 disambiguation, we get:

1 iff $\exists w' \in W$ (w' ≠ w & there is a unique $x \in D_e$ such that x is a teacher of Alexander in w', & every x such that x is teacher of Alexander in w' is such that x did not teach Alexander in w')[7]

Again, we see that the B&C theory correctly predicts the intuitive truth-value judgments.

[7] Given Intensional Functional Application, which was introduced in §1.11, the semantic precondition of existence and uniqueness that the definite article introduces on the B&C theory has to be fulfilled at a world that the existential quantifier quantifies over, and not at the world of the context. It might not be easy to see why this is so at this point, but the details are explained in §5.7.

As expected, the Referentialist semantic value for the DD also predicts the truth-value judgments in the case of the referential use, on which the utterance of 4 is intuitively false. On the Referentialist theory, the truth-conditions for 4 are the same on both LFs of 4, given that the contribution of the DD to the truth-conditions is the same in both cases, and does not vary from world to world. They are the following:

there is a unique $x_{<e>}$ such that: x is a teacher of Alexander and c_A intends to refer to x.1 iff $\exists w' \in W$ ($w' \neq w$ & x did not teach Alexander in w')

Given that on the referential use c_A intends to refer to Aristotle, who is the actual teacher of Alexander, the utterance of 4 is predicted to be true, which coincides with the intuitive truth-value judgment.

The result that we get from the discussion in this section is, on the one hand, that the best way to translate the data concerning singularity intuitions into data concerning truth-value judgments requires looking at sentences in which DDs interact with modal operators, such as 3 and 4 above. But, on the other hand, we saw that the Russellian theory (but also the B&C and Fregean theory) correctly predicts the truth-value judgments for these sentences, both on the referential and on the attributive use of the DD. If the theories considered only predicted the correct truth-conditions for the attributive use of the DD, but *not* for the referential use, then Referentialism would be an attractive option. But, given the present results, referential uses do not constitute a reason to embrace Referentialism.

Our discussion of referential uses might very well stop here. However, it is not without theoretical interest to take seriously the kind of data that the Referentialist considers, that is, the intuitions of singularity that referential uses of DDs exhibit. After all, the Referentialist might protest that we have been unfair in evaluating the prospects of Referentialism without considering the kind of data that *she* takes to be crucial. Now, our framework does not predict intuitions of singularity, as already argued. But we did try to approximate Reimer's and Devitt's Referentialist proposal within our framework of flat propositions when we designed our version of Referentialism taking into consideration two features: (i) that referential DDs are rigid designators, and (ii) that the denotation of a referential DD is the individual the speaker intends to refer to. None of these two features is present in the Russellian, Fregean, or B&C analyses of sentences 2, 3 and 4 discussed above. None of these theories predict is that the utterances of these sentences in which the DD is used referentially it is a rigid expression. With respect to this aspect, the Referentialist proposal differs from the other proposals in the truth-conditions it assigns to 2, 3 and 4, although we have not been able to find a way to *test* these different hypotheses in a way that would allow us to make a decision in favour of one or the other option.

In the next section I discuss a feature of Referentialism that we have not addressed so far, which is the claim that DDs are ambiguous. I argue that this is not an attractive view. In the last section I argue that the Russellian, Fregean and B&C theories have the resources to predict that the DD is a rigid expression when used referentially. We will finally conclude that Referentialism neither needed nor plausible.

§4.4. Is the definite article ambiguous?

Reimer and Devitt's Referentialism is the claim that there is a semantic convention specific to referential uses of DDs. Given that according to these authors attributive uses are to be treated as the Russellian does, the semantic of the two uses of DDs is a case of lexical ambiguity. If this is to be located at the level of the semantics of the definite article, then the latter has two linguistic meanings. That is, 'the' is ambiguous, having two independent semantic values: a Referential one, that is deployed in attributive uses, when the semantic content is *general*, and a Referential one, that is deployed in referential uses, when the semantic content is *singular*. Kent Bach has pointed out that this view is implausible, as it postulates

> a massive cross-linguistic coincidence… It would be a remarkable fact that an ambiguous word ('the' in this case) in one language should have translations in numerous other languages that are ambiguous in precisely the same way." (2004: 226-227)

That is because standard cases of ambiguity are linguistic accidents that are usually specific to one particular language, and are not to be found in many other languages. Therefore, the ambiguity of 'the' would be a surprising fact, one that the Referentialist could not account for, Bach suggests.

In other words, if 'the' is actually ambiguous in English, we should expect the ambiguity to be removed by translating the definite article to other languages. As Kripke writes:

> "Bank" is ambiguous; we would expect the ambiguity to be disambiguated by separate and unrelated words in some other languages. Why should the two separate senses be reproduced in languages unrelated to English?... If

> no such language is found, once again this is evidence that a unitary account of the word or phrase in question should be sought. (Kripke 1977: 268)

Kripke does not cite empirical evidence, but writes that, "I at least would find it quite surprising to learn that say, the Eskimo, used two separate words "the" and "ze," for the attributive and referential uses." (1977: 268) Bach claim that this expectation is empirically justified: if 'the' is ambiguous, "One would expect there to be plenty of languages with two definite articles, each with one meaning, but there in fact aren't." (2007: 56)

Amaral (2008: 290f) replies to Bach's objection to the ambiguity thesis that the Referentailist does have an explanation for the cross-linguistic fact that the definite article is ambiguous in many languages. Such an explanation is available if we distinguish between two kinds of ambiguity: homonymy and polysemy. The former are expression forms that have two unrelated meanings, and which are indeed the result of historical coincidences. Such is the word 'bass' in English: Amaral (2008: 291) tells us that one of its meanings, the one that names a fish, comes from a word in Old English, while the other, the one that names the lowest register of the male voice, comes from the Italian word 'basso'. Polysemies, on the other hand, are expressions forms that have more than one meaning, but these meanings are systematically related. Thus, English speakers use the word 'foot' to refer to a human limb, but also to refer to the feet of chairs and tables, or the foot of a mountain. The two meanings of 'foot' are systematically related, and not a cross-linguistic coincidence. A plausible hypothesis concerning the history of the latter meaning could be construed, involving a derivation of that meaning from the former meaning. And if a hypothesis of this kind is correct, then the new meaning is not the result of historical contingencies, but, at least in part, the outcome of a law-governed process that we expect to find in other languages too. That is, the reason why a word is polysemic in one language is general enough to expect the corresponding word in a different language to be polysemic too (and indeed, this is so in many languages, for instance: 'pie' in Spanish, 'pé' in Portuguese, 'picior' in Romanian, are all polysemic in the same way as 'foot' is in English).

So, Bach's argument is plausible only if we run it against the hypothesis that the ambiguity of 'the' is a case of *homonymy*, but not if it is said to be a case of polysemy. The latter are not unexplained coincidences. So, in order to avoid the undesirable consequence that the ambiguity of 'the' is a massive cross-linguistic coincidence,[8] the Referentialist has at her disposal the option of taking the definite article to be *polysemic*, having two distinct but *related* linguistic meanings. For that claim to pass muster, the Referentialist must provide an account of how the polysemy was formed, which should show why it is a case of polysemy at all and not one of homonymy. Amaral (2008: 292-293) proposes such a hypothesis, involving a derivation of the referential meaning from the attributive (Russellian) meaning. Assuming that the attributive meaning is the original meaning in all languages, this makes it reasonable to expect that the ambiguity of the definite article is present in many languages, Amaral (2008) argues. It explains why we should not expect the ambiguity to be removed by translation, as Kripke suggests.[9]

Amaral's (2008) view that the Russellian-Referential ambiguity of the definite article is a case of polysemy diminishes the initial force of Bach's and Kripke's objections to the ambiguity claim. However, Amaral's claim does not show that the definite article *is* a case of polysemy. It only shows that the claim that it is is not as implausible as Bach and Kripke think it is. It is still an open question whether we should opt for the view that the definite article is ambiguous. I consider in what follows certain tests for ambiguity, and I argue that what they suggest is that the definite article is not even polysemic.

§4.5. Tests for ambiguity

Sennet (2002) appeals to the tests for ambiguity that are available in the literature on lexical semantics in order to determine whether the definite article is ambiguous or not. Although these tests cannot be taken as the final word on the issue of whether the dual use of DDs, i.e. a referential use and an attributive use, is really a case

[8] Actually, this assumption is not totally warranted. The duality of referential and attributive uses of the same definite article is present in many languages, but not all. Amaral (2008: 294-295) argues that there are languages that remove the ambiguity of the definite article by citing evidence concerning Malagasy, an Austronesian language, and Mönchengladbach, a Low Franconian dialect spoken in the northwest of Germany, where there are two definite articles, corresponding to the two uses.

[9] This point was in fact already made in Kripke's article (although Kripke does not explicitly mention the distinction between homonymies and polysemies): "The more we can explain relations among senses, and the more "natural" and "inevitable" the relationship, the more we will expect the different senses to be preserved in a wide variety of other languages." (1977: 275)

of semantic ambiguity,[10] they provide considerations that are relevant when discussing the Referentialist proposal.

One test that Sennet (2002) appeals to is the so-called "conjunction reduction test" (Zwicky and Sadock 1975: 18; Bach 1998).[11] The idea of the test is to bring into play simultaneously the two uses of an (alleged) ambiguous word. The test works as follows: take two sentences in which the alleged ambiguous word is used in the two respective ways at issue; conjoin the two sentences and "reduce" them, such that the word we test for appears only once; if the resulting sentence is "judged unacceptable, then [the word] is prima facie ambiguous." (Gillon 2004: 181); if it is judged as a case of "zeugma" then the word is ambiguous. "Zeugma" is the term sometimes used to label a sentence that lacks any interpretation, or only has an odd or absurd one.[12] The reason why the test indicates that the word we test for is ambiguous is that

> independent senses of a lexical form are antagonistic to one another; that is to say, they cannot be brought into play simultaneously without oddness. Contexts which do activate more than one sense at a time give rise to a variety of oddness labelled zeugma. (Cruse 1986: 61)

Consider sentences 5 and 6 in which the word 'newspaper' is used in two different ways. Sentence 7 results from applying conjunction and reduction to 5 and 6. We notice that an utterance of 7 is infelicitous, in the specific sense that it is unintelligible or hard to interpret. Any attempt to interpret it gives us an odd result. That is, 7 is a case of zeugma.

5. The newspaper fell off the table.
6. The newspaper fired the editor.
7. #The newspaper fell off the table and fired the editor. (Gillon 2004: 177)

Therefore, according to this test the two uses of 'newspaper' correspond to two *different* senses, or linguistic meanings, of the word. The word 'newspaper' is ambiguous, and we should consider assigning to it two different semantic values.

Now, it is not beyond doubt whether this test actually proves ambiguity. It may very well be denied that any ambiguous word must pass this test. There might be

[10] See the discussion in Sennet (2011: §4) concerning this point.

[11] The literature on this test is rich, although sometimes it is presented under different names: "the antagonism test" (Cruse 1986: 61-2), "the copredication test" (Asher 2007: 65), or as "the predicate coordination test" (Gillon 2004: 176).

[12] One famous example of zeugma is Chomsky's (1957) 'Colorless green ideas sleep furiously'. The sentence is grammatically correct but nonsensical.

alternative explanations of the data in 7. However, many cases of intuitively ambiguous words do pass the test, which is an indication that there are reasons to take it seriously. Sennet (2002: 84-85) does so and applies the test to the definite article. Consider an utterance of 8 made by a revolutionary who has just identified the prince and plans to kill him during the forthcoming revolution. And consider an utterance of 9 by the same revolutionary who in fact has never seen the Queen and arguably is unable to entertain a singular proposition about her (the speaker might even add “whoever she is”, a mark of attributive uses, according to Donnellan).

8. The Prince will die at dawn.
9. The Queen will die at dawn.
10. The Prince and Queen will die at dawn.

Sentence 10 results by conjunction and reduction from 8 and 9, and is perfectly felicitous. This is not what we should find if the definite article were ambiguous. So, ‘the’ does not pass the test for ambiguity. It is easy to replicate this result as many times as we want to, so I will not insist any further. The conclusion that this suggests is that it is not plausible to take ‘the’ to be ambiguous, not even if we see this ambiguity as a case of polysemy, and not as a case of homonymy. The CN ‘newspaper’ passes the test although it is plausible to see it as a case of polysemy, as the two uses (in sentence 5 and 6, respectively) are strongly related.

§4.6. Rigidity without ambiguity

We have seen in the previous section that Referentialism is not a plausible thesis, as it requires postulating that the definite article is ambiguous, a thesis that lacks empirical support. But I have suggested in section §4.3 that it is not without theoretical interest to predict that when used referentially (i) DDs are rigid designators, and (ii) the denotation of a referentially DD is the individual the speaker intends to refer to. I argue in this section that the Russellian theory, but also the Fregean and the B&C theory, predict both (i) and (ii). Referentialism is just one way in which (i) and (ii) could be implemented semantically, but not the only way.

The view that I discuss in this section is proposed in Neale (2004: 171-173). Neale’s purpose is to offer a *semantic* account of the referential use of DDs without having to abandon the Russellian theory. The idea of the proposal is that, when an incomplete DD is used referentially, the completion of the description is achieved with the help of a variable that takes as value precisely the individual the speaker is referring to with the description. Neale uses an example introduced in Schiffer (1995: 114): the speaker and the hearer are waiting in the audience for the philosopher Ferdinand Pergola to give a talk. When he shows up, the speaker utters in surprise:

11. I'll be damned! The guy's drunk!

According to Neale (2004: 171), the utterance of the second sentence in 11 is true iff *there is a unique x such that guy (x) ∧ x = a, and x is drunk* (where *a* is a variable the value of which is assigned by a contextually determined assignment).[13]

Neale's approach could be implemented in the semantic framework used in this thesis, which we supplemented in the pervious chapter with Stanley and Szabó's (2000) theory of contextual domain restriction (or, more precisely, of contextual nominal completion). That would be a departure from Neale's original proposal, in as much as he conceives of it as an application of his "explicit" approach to contextual domain restriction, and he rejects the Stanley and Szabó approach (see Neale 2000). Nevertheless, the implementation of Neale's proposal I present in what follows captures his suggestion concerning the correct truth-conditions of utterances of sentences containing referentially used DDs.

According to Stanley and Szabó, the LF of the second sentence in 11 is:

$[_S\ [_{DP}\ [_{Det}\ \text{The}]\ [_{CN}\ \text{guy},\ f_{1.1}(i_1)]]\ [_{VP}\ \text{is drunk}]]$

The value of 'f' and 'i' are contextually supplied. On the present proposal, when the DD 'the guy' is used referentially the completion is not realized descriptively, but non-descriptively. The semantic type of the variable 'f' is <e,<e,t>>, and that of the variable 'i' is <e>. According to Neale's proposal, the completion of incomplete DDs is achieved *demonstratively*, and not descriptively. In particular, the value of 'i' is precisely the individual the speaker *intends to refer to* (i.e. intends to talk about, has in mind), and the value of 'f' is the identity relation. This way, we can implement (ii) in the semantics of DDs without having to abandon the Russellian theory. So, under the contextually determined assignment *a*, we get:

a(1.1) = identical to

a(1) = *that* (the individual that the speaker intends to refer to)

So, we get:

$||[_{CN}\ \text{guy},\ f_{1.1}(i_1)]||^{w,a} =$

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[13] Neale's formulation of the truth-conditions in a semi-formal language in which we introduce a Russellian generalized quantifier '*the*' is the following: [*the* x: guy (x) ∧ x = *a*] x is drunk.

$= \lambda x_{<e>}.1$ iff x is a guy and is *a*(1.1) (*a*(1)) in w =

$= \lambda x_{<e>}.1$ iff x is a guy and is identical to *that* in w

Therefore:

$||[_{NP}\ [_{DET}$ The$]\ [_{CN}$ guy, $f_{1.1}(i_1)]]||^{w,a} =$

$= ||\text{the}||^{a,w}(||[_{CN}$ guy, $f_{1.1}(i_1)]||^{w,a}) =$

$= [\lambda f_{<e,t>}.[\lambda g_{<e,t>}.1$ iff there is a unique $x_{<e>}$ such that f(x) = 1, and g(x) = 1]]($\lambda x_{<e>}.1$ iff x is a guy and is identical to *that* in w) =

$= \lambda g_{<e,t>}.1$ iff there is a unique $x_{<e>}$ such that x is a guy and is identical to *that* in w, and g(x) = 1

We get the following truth-conditions for the utterance of 11:

$||[_S \ldots]||^{w,a} =$

= 1 iff there is a unique $x_{<e>}$ such that x is a guy and is identical to *that*, and x is drunk in w.

Notice that the extension of the DD is rigid: it picks out the individual the speaker intends to refer to relative to all worlds in which that individual is a guy. Arguably, there are possible worlds in which that individual does not fulfil the description, i.e. is not a guy, in this case. Relative to those worlds, the DD fails to pick out any individual. Therefore, this proposal fulfils (i) also, i.e. it makes referentially used DDs rigid expressions.

However, a difference between Referentialism and the present proposal is that in such cases of misdescription Referentialism predicts that the utterance of 11 is *truth-valueless* if the intended individual does not fulfil the description (is not a guy, but say, a robot that looks like a person from a distance). However, according to the truth-conditions predicted here, the utterance of 11 is *false* relative to w if the speaker referent is not a guy in w. That is because so far we have only considered how the Russellian theory could accommodate Neale's suggestion. But the same suggestion concerning nominal completion could be used in conjunction to other theories of DDs, such as the Fregean theory. On the Fregean theory, the utterance of ‘The guy’s drunk!’ under consideration has the following truth-value relative to a world w:

$||[_S \ldots]||^{w,a} =$

= there is exactly one $x_{<e>}$ such that x is a guy and is identical to *that* in w.1 iff x is drunk in w.

Finally, on the B&C hypothesis, the analysis of the sentence turns out to be the following:

$||[s \ldots]||^{w,a} =$

= there is exactly one $x_{<e>}$ such that x is a guy and is identical to *that* in w.1 iff every $x_{<e>}$ such that x is a guy and is identical to *that* is drunk in w.

On both these theories, the utterance of the sentence turns out truth-valueless when the individual the speaker referent does not fulfil the description (i.e. is not a guy). In this respect they coincide in predictions with Referentialism, as they predict the existence of truth-valueless utterances of sentences containing DDs used referentially. And, in this respect they differ from the Russellian theory, which predicts that the utterance is false, not truth-valueless.

Finally, notice that one advantage of our implementation of Neale's proposal (or of a version of it) is that it offers a solution to the *underdetermination problem* (discussed in the previous chapter, §3.6) for referential uses of DDs. Schiffer (1995) formulates the problem, in relation to the utterance of 11, as follows:

> Imagining myself as your audience, I do not see how I could have identified any one definite description, however complex, as *the one* that figured in the proposition you asserted. And yet, it would seem that I understood your utterance perfectly well" (1995: 115)

Neale replies: "I suggest *simple* rather than *complex*" (2004: 171). Indeed, the demonstrative completion of the description is the most natural candidate for completing the description in the case of referential uses. The completion of the DD 'the guy' is not the guy *I am looking at*, or the guy *on that stage* or any other completion equally implausible, but rather the guy *which is identical to that* [the guy that the speaker intends to refer to]. The speaker needs not make use of any *descriptive* completion of 'the F' given that the intended referent is anyway salient (or, at least the most salient F in the context). So it is not surprising that the demonstrative completion is the solution to the underdetermination problem (or, strictly speaking, there is no underdetermination problem for referential uses).

In conclusion, the discussion in the present chapter suggests that the theories we have been discussing so far (Russellian, Fregean and B&C) have the resources to account for the data that the Referentialist takes to require a semantic treatment of referential uses of DDs. The proposal developed here and inspired by Neale (2004) is applicable not only to the Russellian theory, as Neale does, but also to the other two theories discussed. The theoretical advantages of this treatment of referential uses are that it does not involve postulating an ambiguity, and that it helps solve the underdetermination problem for referential uses.

Chapter 5: The presupposition of DDs

§5.1. The phenomenon of presupposition

In chapter 2 different theories of DDs were introduced and compared from the point of view of four criteria. In this and the next chapter I look more closely at question number (iv), about whether *improper* DDs (i.e. DDs that no object satisfies, or that more than one object does) have a defined semantic value. As we have seen, the Russellian answers the above question affirmatively, while the Fregean answers it negatively, assigning to 'the F' a semantic value only if there is a unique F. For the Fregean, simple sentences containing DDs that turn out to be improper relative to the possible world considered do not have a truth-value. The Fregean theory makes different predictions than the Russellian theory, on which simple sentences containing improper DDs do have a truth-value, and in particular, they are false (if there is nothing else wrong with them). Should we go with the Russellian or the Fregean in this respect?

I address this question directly in the next chapter. In this one I start by placing it within a broader perspective, that of the question whether DDs introduce a *presupposition* of existence and uniqueness. I have already mentioned presuppositions in chapter 2 in relation to the Fregean theory. Frege uses the word 'presupposition' in his discussion of the semantics of singular referential expressions: "If anything is asserted there is always an obvious presupposition that the simple or compound proper names used have referents." (Frege 1892: 40) But the phenomenon of presuppositions identified in the literature is not confined to the question whether certain expressions introduce preconditions that need to be fulfilled in order for the expression to have a semantic value. In fact, this is only one *theoretical* approach to a more general phenomenon, one that needs not be described in semantic terms. It is useful to consider the more general phenomenon, to identify the relevant data, and to see whether there are alternative ways of accounting for it, apart from that of postulating a Fregean presupposition.

Discussions of the phenomenon of presupposition in the literature usually start by observing that the use of certain expressions exhibits certain features that can be isolated in the following way: when uttering certain sentences and say, asserting that *p*, there is a sense in which the speaker is also *implying* that *q*. The crucial aspect here is that this implication is preserved when embedding the initial sentence in a variety of linguistic contexts under which other implications (e.g. logical, material etc.) are not preserved. The presupposition of the initial sentence is said to *project* when it is inherited by the larger sentence. As Soames (1980: 554) notes, "Heritability is such a striking feature of presuppositions that they are often identified as those commitments that are inherited".

The phenomenon is usually introduced by appeal to paradigmatic examples, such as sentences formed with change of state verbs ('John stopped smoking' implies that *John used to smoke*; 'John started to smoke' implies that *John did not smoke before* etc.), cleft constructions ('What John said was that we should leave' implies that *there is something that John said*; 'It is John who broke the window' implies that *someone broke the window*) etc. The word 'implies' is used above in a pre-theoretical sense, and, at this level of description of the phenomena, it is not meant to be understood strictly in terms of a semantic relation between the content of the sentence and the content of the implication. Another way to put it is to say that whoever utters 'John stopped smoking' *is committed to* (or presents herself as being committed to) it being the case that *John used to smoke*, and so on.

These implications are preserved when embedding the sentence under a variety of contexts. Consider, for instance, embedding the former sentences under negation: 'It is not the case that John stopped smoking' also implies that *John used to smoke*; 'It is not the case that what John said was that we should leave' also implies that *John said something*, etc. Frege already noticed that the presuppositions ("Voraussetzung" in German) of a sentence are also the presuppositions of the *negation* of that sentence. He made this observation in relation to proper names, but the point applies also to the general phenomenon of presupposition as introduced here:

> If one therefore asserts 'Kepler died in misery,' there is a presupposition that the name 'Kepler' designates something… That the name "Kepler" designates something is just as much a presupposition for the assertion 'Kepler died in misery' as for the contrary assertion ['Kepler did not die in misery']. (Frege 1892: 40)

It is not only negation that the implications in the previous examples survive under, but also many other expressions. A list of expressions such that the presuppositions of their complements become presuppositions of the entire sentence includes negation, modal operators, conditional 'if', and interrogatives. These four form a list of sentential operators and connectives known as "the S family" (Chierchia and

McConell-Ginet 1990). They are typically used to test whether a certain implication is a presupposition.[1]

Not all implications of sentences survive the embedding of the sentence under these operators. Notice, for instance, that 'John ate an egg' implies that *John ate something*. But this implication disappears if we embed the sentence under negation: neither 'It is not the case that John ate an egg', nor 'John did not eat an egg', implies that *John ate something*. Similarly, 'John ate an egg' implies that *somebody ate an egg*. Again, it is not an implication of 'John did not eat an egg' that this is the case. An explanation is required for the fact that certain implications survive the embeddings while others do not. Presumably, given that the latter examples concern (logical or material) *entailments* of the sentences considered, presuppositions are not entailments. This is a point I return to later on.

To sum up, we have considered so far the following kind of linguistic data:

(i) the use of certain sentences introduces a particular a particular commitment (or felt implication),

(ii) which is preserved when embedding the sentence in certain linguistic contexts.

This data is sometimes discussed under the label of 'presuppositions'. However, as I discuss below, many authors offer an alternative account of the phenomenon of presupposition. So I call the phenomenon discussed so far *presupposition$_1$*. Before moving to a different account of the presupposition data, let us consider the question whether DDs have a presupposition$_1$?

§5.2. Do DDs introduce a presupposition$_1$?

The question we address here concerns the phenomenon identified by features (i) and (ii) outlined above. Consider the following sentences:

1. The mathematician who proved Goldbach's Conjecture is a woman.
2. The king of France is bald.
3. I talked to the philosophy professor.
4. I read Crime and Punishment at the public library in our town.

These sentences introduce various implications. For instance, 1 implies various things:

[1] Kadmon (2001: 11) also writes: "Survival in this sort of "family of sentences" is often taken to be a crucial test - *the* test even - for presupposition status."

that there is a woman, that there are mathematicians and many more. Consider the implication that *there is a mathematician who proved Goldbach's Conjecture and only one such mathematician*. Sentence 2 has a similar implication, in particular, that there is a unique king of France. We get similar implications with simple sentences that contain a DD in the object position of a verb, as in 3, and in the object position of a preposition, as in 4. If we consider similar examples, the general observation is that the implication systematically related to the use of the definite article is that *there is a unique individual* that satisfies the CN in the DD. The intuition is strong enough to take on board as a piece of linguistic data simple sentences containing expressions of the form 'the F' imply (in some sense) that there is an F (for short, *existence*) and only one such F (for short, *uniqueness*).

Now, sentence 5 also implies that there is a unique mathematician who proved Goldbach's Conjecture (GC, henceforth):

5. There is a unique mathematician who proved Goldbach's Conjecture.

But the projection data for sentences 1 to 4 is different from the data for 5. Consider embedding sentence 1 in negation, interrogative mood, a modal operator, and the antecedent of a conditional. The resulting sentences are, respectively, 6, 7, 8 and 9.

6. It is not the case that the mathematician who proved GC is a woman.
7. Is the mathematician who proved GC a woman?
8. It is possible that the mathematician who proved GC is a woman.
9. If the mathematician who proved GC is a woman, Fermat did not prove it.

Now consider the same operation for sentence 5, the resulting sentences being, respectively, 10, 11, 12 and 13.

10. It is not the case that there is a unique mathematician who proved GC.
11. Is there a unique mathematician who proved GC?
12. It is possible that there is a unique mathematician who proved GC.
13. If there is a unique mathematician who proved GC, Fermat did not do it.

The embedding of sentences 1 and 5 under these operators has a *different* effect on the implication of existence and uniqueness of the resulting sentences. While sentences 6 to 9 preserve the implication of uniqueness and existence, sentences 10 to 13 do not. Intuitively the former sentences introduce the implication that there is a unique mathematician who proved GC. This implication projects, and so, as it fulfils both criteria (i) and (ii), it is a presupposition$_1$. Repeating the test for sentences 2, 3 and 4, we can see that they also introduce a similar presupposition$_1$ of existence and uniqueness.

Given that all these sentences have in common the occurrence of a DD, it is reasonable to conclude that it is the DD that triggers the presupposition$_1$.

§5.3. Alternative accounts of the data: presupposition$_2$

According to some alternative accounts, the data that theories of presupposition should explain consists in a certain kind of felt implications, in particular, implications that speakers *take for granted*. Kadmon (2001: 10), for instance, writes: "What is the basic linguistic intuition on which the notion of presupposition is based? ... I believe that the basic intuition about a presupposition is that it is taken for granted."[2] According to Chierchia and McConnell-Ginet (1990: 281), "the main empirical characteristics of presuppositions can be taken to be the following two: being *backgrounded* and being *taken for granted*." Other authors introduce even more sophisticated accounts of the data. According to Kai von Fintel (2004: 316), the phenomenon should be characterized in terms of intuitions of *felicity* or *infelicity* of the use of certain sentences, together with facts concerning projection. He writes: "the main empirically observable facts that motivate theories of presupposition" are two: first, utterances of certain sentences "are hard to use felicitously unless the speaker takes it for granted that the 'presupposed' component of meaning is already common ground among the participants in the conversation (as Stalnaker puts it, sentences require a speaker presupposition)"; and, second, this fact "persists even when such sentences occur embedded in larger constructions".

It is not always easy to distinguish the theoretical accounts of the phenomenon of presupposition from the data to be explained. von Fintel's characterization of presupposition is an example of this problem, as it seems to go beyond a direct presentation of a kind of linguistic *data* that needs an explanation, in as much as it relies on Stalnaker's theoretical notion of speaker presupposition. However, if we read "take for granted" in a non-technical sense, then von Fintel's characterization could be taken to correspond a pretheoretical datum (i.e. "empirically observable facts" as he claims).

So, the authors quoted above propose an alternative characterization of the data, which involves the notion of a speaker *taking for granted* a certain proposition, as well as certain intuitions of *felicity* or *infelicity*. In particular, the idea is that utterances of

[2] In the same vein, Soames (1980: 553) writes: "to presuppose something is to take it for granted in a way that contrasts with asserting it."

certain sentences are hard to use felicitously unless the speaker takes for granted a certain proposition. These notions were not part of the characterization of the phenomenon of presuppositions$_1$, in (i) and (ii) above. I will then call *presupposition$_2$*, the phenomenon characterized by the following features:

(i') utterances of certain sentences carry an implication which is such that the utterance is infelicitous unless the speaker takes it for granted (i.e. takes for granted that the implication obtains);

(ii') (i') persists even when such sentences occur embedded in larger constructions.

If we take this to be the data that theories of presupposition account for, it is a different phenomenon than that of presupposition$_1$, and in particular, a *subspecies* of that phenomenon. With presupposition$_1$ we did not look at *the kind* of felt implication that sentences introduce (i.e. one that is intuitively taken for granted), or what the effect of presupposition failure is on utterances of sentences (i.e. infelicitous use). The initial description of the data was simply less specific than the one we focus on at this point.

If we look at the paradigmatic examples of implications that theories of presuppositions are usually taken to explain (those introduced by change of state verbs, *it*-clefts, *wh*-constructions and so on), we see that they do exhibit the features in (i') and (ii') above. However, I am not interested here in the question whether what we called presupposition$_1$, or the more specific phenomenon of presupposition$_2$, corresponds to the correct definition of the *genuine* phenomenon of presupposition. It may turn out that there is no unique genuine phenomenon of presupposition, no one natural kind that corresponds to the observed facts. It may be that for different linguistic expressions, or different linguistic environments, the data is to be explained differently. This question is beyond our concerns here. Instead, I go on in what follows distinguishing between the two different sets of data and see whether they are present with DDs, and whether the various theories of DDs can account for it.

We saw above that DDs do introduce a presupposition$_1$ of existence and uniqueness. Does this data also correspond to the phenomenon of presupposition$_2$? Consider again sentence 1, repeated here as 14:

14. The mathematician who proved Goldbach's Conjecture is a woman.

Sentence 1/14 is *infelicitous*, or inappropriate, to utter in a context in which it is known by speaker and addressee that there is no unique MPGS. Intuitively, the speaker of 14 is *taking for granted* that there is a unique MPGC. So point (i') obtains relative to sentence 1. We can make the same observation concerning sentence 2, 3 and 4, which I do not repeat here.

We obtain further evidence relative to point (i') from simple sentences containing DDs if we consider, as Kadmon (2001: 12) suggests, the addressee's possible replies to 1/14. In case the addressee believes there is *no unique MPGC* she cannot felicitously directly agree, nor disagree with 1/14. A direct response such as 'Yes', 'I agree', or 'No', 'I don't think so', is not appropriate. This indicates that it is not part of what has been asserted that there is a unique MPGC. Instead, this is an implication, or a backgrounded content. We see that this backgrounded content is something the speaker takes for granted if we consider the replies that *are* appropriate in those circumstances. As von Fintel (2004: 316-7) notes, it is suggestive to look at replies such as 'Hey, wait a minute, I did not know that …', or 'Hey, wait a minute, we cannot take for granted that …'. Indeed, it is infelicitous to reply to 15 with 16, but it is felicitous to reply with 17:

15. Mary stopped smoking.
16. # Hey, wait a minute, I did not know that Mary stopped smoking.
17. Hey, wait a minute, I did not know that Mary used to smoke.

Von Fintel does not explain what exactly the test shows, but it may help to notice that the purpose of these replies is to point out to the speaker that she has taken for granted a proposition she should not have taken for granted in the context. The reply is also a way of pointing out that something went wrong with the previous speech act. The continuation of the remark (i.e. "I did not know that…") indicates what went wrong, as it is a way of saying: "do not take this for granted, as it is new information to us (the audience)". So, such remarks help identify contents that speakers take for granted.[3] Going back to sentences with DDs, we observe that it is felicitous to reply to 1/14 with either 18 or 19, which provides further data that the speaker of 1/14 takes for granted that the existence and uniqueness implications of the sentence obtain.

18. Hey, wait a minute, I had no idea that there is a mathematician who proved Goldbach's Conjecture.
19. Hey, wait a minute, I had no idea that at most one mathematician proved Goldbach's Conjecture.

[3] Some authors, such as García-Carpintero (2010: 25), express confidence in the test: "The intuitions unveiled by the 'Hey, wait a minute' test are robust… The robustness of the intuitions suggests at least prima facie that we are confronted with a sufficiently 'natural' kind".

I take it that the above discussion is sufficient to suggest that simple sentences containing DDs exhibit the data relative to (i'): they carry an implication of existence and uniqueness, and when the utterance of the sentence is felicitous, the speaker takes it for granted.

The projection data, relevant for point (ii') above, results from considering again sentences 6 to 9 resulting from embedding 1/14 in negation, interrogative mood, modal operators and conditionals. Again, the conclusion is that DDs exhibit the phenomenon of presupposition$_2$, as described above.

I turn now to the question whether the different theories of DDs considered could account for the data concerning presupposition$_1$ and presupposition$_2$, and which of them does a better job in this sense. I focus first on simple sentences of the form 'The F is G', and see whether the main theories of DDs introduced in the previous chapter (the Fregean, the Russellian, and the Barwise and Cooper theory) predict the data relevant to (i) and (i'). After that I consider the projection data, (ii) and (ii') respectively, and look at complex sentences that result from embedding the simple sentence in negation, interrogative mood, modal operators and the antecedent of conditionals. A number of complications will be considered along the way.

§5.4. Simple sentences

We already saw in chapter 2 the truth-conditions that the three main theories considered assign to simple sentences containing DDs. For the sake of simplicity, I skip a detailed analysis of the complex noun 'mathematician who proved Goldbach's Conjecture', and treat it a simple CN expressing the property of being a mathematician who proved GC (MPGC, for short). On the Russellian theory, we get the following truth-conditions for an utterance of sentence 1/14:

20. $||[_S [_N [_{Det}$ the$] [_{CN}$ MPGC$]] [_{VP}$ is a woman$]]||^{w,a}$ =

= 1 iff there is a unique $x \in D_e$ such that x is MPGC in w, and x is a woman in w

On the Fregean theory, we get the following result:

21. $||[_S [_N [_{Det}$ the$] [_{CN}$ MPGC$]] [_{VP}$ is a woman$]]||^{w,a}$ =

= there is a unique $x \in D_e$ such that x is MPGC in w.1 iff the MPGC is a woman in w

On the B&C theory, we get:

22. $||[_S [_N [_{Det}$ the$] [_{CN}$ MPGC$]] [_{VP}$ is a woman$]]||^{w,a}$ =

= there is a unique $x \in D_e$ such that x is MPGC in w.1 iff every MPGC is a woman in w

The three theories predict that it must be the case that *there is a unique MPGC in the world of evaluation* for the sentence 1 to be true. On the Russellian theory this is part of the main truth-conditions, while on the Fregean and B&C theories, this is a precondition for the utterance of the sentence to have a semantic value at all. In both cases it is an *entailment* of the utterance, as the truth of the utterance requires the truth of the above proposition. But in one case this is *part of the content asserted* (i.e. part of the semantic value), while in the other it is a *precondition* for the sentence to have a semantic value. The difference affects the evaluation of the utterance at worlds at which there is no unique MPGC: the Russellian theory predicts that the utterance is *false* at those worlds, while the Fregean and B&C theories that it *does not have a semantic value* relative to those worlds. However, this difference is not relevant when it comes to the data concerning point (i). All theories considered account for point (i), that DDs introduce a *felt implication* of existence and uniqueness. They also predict that the speaker is *committed* to the existence and uniqueness of a MPGC: in sincerely uttering a sentence she commits herself to the truth of what she is saying; and the truth of an utterance of 1/14 requires that existence and uniqueness obtain. Conversely, if the speaker knows existence and uniqueness do not obtain, she will not sincerely utter 1/14.

It looks like the above discussion of the data does not offer us a foothold to make a choice between the different theories of DDs considered. All the theories account for the data, although in different ways. However, we have only considered so far point (i), relative to the phenomenon we called presupposition_1. Let us consider now point (i'), which is relevant to presupposition_2. Simple sentences containing DDs exhibit the datum (i'), i.e. that utterances of such sentences are hard to use felicitously unless the speaker takes for granted that the implication of existence and uniqueness obtains. So we must ask which of the different theories of DDs accounts better for it.

The Russellian theory is obviously less prepared to account for (i'). The Russellian accounts for the felt intuition in terms of the semantic value of the sentence containing the DD. On this theory, it is part of the *asserted content* that there is a unique individual that satisfies the description. If existence and uniqueness do not obtain, then the asserted content is false. But this does not make the utterance infelicitous. The asserted content (or a proposition that the asserted content entails) needs not be taken for granted (or even believed) in order for a sentence to be uttered felicitously. On the contrary, usually the asserted content is not taken for granted and it is not backgrounded. Arguably, an utterance of a sentence is felicitous only if the content is *new* information, and not information that the speaker takes for granted. To enforce the point that asserted content is not taken for granted, consider an utterance of 23, the truth-conditions of which are the same as the truth-condition of 1/14 according to the Russellian theory.

23. There is a unique mathematician who proved Goldbach's Conjecture and she is a woman.

An utterance of 23 is false if no one proved GC (i.e. if existence and uniqueness do not obtain), but intuitively that is not something the speaker takes for granted. However, the utterance is felicitous. The Russellian theory makes the same prediction for an utterance of 1/14, but in that case the utterance is infelicitous unless the speaker takes for granted existence and uniqueness. So, the theory fails to account for the $presupposition_2$ (i.e. the datum (i')).

On the other hand, the Fregean and the B&C theory have in common that they introduce a *precondition* of existence and uniqueness that needs to be fulfilled in order for the DD to have a semantic value. In case the condition is not fulfilled, the sentence does not have a semantic value at all. These theories seem better prepared to account for the fact that taking for granted existence and uniqueness is a condition for felicity. The explanation goes as follows: the proposition that the sentence expresses is not defined for those worlds relative to which existence and uniqueness do not obtain. If the world of the context is one of them, the sentence cannot be assigned an extension, i.e. does not have a truth-value. We can neither agree nor disagree with it. This shows that the semantic precondition is also a condition for the felicity of the utterance. Given that speakers normally aim at making felicitous utterances, whenever a speaker uses a sentence she takes for granted that the conditions for it to be felicitous obtain. If one such condition is that existence and uniqueness obtain relative to the world of the context, then this is something the speaker takes for granted. So, in uttering a sentence such as 1/14 the speaker takes for granted that existence and uniqueness obtain.

Now, this discussion does not count as a refutation of the Russellian theory, in as much as the data to explain are not data concerning the truth-conditions of the utterance of sentences, but merely concerning felicity/infelicity judgements. The Fregean and B&C theories account for this data in *semantic* terms. So, the prediction that they make is more specific than the data that needs to be explained. Saying that the truth of utterances of these sentences requires uniqueness and existence is just *one* way of predicting the data. There might be alternative ways to account for it, which appeal to non-semantic, pragmatic, facts about utterances of sentences such as 1/14. However, unless a compelling theory of this kind is offered, the Russellian theory seems less prepared to account for the data considered than the alternatives. That is, the Fregean and B&C theory have *more explanatory power* than the Russellian theory. This is the conclusion that we reached so far.

In the remaining of this chapter I discuss complex sentences that result from embedding sentences such as 1/14 in under negation, interrogative mood, modal operators, and conditionals. I consider the data relevant to such sentences, that is (ii) and (ii'), and again I look at the predictions that our theories of DDs make.

§5.5. Negation

Consider again sentence 6, which I repeat here as 24:

24. It is not the case that the mathematician who proved GC is a woman.

Sentence 24 results from embedding sentence 1/14 under negation. A complication occurs in the analysis of such sentences, as our theoretical framework predicts that there should be *two* LFs for 24. In particular, assuming that negation is a sentential operator, we get a difference with respect to the scope relation of the DD and negation. One LF that corresponds to the superficial form in 24 is 24.1 below. This LF results from combining the expressions in syntactically correct ways, in a way that mirrors the surface structure of the sentence. In 24.1 the negation takes wide scope over the DD. A different LF results from QR-ing the DD 'the mathematician who proved GC' from its original position at surface structure and adjoining it to the leftmost S node. This operation has been described in the introductory chapter. Given that in the original sentence there is no type mismatch, QR-ing the DD is not mandatory, but an optional transformation. Hence, two LFs are possible for sentence 24: one on which the DD stays in its original position, and one on which it is QR'ed:

24.1 $[_S$ [it is not the case that] $[_S[_N$ the MPGC] $[_{VP}$ is a woman]]]

24.2 $[_S$ $[_N$ the MPGC] $[[\lambda_1]$ $[_S$ [it is not the case that] $[_S$ $[t_1]$ $[_{VP}$ is a woman]]]]]

In what follows I calculate the truth conditions of the two LFs that correspond to the superficial form 24. I consider the following extension for the negation, as in Heim and Kratzer (1998: 215):

$||\text{it is not the case that}||^{w,a} = \lambda f_{<t>}.\ 0 \text{ if } f=1;\ 1 \text{ if } f=0$

Let us start with the Russellian theory. In order to avoid too long formulas, I adopt a bottom-up approach to calculating the semantic value of the sentence. On the Russellian theory the semantic value of the sentence embedded in negation is given in 20 above. If we insert this in the calculation of the semantic value of 24.1, we get:

$||[_S \text{ [it is not the case that] } [_S[_N \text{ the MPGC] } [_{VP} \text{ is a woman]]]}||^{a,w} =$

$= [\lambda f_{<t>}.1$ iff it is not the case that f=1](1 iff there is a unique MPGC in w, and it is a woman in w) =

= 1 iff it is not the case that there is a unique MPGC in w and it is a woman in w

Let us consider now the LF 24.2. First, consider:

$||[_S[_N\ t_1]\ [_{VP} \text{ is a woman]]}||^{w,a} =$

$= [\lambda x_{<e>}.1$ iff x is a woman in w]$(||t_1||^{w,a})$

= 1 iff a(1) is a woman in w

Second, consider:

$||\text{[it is not the case that] } [_S\ [t_1]\ [_{VP} \text{ is a woman]]}||^{w,a} =$

= 1 iff it is not the case that a(1) is a woman in w

Next, consider:

$||[[\lambda_1]\ [_S \text{ [it is not the case that] } [_S\ [t_1]\ [_{VP} \text{ is a woman]]]}||^{w,a} =$ (by PA)

$= \lambda x_{<e>}.||\text{[it is not the case that] } [_S\ [t_1]\ [_{VP} \text{ is a woman]]}||^{w,ax/1} =$

$= \lambda x_{<e>}.1$ iff it is not the case that x is a woman in w

Finally, this combines with the semantic value of the DD, and we get (given the Russellian semantic value for the DD):

$||[_S\ [_N \text{ the MPGC] } [[\lambda_1]\ [_S \text{ [it is not the case that] } [_S\ [t_1]\ [_{VP} \text{ is a woman]]]]]}||^{a,w} =$

$= [||\text{the MPGC}||^{a,w}](\lambda x_{<e>}.1$ iff it is not the case that x is a woman in w) =

$= [\lambda f_{<e,t>}.1$ iff there is a unique $x \in D_e$ such that x is a MPGC in w, and f(x)=1] $(\lambda x_{<e>}.1$ iff it is not the case that x is a woman in w) =

= 1 iff there is a unique $x \in D_e$ such that x is a MPGC in w, and it is not the case that x is a woman in w

A question arises here concerning the correctness of this prediction: does sentence 24 really have *two* readings, corresponding to different truth-conditions we obtained? In particular, it is doubtful that we hear the reading corresponding to 24.1. Is an utterance of 24 judged as *true* in a context in which it is not the case that there is a unique MPGC? The Russellian theory predicts that on one reading of the sentence, i.e. 24.1, the sentence is true. Russell (1905: 490) claims that this prediction is correct.[4] But it is difficult to agree. This is in itself a problem for the Russellian theory, although there are proposals in the literature – including Böer and Lycan (1976: 48-51), Grice (1981: 270f), Neale (1990: 162-164) – defending the Russellian view and offering a pragmatic explanation for why the controversial reading (corresponding to 24.1) is difficult to hear. But I do not discuss this issue here, because it is not relevant to our present purposes in this chapter. That is because, even admitting that the Russellian is right and sentence 24 is ambiguous, the reading on which negation takes wide scope over the DD (which is, according to the Russellian, that it is not the case that there is a unique MPCG and she is a woman) does *not* carry the implication of existence and uniqueness. That is, assuming the Russellian truth-conditions for 24.1 correspond to an actual reading of 24, this reading does not carry the felt implication that we aim to account for here. So we can simply ignore this reading.

Concerning the LF 24.2, the Russellian analysis predicts that existence and uniqueness is part of the asserted content. The salient reading of 24 carries the implication of existence and uniqueness as a matter of simple entailment. The situation is similar to the one we found in the case of simple sentences. However, we must be careful in how we frame the Russellian account of the data: the Russellian denies that 24, on the reading 24.2, is a case in which the simple sentence containing a DD in subject position is *embedded* under negation, and the result is a sentence that still entails uniqueness and existence (so that this implication *projects*). That is, the Russellian rejects the account of the data concerning $presupposition_1$ in (ii), and concerning $presupposition_2$ in (ii'), when it comes to sentences such as 24. Both these accounts assume that 6/24 is the result of *embedding* 1/14 under negation. But, according to the Russellian, the reading of 6/24 on which existence and uniqueness are entailed is the reading on which the DD takes *wide scope* over negation, and it is not a case of embedding the DD under negation.[5]

However, we can still draw similar conclusion to the ones we drew in the case of simple sentences: the Russellian theory accounts for the felt implication of existence and uniqueness of the salient reading of 6/24, but fails to account for the (in)infelicity

[4] See the discussion of sentence 5 in chapter 2, section §2.4.

[5] However, if by "embedding" one refers to a certain *surface* structure (the one that sentence 24 has), and not understood as referring to a certain scope relation at the level of LF, then the Russellian might be happy to admit the account of the data in (ii) and (ii'). It might be that this is the correct way to understand "embedding", given that (ii) and (ii') are meant to be pre-theoretical accounts of the data, and so not to rely on the notion of scope.

intuitions, that we saw are triggered by an utterance of this sentence when the speaker does not take it for granted that existence and uniqueness obtain. These conclusions are the same as the ones we drew for simple sentences.

I turn now to the Fregean analysis of the sentence 6/24. Consider first 24.1. Using the semantic value in 21 for the embedded sentence, we get:

$||[_S \ldots]||^{w,a} =$

$= [\lambda f_{<t>}$. 1 iff it is not the case that f=1](there is a unique $x \in D_e$ such that x is MPGC in w.1 iff the MPGC is a woman in w) =

= there is a unique $x \in D_e$ such that x is MPGC in w.1 iff it is not the case that the MPGC is a woman in w

For the LF 24.2, The steps of the calculation are the same as in the case of the Russellian theory up to the following result:

$||[[\lambda_1]$ $[_S$ [it is not the case that] $[_S$ $[t_1]$ $[_{VP}$ is a woman]]]$||^{w,a}$ = (by PA)

$= \lambda x_{<e>}$.1 iff it is not the case that x is a woman in w

And finally:

$||[_S \ldots]||^{w,a} =$

= $[||[[\lambda_1]$ $[_S$ [it is not the case that] $[_S$ $[t_1]$ $[_{VP}$ is a woman]]]]$||^{w,a}]$($||[_N$ the MPGC]$||^{w,a}$) =

$= [\lambda x_{<e>}$.1 iff it is not the case that x is a woman in w](there is a unique $x \in D_e$ such that x is MPGC in w. the MPGC in w) =

= there is a unique $x \in D_e$ such that x is MPGC in w.1 iff it is not the case that the MPGC is a woman in w

Notice that on the Fregean theory the truth-conditions of 24.1 and 24.2 are the same. The superficial form 24 has two corresponding LFs, but they receive the same interpretation on the Fregean account. The scope ambiguity for the case of embedding simple sentences in negation as in 24 does not affect the truth-conditions of an utterance of the sentence. The conclusion that we can draw relative to our question concerning $presupposition_1$ and $presupposition_2$ is that the above truth-conditions for 24 fulfil both (ii) and (ii'). We can repeat here the observations made about simple sentences containing DDs on the Fregean analysis: an utterance of 24 introduces the precondition for having a truth-value relative to w (that there be a unique MPGC in w); this explains why the sentence carries an the implication of existence and uniqueness (the data relevant to (ii)), and why these are conditions for felicity and are taken for granted (the data relevant to (ii')). I do not repeat the details of the explanation here (see section §5.4 above).

I turn now to the B&C theory. For 24.1 we use the value of the embedded sentence determined in 22, and we get:

$||[_S \ldots]||^{w,a}$ =

= [$\lambda f_{<t>}$.1 iff it is not the case that f=1](there is a unique $x \in D_e$ such that x is MPGC in w.1 iff every MPGC is a woman in w) =

= there is a unique $x \in D_e$ such that x is MPGC in w.1 iff it is not the case that every MPGC is a woman in w

For the LF 24.2 we get (given the B&C semantic value for the DD):

$||[_S \ldots]||^{w,a}$ =

= [$||[_N$ the MPGC$]||^{w,a}$]($||[[\lambda_1]$ $[_S$ [it is not the case that] $[_S$ $[t_1]$ $[_{VP}$ is a woman]]]]$||^{w,a}$) =

= [$\lambda f_{<e,t>}$ and there is a unique $x \in D_e$ such that x is MPGC in w.1 iff every x such that it is a MPGC is such that f(x)=1]($\lambda x_{<e>}$.1 iff it is not the case that x is a woman in w) =

= there is a unique $x \in D_e$ such that x is MPGC in w.1 iff every x such that x is a MPGC is such that it is not the case that x is a woman in w

As with the Russellian theory, the B&C theory assigns different truth-conditions to 24.1 and to 24.2. However, these truth-conditions are equivalent: for to the worlds relative to which the precondition is not fulfilled, the utterance of 24 does not have a truth-value (both on the 24.1 reading and on the 24.2 reading). For to the worlds relative to which the precondition *is* fulfilled (i.e. there is a unique MPGC), on the 24.1 reading the utterance is true if it is not the case that every MPGC is a woman; but given that in those worlds there is a unique MPGC, this comes down to saying that *that* MPGC is not a woman. And we get the same result for 24.2 relative to the worlds in which the precondition is fulfilled. So, sentence 24 is not ambiguous either.

Concerning the phenomena of presupposition_1 and presupposition_2, we obtain the same result we obtained for the Fregean theory. That is, the B&C theory accounts for both kinds of data considered.

§5.6. Questions

Consider sentence 8, repeated here as 25:

25. Is the mathematician who proved GC a woman?

On one influential semantic theory of interrogative sentences (cf. Hamblin (1973), Heim (1993, 2000)) the denotation of such a sentence is a set of propositions, those that constitute the answers to the question. Not any possible answer is included in the set, as replies such as ‘I don’t know’, or ‘I don’t understand the question’ are left out. For the case of yes/no questions, the set of answers is simply the affirmative and the negative answer. For that we need not determine which is the *correct* answer to the question. The correct answer may vary depending on the world if evaluation, although the answer set does not. We only need to determine what counts as a direct, affirmative or negative, answer to the question.

The semantic value of an interrogative sentence such as ‘Is it raining?’ is then the set {that it is raining; that is it not raining}. The characteristic function of a set of propositions is a function from propositions to truth-values, which returns 1 iff a proposition is in the set. If we want our function to determine the above set of answers, then it should be the following function of type <<s,t>,t>:

$||\text{is it raining?}||^{w,a} = \lambda q_{<s,t>}.1 \text{ iff } q = [\lambda w.1 \text{ iff it is raining in } w] \vee q = [\lambda w.1 \text{ iff it is not raining in } w]$

This is a function that takes propositions as arguments, and returns 1 for, and only for, the proposition *that it is raining* and the proposition *that it is not raining*.

Sentence 25 is also a yes/no question, which means the set of expected answers contains two propositions. In order to determine what propositions they are, consider the possible answers to 25. Naturally, they are the following:

26. Yes, the mathematician who proved GC is a woman.

27. No, mathematician who proved GC is not a woman.

These sentences express different propositions depending on the theory of DDs we choose. Using the results achieved above, we obtain the semantic value for the question 25. Sentence 26 is the simple sentence 1/14 we analysed above. Sentence 27 receives the same analysis as 6/24 discussed in the previous section.

On the Russellian theory, the analysis of 26 is 20, and the analysis of 27 corresponds to the semantic value of 24.2, the salient reading of 24. So, for 26, we get:

$||\text{Is the MPGC a woman?}||^{w,a} =$

= $\lambda q_{<s,t>}$.1 iff q = [λw.1 iff there is a unique $x \in D_e$ such that x is MPGC in w, and x is a woman in w] ∨ q = [λw. 1 iff there is a unique $x \in D_e$ such that x is a MPGC in w, and it is not the case that x is a woman in w]

On the Fregean theory, the analysis of 26 is 21, and that of 27 we take from the previous section:

||Is the MPGC a woman?||^{w,a} =

= $\lambda q_{<s,t>}$.1 iff q = [λw and there is a unique $x \in D_e$ such that x is MPGC in w.1 iff the MPGC is a woman in w] ∨ q = [λw and there is a unique $x \in D_e$ such that x is MPGC in w.1 iff it is not the case that the MPGC is a woman in w]

On the B&C theory, the analysis of 26 is 22, and, again, that of 27 we take from the previous section:

||Is the MPGC a woman?||^{w,a} =

= $\lambda q_{<s,t>}$.1 iff q = [λw and there is a unique $x \in D_e$ such that x is MPGC in w.1 iff every MPGC is a woman in w] ∨ q = [λw and there is a unique $x \in D_e$ such that x is MPGC in w.1 iff every x such that x is a MPGC is such that it is not the case that x is a woman in w]

Notice that all the analyses share a certain feature: that both the affirmative and the negative answer *entail* that there is a unique MPGC. This entailment is different in the case of the Russellian theory, where it is entailed by the asserted content, while in the case of the Fregean and B&C theory it is a precondition for each answer to have a semantic value. Given the existence of this entailment, all the above theories account for the data concerning presupposition$_1$, i.e. the existence of an implication of existence and uniqueness.

Moreover, all the theories (including the Russellian) account for the data concerning presupposition$_2$, i.e. the fact that the utterance of 25 is felicitous only if the speaker takes for granted that existence and uniqueness obtain. To see this consider a context in which there is no unique MPGC. In that case, on the Russellian theory both answers in the set are *false*. On the other two theories, both of them are *truth-valueless.* In both cases, if there is no unique MPGC there is no correct answer to the question. For the utterance of 25 to be correct and felicitous, it must be the case that one of the two possible answers is correct, and in turn, this means that they are not *both* false (or both truth-valueless, respectively). This is to say that the question, in order to be felicitous, requires that there be a unique MPGC. This accounts not only for the felt implication that there is a unique MPGC (i.e. datum (ii)), but also for the datum (ii'), that an utterance of 25 is felicitous only if existence and uniqueness obtain. Competent speakers will utter 25 only in those contexts in which it is known that existence and uniqueness, i.e. they utter the sentence in context in which they take for granted that it obtains.[6] In conclusion, the different theories considered explain equally well the data for the case of questions.

§5.7. Modal operators

DDs embedded in modal operators preserve their implication of existence and uniqueness, as sentences 28 and 29 show:

28. It is possible that the mathematician who proved GC is a woman.

29. It must be the case that the mathematician who proved GC is a woman.

Observe that both 28 and 29 have various readings, depending on the way we interpret the modal operator. I focus on sentence 28 in what follows, but an analogous line of reasoning applies to 29. 'It is possible that p' (or 'possibly, p', or 'it may be that p') may be taken to express metaphysical possibility (roughly equivalent to "it is conceptually possible that p"), or possibility given the laws of nature (roughly equivalent to "it is physically possible that p"), or epistemic possibility ("it is compatible with our evidence that p"), or deontic possibility ("it is admissible, given the traffic rules, that p"), and may have other readings too.

In order to see whether our different theories of DDs get us the right predictions, we need to appeal to a semantic theory of modal operators. I use here the proposal in Fintel and Heim (2011), which I briefly explain here. Consider, for instance, the epistemic reading of 'it is possible that': saying that *it is compatible with the evidence we have that p* is equivalent to saying that *of all the worlds compatible with the evidence we have, there is at least one relative to which p is true*. We could take our evidence to be a proposition (probably a very large conjunction), say q. This is what is usually called the *modal base* (or *the accessibility relation*, given that it tells us what

[6] I have only considered here one approach to interrogatives, but there are other alternative proposals. According to Frege (1918), Davidson (1979), Stainton (1999) and others, the semantic content of the interrogative 'Is it raining? is the same as that of the declarative sentence 'It is raining'. The difference between them is located not at the level of content but of the *illocutionary force*. On this approach, the semantic content of 25 is the same as the semantic content of the declarative sentence 1/14, corresponding to the affirmative answer to 25. Using this approach requires detailed account the interaction of force and content. For reasons of simplicity I have ignored it here.

worlds the modal operator is quantifying over). Then, the epistemic reading of the modal is equivalent to saying that *of all the worlds in which q is true, there is at least one in which p is true*. That is: *there is a world w such that p(w) = 1 and q(w) = 1*. The same reasoning can be applied to the other variants of modality, taking q to be the proposition that expresses the laws of nature, or the traffic rules, etc. So, we get for the possibility operator the following semantic value, of type <<s,t>,<<s,t>,t>> (as in Fintel and Heim (2011: 35)):

$$||\text{it is possible that}||^{w,a} = \lambda q_{<s,t>}.\ \lambda p_{<s,t>}.\ 1 \text{ iff } \exists w \in W\ (p(w) = 1\ \&\ q(w) = 1)$$

Applying a similar reasoning for 'it is necessary that', what it means is that all the worlds in the modal base (in which q is true), are worlds in which p is true as well. So we get the following denotation, where the symbol '→' stands for the material conditional:

$$||\text{it must be the case that}||^{w,a} = \lambda q_{<s,t>}.\ \lambda p_{<s,t>}.\ 1 \text{ iff } \forall w \in W\ (q(w) = 1 \rightarrow p(w)= 1)$$

Now, where does the modal base come from? It must be the semantic value of an element in the sentence. Fintel and Heim (2011) postulate an unpronounced variable R in the LF of sentences containing modal operators. Given that the syntactic type of R is of type N, that of 'it is possible that' will be (S/S)/N, which allows us to form the following LF corresponding to 28:

$[_S$ [it is possible that $[_N$ R]] $[_S[_N$ the MPGC] $[_{VP}$ is a woman]]]

The semantic value of R will not be of <e> type, but rather of a complex type. One natural option is to assign to R a semantic value of type <s,t>, given that R is to give us the modal base q. But this option is ultimately incorrect for the following reason: the above semantic values given for the modal operators do not account for the fact that sentences such as 28 and 29 are *contingent*. That is, their truth-value can vary depending on the world of evaluation considered. On an epistemic reading of 28, it may be true relative to a world in which we know someone proved GC but we do not know her/his sex, while it is false relative to a world where we know the mathematician is male. Fintel and Heim's (2011) solution is to make R a variable of type <s, <s,t>>: a function that for any world w it gives the modal base relative to that world. This must be so given that our epistemic base, the traffic rules, the laws of nature etc. are all contingent, and so vary from world to world. The value of R depends on the context of utterance, and will be the following on the epistemic interpretation of 28:[7]

$||R||^{w,a}$ = λw. the accessibility relation for w

= λw. λw'. 1 iff our evidence in w is compatible with w'

On other interpretations of 28, instead of 'our evidence' we would have 'the traffic rules', 'the laws of nature' etc. For the epistemic case, the semantic values for the modal operators will then be, following Fintel and Heim (2011; 38):

||it is possible that$||^{w,a}$ =

= $\lambda R_{<s<s,t>>}$. $\lambda p_{<s,t>}$.1 iff ∃w' ∈W (R(w)(w') = 1 & p(w') = 1)

||it must be the case that$||^{w,a}$ =

= $\lambda R_{<s<s,t>>}$.$\lambda p_{<s,t>}$.1 iff ∀w' ∈W (R(w)(w')=1→ p(w') = 1)

Therefore, we get:

||[it is possible that [$_N$ R]]$||^{w,a}$ =

= ||it is possible that$||^{w,a}$ ($||R||^{w,a}$) =

= [$\lambda R_{<s<s,t>>}$. $\lambda p_{<s,t>}$.1 iff ∃w' ∈ W (R(w)(w') = 1 & p(w') = 1)](λw. λw'.1 iff our evidence in w is compatible with w')

= $\lambda p_{<s,t>}$.1 iff ∃w' ∈ W ([λw. λw'.1 iff our evidence in w is compatible with w'](w)(w') = 1 & p(w') = 1)

= $\lambda p_{<s,t>}$.1 iff ∃w' ∈ W (our evidence in w is compatible with w' & p(w') = 1)

In a similar way, we get:

||it must be the case that$||^{w,a}$ =

= $\lambda_{<s,t>}$.1 iff ∀w' ∈ W (our evidence in w is compatible with w' → p(w') = 1)

As in the case of negation, our framework predicts that there should be two readings of sentences 28 and 29. On one reading the DD occurs within the scope of the modal operator, on the other, it takes wide scope. Given that in the original sentence there is no type mismatch, QR-ing the DD is optional, which means that we get a systematic ambiguity in all sentences of this form, as follows:

28.1. [$_S$ [it is possible that [$_N$ R]] [$_S$[$_N$ the MPGC] [$_{VP}$ is a woman]]]

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[7] A technical difficulty arises here relative to how the context assigns a value to the variable R. According to Fintel and Heim (2011) the value of R is given by an assignment. I have defined assignments as functions from natural numbers to elements in D_e. This is not adequate here, as the value of R is of type <s,<s,t>>. For that we must introduce new indices to variables of this type, e.g. rational numbers such as 2.1, 2.2, 2.3, following the procedure described in §3.4. Then, we define assignment functions as branching functions, that, apart from assigning objects to natural numbers, assign elements of type <s,<s,t>> to variables that bear the indices mentioned. The value of $R_{2.1}$ would then be *a*(2.1). However, in order to simplify notation, I skip this here and directly introduce the value of R in the calculation of the truth-conditions.

28.2. $[_S [_N$ the MPGC] $[[\lambda_1]$ $[_S$ [it is possible that $[_N$ R]] $[_S[_N\ t_1]$ $[_{VP}$ is a woman]]]]]

Consider first the LF 28.1. On the Russellian theory, the extension of the embedded sentence is given in 20. But notice that the intensional operator combines with the *intention* of this sentence. So, we get:

$||[_S\ldots]||^{w,a}$ =

= [||[it is possible that $[_N$ R]]$||^{w,a}$](λw.||$[_S[_N$ the MPGC] $[_{VP}$ is a woman]]$||^{w,a}$) =

= [$\lambda p_{<s,t>}$.1 iff ∃w'∈W (our evidence in w is compatible with w' & p(w')=1)] (λw.1 iff there is a unique $x \in D_e$ such that x is MPGC in w, & x is a woman in w) =

= 1 iff ∃w' ∈ W (our evidence in w is compatible with w', & there is a unique $x \in D_e$ such that x is MPGC in w', and x is a woman in w')

On the Fregean theory, the intention of the embedded sentence, given 21, is the following:

λw.||$[_S[_N$ the MPGC] $[_{VP}$ is a woman]]$||^{w,a}$ =

= λw.[there is a unique $x \in D_e$ such that x is MPGC in w.1 iff the MPGC is a woman in w] = (given the notation we have used so far for partial functions)

= λw & there is a unique $x \in D_e$ such that x is MPGC in w. 1 iff the MPGC is a woman in w

Using this result, we get the truth-conditions:

$||[_S\ldots]||^{w,a}$ =

= [$\lambda p_{<s,t>}$.1 iff ∃w'∈W (our evidence in w is compatible with w' & p(w')=1)] (λw & there is a unique $x \in D_e$ such that x is MPGC in w.1 iff the MPGC is a woman in w) =

= 1 iff ∃w'∈W (our evidence in w is compatible with w' & there is a unique $x \in D_e$ such that x is MPGC in w' & the MPGC is a woman in w')

The precondition that the intension of the embedded sentence introduces needs to be fulfilled at one of the world that the existential quantifier quantifies over, and *not* at the world of the context. This is the reason why the precondition that this intension introduces does not become a precondition for the utterance of whole sentence to have a truth-value.

On the B&C theory we get (using 22):

$||[_S\ldots]||^{w,a}$ =

$= 1$ iff $\exists w' \in W$ (our evidence in w is compatible with w' & there is a unique $x \in D_e$ such that x is MPGC in w' & every MPGC is a woman in w')

Notice that all the theories mentioned assign *the same* truth-conditions to 28.1: the utterance of the sentence is true iff there is a world compatible with our evidence in which there is a unique MPGC, and that/every MPGC is a woman. If no world compatible with our evidence is such that there is a unique MPGC, then an utterance of 28 (on the LF 28.1) is *false*, on all the theories considered. All the theories predict that, on this reading, the utterance does *not* bear an implication of uniqueness and existence. However, this reading is normally not the salient one. It becomes salient if we prefix an utterance of 28 with saying, for instance, 'There might be a mathematician who proved Goldbach's Conjecture.'[8] Also, it seems easier to obtain it with 'It might have been the case that…', as we did in the previous chapter. But generally the narrow scope reading is harder to hear than the reading on which the DD takes wide scope. We should then look at the other LF assigned to 28 for the explanation of the facts about presupposition that we are interested in.

I turn now to 28.2. The modal operator 'it is possible that' is an intensional operator, which means that it does not take as argument the extension of the sentence with respect to a given possible world, but a proposition, i.e. a function from worlds to truth-values. In the case of 28.2 it is the following:

$\lambda w.||[_S[_N\ t_1]\ [_{VP}$ is a woman$]]||^{w,a} =$

$\lambda w.[\lambda x_{<e>}.1$ iff x is a woman in w$](||t_1||^{w,a})=$

$\lambda w.[\lambda x_{<e>}.1$ iff x is a woman in w$](a(1)) =$

$\lambda w.1$ iff $a(1)$ is a woman in w

Given the value of [it is possible that $[_N$ R]] calculated above, we get:

$||[$ it is possible that $[_N$ R]] $[_S[_N\ t_1]\ [_{VP}$ is a woman$]]||^{w,a} =$

$= [\lambda p_{<s,t>}.1$ iff $\exists w' \in W$ (our evidence in w is compatible with w' & $p(w')=1)]$ ($\lambda w.1$ iff $a(1)$ is a woman in w) =

[8] The reading in which the DD takes narrow scope is not always available. It is hard to hear it for a sentence containing an incomplete DD such as (a):

a. The mathematician might be a woman.

Bach (1987: 145-6, fn.18) suggests an explanation for why this is so: "Only those [descriptions] which are obviously complete readily take narrow scope… Descriptions which are obviously incomplete, such as 'the front table' and 'the girl with the curl', cannot readily be used with narrow scope because the property being expressed is likely to be widely possessed at any given possible world… they [incomplete DDs] tend to be used to make objectual reference…" See Rothschild (2007) for a development of Bach's point.

= 1 iff $\exists$w'$\in$W (our evidence in w is compatible with w' & a(1) is a woman in w')

By using Predicate Abstraction we compute the value of the expression [[λ_1]…]:

$||[[\lambda_1]\ldots]||^{w,a}$ =

= $\lambda x_{<e>}$.||[it is possible that [$_N$ R]] [$_S$[$_N$ t_1] [$_{VP}$ is a woman]]$||^{w,ax/1}$ =

= $\lambda x_{<e>}$.1 iff $\exists$w'$\in$ W (our evidence in w is compatible with w' & x is a woman in w')

At this point it becomes relevant which theory of DDs we consider. On the Russellian theory, in calculating the semantic value of 28.2, the DD (which is of type <<e,t>,t>) takes as argument the denotation of the rest of the sentence, and not the other way around. So, we get:

$||[_S\ldots]||^{w,a}$ =

= [||the MPGC$||^{w,a}$)](||[[λ_1]…]$||^{w,a}$) =

= [$\lambda f_{<e,t>}$.1 iff there is a unique x$\in D_e$ such that x is a MPGC in w, and f(x)=1] ($\lambda x_{<e>}$.1 iff $\exists$w'$\in$W (our evidence in w is compatible with w' & x is a woman in w')) =

= 1 iff there is a unique x$\in D_e$ such that x is a MPGC in w, and $\exists$w'$\in$ W (our evidence in w is compatible with w' & x is a woman in w')

On the Fregean theory, we obtain the denotation of 28.2:

$||[_S\ldots]||^{w,a}$ =

= [||[[λ_1]…]$||^{w,a}$](||the MPGC$||^{w,a}$) =

= [$\lambda x_{<e>}$.1 iff $\exists$w'$\in$ W (our evidence in w is compatible with w' & x is a woman in w')](there is a unique x$\in D_e$ such that x is MPGC in w. the MPGC in w) =

= there is a unique x$\in D_e$ such that x is MPGC in w.1 iff $\exists$w'$\in$ W (our evidence in w is compatible with w' & x is a woman in w')

On the B&C theory, we get the following truth-conditions:

$||[_S\ldots]||^{w,a}$ =

= [||the MPGC$||^{w,a}$)](||[[λ_1]…]$||^{w,a}$) =

= [$\lambda f_{<e,t>}$ and there is a unique x$\in D_e$ such that x is MPGC in w.1 iff every x such that it is a MPGC is such that f(x)=1]($\lambda x_{<e>}$.1 iff $\exists$w'$\in$ W (our evidence in w is compatible with w' & x is a woman in w')) =

= there is a unique x$\in D_e$ such that x is MPGC in w.1 iff every x such that it is a MPGC is such that $\exists$w'$\in$ W (our evidence in w is compatible with w' & x is a woman in w')

On all the accounts of DDs considered, the truth of the utterance of 28 on the 28.2 reading requires that there be a unique MPGC in the world of evaluation. In the case of the Russellian theory this is an entailment of the asserted content, in the case of the other theories it is a semantic precondition. The conclusions concerning the phenomena of $presupposition_1$ and $presupposition_2$ parallel those reached in section §5.5, where we discussed negation: all the theories considered account for the existence of a felt implication of existence and uniqueness (or the speaker's commitment to existence and uniqueness), i.e. the datum (ii), but only the Fregean and the B&C theories account for the datum (ii'). For the detailed explanation see section §5.5.

As in the case of negation, the Russellian denies that this is a case of *embedding* the simple sentence in a modal operator, as DD takes wide scope. In a sense, the LF 28.2 is not a case of embedding the DD in a modal operator at all (however, see the discussion in footnote 5 above). But this is true of all the theories considered: the fact that the DD takes wide scope in the LF 28.2 (and so there is no embedding at the level of LF) is independent of which theory of DD we choose. However, given that 28.2 is the only salient reading of 28, it is this LF that we should look at to account for the facts about felicity in (ii'), independently of whether we should count it as a case of embedding or not. The relevant conclusion to draw parallels the conclusion of section §5.5: the Fregean and B&C theories are able to account for the data concerning felicity, while the Russellian theory is not. We obtain a similar result for sentence 29, where the modal operator is necessity.

§5.8. Conditionals

In the case of conditionals the data shows that the implication of existence and uniqueness projects both when the DD is in the antecedent – sentence 30 – as when it is in the consequent – sentence 31. The only exception to this seems to be the case in which the DD occurs in the consequent, and the antecedent *entails* existence and uniqueness, as in the case of the sentence 32. This is the reason why Karttunen (1973: 178-181) put conditionals in the category of *filters*, that is, sentential connectives that let the presuppositions of their complements project only under certain conditions.

30. If the mathematician who proved GC is a woman, I win the bet.

31. If I win the bet, then the mathematician who proved GC is a woman.

32. If there is a unique mathematician who proved GC, the mathematician who proved GC wins the Fields Medal.

The explanation that I provide in what follows for the data relative to 30 and 31 parallels the case of modals in that I take DD to take wide scope over the conditional. For that reason I skip some of the steps of the calculations.

It is important to use a theory of conditionals that makes correct predictions. A simplistic account of conditionals may lead to incorrect predictions independently of the theory of DD we consider. Although conditionals are a very controversial topic, Kratzer's (1986) view of *if*-clauses as restrictors has become increasingly popular amongst semanticists, and recently also amongst philosophers. My aim here is to illustrate what the theorist can say about the projection of uniqueness and existence implications of DDs under embedding with conditionals, so I will concentrate on this important, and increasingly standard approach to conditionals. Much of what I say would carry over to different accounts of conditionals.

Kratzer's account takes *if*-clauses to be devices for restricting the domains of an implicit modal operator (cf. Fintel and Heim (2011: 55-6); Portner (2009: 247-9)). That is, when the conditional does not contain an explicit modal operator, it is taken to be implicitly embedded in a modal operator. For the purpose of illustration, consider the following sentence:

33. If the police stops you, you might get a fine.

34. If the glass falls, it breaks.

Sentence 33 contains an explicit modal operator expressing possibility. On the present account, 33 says that all worlds in which the police stops you, and which are *compatible with the actual dispositions of the police*, you get a fine. The accessibility relation for the modal operator (i.e. or the set of worlds the modal quantifies over) is provided by the implicit R variable (that any modal introduces in the LF of the sentence) together with the antecedent of the conditional. On this view 'if' is not a two-place sentential connective, but it is a sister of the variable R. Its semantic role is to restrict further the accessibility relation, including only the worlds in which the police stops you.

Sentence 34 does not contain an explicit modal operator. The way to predict the correct truth-conditions, on the present account, is to postulate an implicit restricted necessity operator. Sentence 34 does not say that in all worlds in which the glass falls it breaks. Rather, 34 says that *in all worlds compatible with the actual law of nature and other particular conditions that are in place in the actual world, and in which the glass* *falls, it breaks*. The hidden variable R together with the antecedent provides the accessibility relation.

Now consider 30. Suppose I bet with my friend that the MPGC is a woman. Uttering 30 in that context is equivalent to uttering 35:

35. It must be the case that, if the mathematician who proved GC is a woman, I win the bet.

Sentences 30 and 35 are false if the actual MPGC is a woman and I still lose, given the rules and purpose of the bet. That may happen, for instance, if I am confused about the rules of the bet, or what it is that the bet was about. The fact that I lose in worlds in which the bet has different rules, or we bet on something else, is of course not relevant.

Syntactically, one option is to consider 'if' to be of type (N/N)/S: it combines with a sentence, and the result of that combination combines with the variable R. The result is an N, which could then combines with the modal operator, the type of which we have said to be (S/S)/N. We get the following LF:

35.1 $[_S$ it must be the case that $[[_N$ R] [[if] $[_S$ $[_N$ the MPGC] $[_{VP}$ is a woman]]]] $[_S$ I win the bet]]

As in the case of modal operators, the theory predicts a scope ambiguity. The reading on which the DD takes wide scope is the following:

35.2 $[_S$ $[_N$ the MPGC] $[[\lambda_1]$ $[_S$ [it must be the case that $[[_N$ R] [[if] $[_S$ $[_N$ $t_1]$ $[_{VP}$ is a woman]]]]] $[_S$ I win the bet]]]]

I only consider here the LF 35.2, assuming that this is the salient reading. The explanation of why this must be so parallels the one suggested above for the case of modal contexts. However, I will not enter into details here.

Let us consider 35.2, and see what truth-conditions the theories of DDs predict. The semantic value of the modal operator was already introduced in the previous section. The semantic value of 'if', may be introduced as a function that takes as argument a proposition (the one expressed by the *if*-clause) and gives as value a function from the variable of type <s<s,t>>, to a different variable of the same type.

$||\text{if}||^{w,a} = \lambda p_{<s,t>}. [\lambda R_{<s<s,t>>}. [\lambda w. \lambda w'.1 \text{ iff } p(w')=1 \ \& \ R(w)(w')=1]]$

We obtain the following denotation for the *if*-clause:

$||[[\text{if}]\ [_S\ [_N\ t_1]\ [_{VP} \text{ is a woman}]]]||^{w,a} =$

$= [\lambda p_{<s,t>}. [\lambda R_{<s<s,t>>}. [\lambda w. \lambda w'.1 \text{ iff } p(w') = 1 \ \& \ R(w)(w')=1]]](\lambda w. 1 \text{ iff } a(1) \text{ is a woman in } w) =$

$= \lambda R_{<s<s,t>>}. [\lambda w. \lambda w'. 1 \text{ iff } a(1) \text{ is a woman in } w' \ \& \ R(w)(w')=1]$

Now consider:

||[[$_N$ R] [[if] [$_S$ [$_N$ t_1] [$_{VP}$ is a woman]]]]||^{w,a} =

= [λ$R_{<s<s,t>>}$. [λw. λw’. 1 iff a(1) is a woman in w’ & R(w)(w’)=1]](λw. λw’.1 iff the rules and purpose of the bet in w are the same as in w’) =

= λw. λw’. 1 iff a(1) is a woman in w’ & the rules and purpose of the bet in w are the same as in w’

Next, consider:

||[$_S$ [it must be the case that [[$_N$ R] [[if] [$_S$ [$_N$ t_1] [$_{VP}$ is a woman]]]]] [$_S$ I win the bet]]||^{w,a} =

= [λ$R_{<s<s,t>>}$.λ$p_{<s,t>}$.1 iff ∀w’ ∈W (R(w)(w’)=1→ p(w’) = 1)](λw. λw’. 1 iff a(1) is a woman in w’ & the rules and purpose of the bet in w are the same as in w’)(λw.1 iff I win the bet in w) =

= 1 iff ∀w’∈W ((a(1) is a woman in w’ & the rules and purpose of the bet in w are the same as in w’) → (I win the bet in w’))

The truth-conditions of an utterance of 35 on the reading 35.2 are the following:

||[s…]||^{w,a} =

= [||the MPGC||^{w,a}](λ$x_{<e>}$.||[$_S$ it must be the case that …]||$^{w,ax/1}$) =

= [λ$f_{<e,t>}$.1 iff there is a unique x∈D_e such that x is a MPGC in w, and f(x)=1](λ$x_{<e>}$.1 iff ∀w’∈W ((x is a woman in w’ & the rules and purpose of the bet in w’ are the same as in w) → (I win the bet in w’))) =

= 1 iff there is a unique x∈D_e such that x is a MPGC in w, and ∀w’∈W ((x is a woman in w’ & the rules and purpose of the bet in w’ are the same as in w) → (I win the bet in w’)) =

The calculation for the B&C theory differs only in the last step, for which we need to introduce the corresponding semantic value for the DD. The result is:

||[s…]||^{w,a} =

= there is a unique x∈D_e such that x is a MPGC in w.1 iff ∀w’ ∈W ((x is a woman in w’ & the rules and purpose of the bet in w’ are the same as in w) → (I win the bet in w’))

On the Fregean theory, we get the following truth-conditions:

||[s…]||^{w,a} =

= [λ$x_{<e>}$.||[$_S$ [it must be the case that…]||$^{w,ax/1}$](||the MPGC||^{w,a}) =

= there is a unique $x \in D_e$ such that x is a MPGC in w.1 iff $\forall w' \in W$ ((the MPGC in w is a woman in w' & the rules and purpose of the bet in w' are the same as in w) $\rightarrow$ (I win the bet in w'))

The conclusions we can draw here are similar to the ones we drew for the case of modals: on the 35.2 reading of sentence 35, the data concerning $presupposition_1$ and $presupposition_2$ is explained by the Fregean theory, as well as the B&C theory, in the familiar way: it is a requirement for the sentence to have a semantic value that there be a unique MPGC in the world of evaluation. The Russellian theory also explains the data corresponding to $presupposition_1$ (in the sense discussed in the previous section), but not the data corresponding to $presupposition_2$.

A similar line of reasoning leads us to the same conclusions regarding 31, i.e. the case in which the DD is embedded in the consequent, and not the antecedent of a conditional.

The more interesting case is that of sentence 32, where the data to explain is why there is *no* felt implication of existence and uniqueness. When the DD takes wide scope relative to the conditional, we get the following LF (assuming, as for 30, an implicit modal operator expressing necessity, and that the accessible worlds are those in which the Fields Medal is awarded in the same conditions as in the actual world):

32.1 $[_S\ [_N$ the MPGC$]\ [[\lambda_1]\ [_S$ it must be the case that $[[_N$ R$]\ [[$if$]\ [_S$ there is a unique the MPGC$]]\ [_S\ [_N\ t_1]\ [_{VP}$ wins the Fields Medal$]]]]]]$

32.2 $[_S$ it must be the case that $[[_N$ R$]\ [[$if$]\ [_S$ there is a unique the MPGC$]]]\ [_S$ the MPGC wins Fields Medal$]]$

As with sentences 31, on 32.1 we do get the prediction that *there is* an implication of existence and uniqueness (depending on the theory of DDs we choose, it takes the form of a Fregean presupposition, or an entailment). I will not repeat here the truth-conditions for the case of each theory of DDs. Looking at the predictions of the Fregean theory is sufficient:

there is a unique $x \in D_e$ such that x is a MPGC in w.1 iff $\forall w' \in W$ ((there is a unique MPGC in w' & the Fields Medal is awarded in w' in the same conditions as in w) $\rightarrow$ (the MPGC in w gets the Fields Medal in w'))

Relative to the actual world, where there is no MPGC, the utterance of 32 on this LF is truth-valueless. We get the same result on the B&C theory, while the Russellian predicts that an utterance of 32 on this reading is false relative to the actual world. But these predictions do not square with intuitions. Relative to a context in which *there is* a unique MPGC, the utterance of 32 is predicted to be true if *all the worlds* in which (i) there is a unique MPGC and (ii) the Fields Medal is awarded in normal conditions are worlds in which the MPGC *in* c_w gets the Fields Medal. But then, relative to such a context the sentence is predicted to be *false*: there is at least one possible world w_1 such that (i) and (ii) are true relative to w_1, but the consequent is false, i.e. the MPGC in w_c does not get the Fields Medal *in* w_1. In that case the 32 is false relative to w_c. But intuitively 32 is *not judged as false* relative to a context in which *there is* a unique MPGC. We get the same result for the three theories of DDs considered. So, the LF 32.1 does not correspond to the intuitively correct reading of 32.

The fact that such a reading is systematically false might explain why we do not hear it at all. On top of that, another factor that might contribute is that these truth-conditions are very difficult to grasp. In particular, the speaker must consider those worlds in which (i) there is a unique MPGC (not necessarily identical with the actual MPGC), and in which (ii) the Fields Medal is awarded in normal conditions. Then she must look for the person who is *actually* the MPGC in those worlds, and see whether there is one such world in which this person did not get the medal. If there is no such world the sentence is true; if there is, it is false.

For the alternative reading of 32, i.e. 32.2, in which the DD takes narrow scope, we get truth-conditions that are much easier to grasp. This might explain why this reading is systematically the salient one. The truth-conditions on the Fregean theory are the following:

> 1 iff $\forall w' \in W$ ((there is a unique MPGC in w' & the Fields Medal is awarded in w' in the same conditions as in w) $\rightarrow$ (the MPGC in w' is awarded the Fields Medal in w'))

These truth-conditions are by far easier to grasp: the sentence is true if all the worlds in which there is a unique MPGC and the Fields Medal is awarded in normal conditions are worlds in which *that* MPGC gets the medal. So, with 32.2 we get *no* implication of existence and uniqueness. This corresponds to the intuitive reading of sentence 32, which does not carry such implications. It is easy to see that we reach analogous conclusions for the case of the B&C theory and the Russellian theory.

Thus, we have been able account for the intuitive readings of sentence 30, 31 and 32, and to explain why the first two carry an implication of existence and uniqueness, while 32 does not. The general conclusion to draw about conditions is the same as the one we drew about the previous cases discussed: the Russellian theory accounts for the felt implication of existence and uniqueness of the salient readings of 30 and 31, but fails to account for the (in)felicity intuitions. The Fregean theory and the B&C theory are in better position to deal with this kind of data.

In the next chapter I continue the discussion concerning improper DDs, and consider a different kind of data, in particular, data from competent speakers' intuitive truth-value judgments concerning sentences that contain improper DDs.

Chapter 6: Non-denoting DDs

§6.1. Failures of uniqueness

In this chapter I discuss the data from competent speakers' truth-value judgments concerning sentences that contain non-denoting DDs. I include in this category all uses of DDs that lack a denotation because there is no contextual individual that uniquely satisfies the description. There are two kinds of such cases. First, some uses of DDs may lack a referent because various objects in the context are equally good candidates for the denotation of the DD, and so none of them *uniquely* satisfies the description. Second, a DD may lack a denotation if no individual in the context fulfils the description at all. I argue that both cases offer compelling reasons against the Russellian theory of DDs and implicitly in favour of the alternative theories. I start by addressing the former kind of cases, which involve failures of uniqueness.

One contribution to the literature on non-denoting DDs worth mentioning is Ramachandran's (1993) discussion of uses of DDs in contexts in which no object uniquely fulfils the description. The author considers the following sentence uttered in a room containing various tables, some of which are covered with books and some of which are not.

1. The table is covered with books.

Ramachandran invites us to suppose that the speaker does not have a specific table in mind, or any other object. Ramachandran comments: "In my opinion, we would find that utterance… unintelligible – in the sense that we would feel unable to specify what it would take, what the world would have to be like, for that utterance to be true." (1993: 210) In the footnote on the same page the author comments that he is not denying that the sentence-*type* is intelligible, only that the particular token in question is. He also comments that he qualifies the sentence-token as unintelligible in the sense that we "experience… much difficulty in simply interpreting the token of 1, i.e. in determining its truth-conditions" (1993: 211). Ramachandran argues that the Russellian theory incorrectly predicts that the utterance of the sentence is false. So the Russellian theory fails to make correct predictions relative to cases such as this, Ramachandran concludes.

Notice that this is an argument against a *naïve* version of the Russellian theory. That is the theory according to which an utterance of 1 is true iff *there is a unique table and it is covered with books in the world of evaluation*. In the scenario there are several tables so the utterance of 1 is predicted to be *false*. This does not match with intuitions, as we would not say that the utterance of 1 in the given context is false.[1] Intuitively, a competent speaker does not judge the utterance of 1 as either true or false. Instead, we would find it difficult to evaluate and assign any truth-value to it. So, Ramachandran does have a simple and powerful argument against the naïve Russellian theory.

A defender of the Russellian theory might want to bite the bullet and abandon the naïve form of the theory, while embracing the more sophisticated version that we introduced in chapter 3. There we proposed supplementing the Russellian theory with Stanley&Szabó's proposal for a syntactic implementation of the mechanism of nominal completion. On this proposal, an incomplete use of a DD is completed at the level of LF by postulating two variables that co-habit the same node with the CN of the DD. Appealing to a mechanism of QDR seems a plausible move that the Russellian might want to make, given that the above argument relies on a particular use of sentence 1 that involves an incomplete DD.

As discussed in chapter 3, on this account a complex variable co-habits the node in which the CN occurs. The semantic value of that node in the case of the DD in sentence 1 is the following:

$||\text{table, f(i)}||^{w,a} = \lambda x_{<e>}.x$ is a table and is a(f) (a(i)) in w

Going back to Ramachandran's scenario, the speaker is assumed to know that there are several tables in the world. Therefore, a contextual domain restriction is required. So, according to this proposal, the utterance of 1 is true iff there is a unique table that is a(f) (a(i)), and it is covered with books. The values a(f) and a(i) are contextually determined. A consequence of this theory is that the utterance of 1 has truth-conditions relative to the context of utterance *only* if the context provides a value for the variables 'f' and 'i'. However, by hypothesis, the speaker does not have in mind any completion of the description. What should a plausible completion for the utterance of 1 look like, given the details of the scenario? As argued in chapter 4, the most plausible completion is the one in which the value of 'f' is the identity relation and the value of 'i' is the individual the speaker has in mind. However, Ramachandran tells us, the speaker does not have any particular table in mind:

[1] While Ramachandran talks about the *unintelligibility* of the utterance of 1, the kind of data that I consider here is that which results from asking competent speakers to form a truth-value judgment about the utterance of a sentence. The relevant data that we get here is that the competent speaker does not feel inclined to judge the utterance of 1 as either true or false.

> Of course, we might ask the speaker which table she was talking about; but after the response to the effect that she wasn't talking about any particular table, as the supposition demands, we surely would be at a loss as to how to take (interpret) [the utterance]. (1993: 210)

Ramachandran's speaker is aware that her use of the DD is incomplete, so that a completion is required. However, she does not have any particular table in mind, or a descriptive completion of the DD. For that reason, the context does not determine any completion whatsoever, and so it leaves the truth-conditions of the utterance undetermined. Notice that the point here is not one of underdetermination in the sense that the context does not determine *a particular* completion among a range of various equally plausible ones. The point is that there is *no plausible candidate* for a completion of the DD.

So, the Russellian theory together with the Stanely&Szabó mechanism for contextual domain restriction predict that the speaker is uttering a sentence the LF of which is insufficient to determine truth-conditions. But this means that we do *not* get the unintuitive prediction that the utterance of 1 is false. Instead, the prediction is that the utterance does not have determined truth-conditions. And this prediction coincides with the intuitive judgement a competent speaker makes about the utterance of 1. So, while Ramachandran's scenario provides a forceful counterexample to the naïve Russellian theory, it fails to prove anything about the more sophisticated Russellian theory.

However, I present in what follows a modified version of Ramachandran's argument that is equally damaging to the enhanced version of the Russellian theory as Ramachandran's original argument is to the naïve theory. Consider again sentence 1 uttered in a slightly different scenario: as before, there are several tables in the salient room, but this time the speaker is in the hallway, outside the room she is talking about (the salient room), and cannot see into the room. However, she has general reasons to believe that there is a unique table in that particular room (say, she has inductive reasons: all the rooms she checked out in the building are classrooms with only one table and many chairs, and the salient room looks like another classroom from the outside). The utterance of DD 'the table' is incomplete (there are many tables in the world), and the speaker knows that it is incomplete. The most plausible completion, we can assume, for 'f(i)' is *in this room,* given that the speaker has the salient room in mind when she utters 1. The Russellian theory then predicts that the utterance of 1 is true iff *there is a unique table in this room and it is covered with books.* However, by hypothesis, there are many tables in that room, and so the Russellian theory predicts that the sentence is *false*. But intuitively it is not false: the speaker does not have in mind any particular table, and so we are not inclined to judge that the utterance of 1 as either true or false. So, our version of the Russellian theory makes incorrect predictions with respect to this case.

Now, a defender of the Russellian theory might reply to all this that the objection advanced here relies on a controversial theory about contextual domain restriction. Indeed, the objection only proves that the Russellian theory fails when supplemented with the Stanley&Szabó mechanism for nominal completion. Maybe the Russellian has the option of subscribing to a different account of domain restriction that avoids the undesirable consequences.[2] However, I argue in what follows that non-denoting DDs of the kind considered here (i.e. resulting from a failure of uniqueness) pose a problem to the Russellian theory even when the DD is complete. In particular, it is possible to produce the same objection to the Russellian theory without relying on any mechanism of domain restriction whatsoever. Suppose that the speaker utters sentence 2 in the same scenario I have presented above (i.e. standing outside the room with many tables). The speaker uses the demonstrative to refer to the salient room.

2. The table in this room is covered with books.

The difference between 1 and 2 is that the implicit completion of the description in 1 is made explicit in 2. Moreover, the speaker of 2 uses the DD as complete. Given that she believes that there is a unique table in the salient room, her utterance of 2 does not require any domain restriction. She does not intend to talk about *a particular* table in this room, one of many tables to be found there, but about the only table she believes there in that room. In other words, the speaker of 2 uses the DD *as if it were complete*. Now, objectively speaking, the DD in 2 is still *incomplete*, in the sense that it does not denote uniquely an object in the context of utterance (as there are several tables in the salient room). However, the speaker is not aware of this fact, as she believes there is a

[2] For instance, in his reply to Ramachandran's article, Bach (1994: 185) claims that the Russellian explains the unintelligibility of these sentences appealing to a *pragmatic* mechanism of contextual domain restriction. However, as Ramachandran (1995: 285-286) points out in his rejoinder, Bach does not provide the details of this pragmatic account, and it is not clear that a plausible pragmatic explanation is available at all. Moreover, as I show in what follows, the problem does not concern only incomplete DDs, but also occurs for complete DDs, to which no mechanism of domain restriction applies.

unique table in that room.[3] For the purposes of semantic analysis, this utterance of 2 is complete.[4]

So, the Russellian predicts that the utterance of 2 in the scenario described is true iff *there is a unique table in this room, and it is covered with books*. As there are several tables, it predicts that the utterance of 2 is *false*. This contradicts the intuitions. Intuitively, the utterance of 2 is neither true nor false, as we refrain from assigning any truth-value to the sentence. As Strawson puts it, the question of its truth or falsity does not arise. I take it that this is a powerful objection to the Russellian theory, which does not depend on any mechanism of domain restriction that the Russellian might subscribe to. Any mechanism of domain restriction is irrelevant in this case because the DD in 2 is complete (in the particular sense discussed above).

The sophisticated Russellian (who embraces the Stanley&Szabó account of QDR) could still object to this argument by rejecting the claim that it is the *speaker's intentions* that should provide the values of the variables for the utterance of 2. A consequence of this claim is that the values of these variables provide no domain restriction whenever the speaker uses the DD as complete, even if it is not complete objectively. But, the Russellian might argue, the utterance of 2 is still such that the DD is (objectively) incomplete. And there is *no* plausible candidate for domain restriction that the context provides. So, the hidden variables in the LF of 2 receive no values. The objective conditions (unbeknownst to the speaker) fail to restrict the domain appropriately, so that no truth-value is determined for the utterance of 2. This prediction does correspond to intuitions, so the sophisticated Russellian faces no problem here.

One could reply to this objection that in simple cases of QDR it is either speaker intentions or saliency considerations that provide the value of the variables. An

[3] Notice that my scenario is different from Ramachandran's scenario, as in the later the speaker *knows* her description is incomplete but, for whatever reason, does not have any completion in mind. In the scenario I am suggesting the speaker is not aware that her use of the DD is incomplete.

[4] These facts about the utterance of 2 could be implemented in different ways in our formal framework. I have tried to present them in neutral terms, so that the argument could be independent of any theoretical choices concerning the details of implementation. When discussing the Stanley and Szabó's proposal (section §3.3) I suggested to postulate an *ambiguity* in the node inhabited by the CN, in such a way that on one reading this is [table, f(i)], on the other it is [table] and does not contain any aphonic variables. The latter option corresponds to cases in which the DD is complete. On this view, the speaker of 2 in the given scenario *disambiguates* the surface sentence 2 by choosing the latter one of the two structures, the one that does not have the variables 'f(i)' co-habiting the node with the CN. But the argument presented here does not depend on this particular implementation of Stanley and Szabó proposal. Alternatively, one can say that the complex variable 'f(i)' is always part of the LF of sentence 2, but in cases in which the DD is (used as) complete the context sets the domain restriction to: no restriction. That is, the value that the context determines for the variables is an all-inclusive one, having no effect on the truth-conditions of the sentence.

utterance of ‘Every bottle is empty’ (discussed in §3.1) in the context of a party gets restricted to every bottle *at this party* is empty because that is the salient domain of quantification. It is not objective factors unknown to the speaker that are responsible for this. And it is difficult to see what objective (and non-subjective) factors could *in principle* be relevant in restricting a quantifier domain. If there were such factors, then it should be easy to find an utterance of, for instance, the sentence ‘Every bottle is empty’ for which the contextual factors that restrict the domain are not available to speaker and audience. But it is not clear that there are such cases. So it is far from clear that the strategy suggested above in defence of the Russellian analysis of 2 (i.e. of looking for objective factors that determine the value of the variables and concluding that the context does not provide any plausible candidate) is correct. I take it that the correct view is that no hidden domain restriction applies to the DD in 2.

The modified version of Ramachandran’s argument that I propose has the advantage of proving to be compelling against the sophisticated version of the Russellian theory – while Ramachandran only considers the naïve version of this theory. But it also has a further advantage, as it avoids a different objection to Ramachandran’s argument. This is how Ramachandran formulates it:

> Some readers may find the objection unconvincing precisely because the alleged counterexamples to RTD involve ‘abnormal’ uses of descriptions (and, consequently, ‘abnormal’ speakers of the language). The following thought does seem compelling: that if a theory of content is to be challenged by way of exposing a clash with ordinary language, one needs to provide *normal*, i.e. *natural*, examples; after all, the reasoning runs, *no* theory could be expected to account for abnormal uses – these simply resist any standard analysis. (1993: 211)

Indeed, a rational and linguistically competent speaker does not use 1 in the way Ramachandran describes in his original argument (i.e. the speaker knows the DD is incomplete, and still she has no object – or alternatively, a descriptive completion – in mind). Ramachandran goes on to reject the objection by saying that his argument does not need to make reference to deviant or abnormal speakers. Instead, it could be formulated by asking us “to assess the correctness of certain sentences, among them [1]…, which were generated by a computer and displayed on a screen (say).” (1993: 211) However, if this is how the argument is formulated then it is questionable that we would even get the intuition that the utterance is unintelligible or lacking a truth-value. Instead, we would normally assume that a potential speaker would have a particular table in mind among the many present in the room. According to our methodology, the question the informant is asked concerns the truth-value the utterance of the sentence has. But competent informants would simply say that it is *incorrect* to use the sentence in that context without having any particular table in mind (or some descriptive completion of the DD). That is, it is not a case of a *correct* utterance (made with appropriate linguistic intentions) which exhibits truth-value judgements that do not correspond to the ones the Russellian theory predicts. Instead, it is a case of an incorrect utterance. The worry that Ramachandran voices is indeed legitimate. However, I have overcome this methodological problem in the modified version of the argument, in which the scenario is such that the speaker is not aware of the existence of various tables in the room, but has reasons to believe there is only one. In the scenario I introduced the use is perfectly normal and correct.

The lesson to be learnt from the above discussion is that the sophisticated Russellian theory (that embraces the Stanley&Szabó account of QDR) makes wrong predictions about uses of DDs for which uniqueness fails, both for complete DDs and for incomplete DDs. Let us now consider the Fregean and the B&C theories. As it turns out, these theories do not face the problem the Russellian theory faces. Let us first consider the scenario in which the subject utters sentence 1 being outside the classroom and assuming there is a unique table inside. Given that this case involves the use of an incomplete DD ('the table'), we need to rely on a mechanism of domain restriction. We supplement both the Fregean and the B&C theory with the Stanely&Szabó semantic mechanism for domain restriction. The truth-conditions of an utterance of 1 on the Fregean theory are the following (where a(f) and a(i) correspond to the values that the contextually determined assignment gives to the variables for completion, see §3.4 for details):

$||[s\ldots]||^{w,a} =$

= there is a unique table that is a(f)(a(i)) in w.1 iff it is covered with books in w.

On the B&C theory the truth-conditions are the following:

$||[s\ldots]||^{w,a} =$

= there is a unique table that is a(f)(a(i)) in w.1 iff every table that is a(f)(a(i)) is covered with books in w.

Suppose that the completion that the subject has in mind (i.e. the value of a(f)(a(i))) is again *in this room* (the salient classroom). Both the Fregean and the B&C theory make correct predictions, as they both introduce a precondition for the utterance of the sentence to have a truth-value. In the context of utterance of 1 this condition is not fulfilled, so the utterance of the sentence does not have truth-conditions. This prediction corresponds to the intuitions.

Consider now the scenario in which sentence 2 is uttered. In this case, as argued above, the DD ‘the table in this room’ is used as a complete description, and so no mechanism of domain restriction is present at the level of the LF of the sentence. Here again the straightforward prediction that both the Fregean and the B&C theory make is that the DD is not assigned a semantic value, and so the utterance of 2 does not have a truth-value. Both theories predict that a competent language speaker does not judge the utterance of 2 to be either true or false, but instead judges it as not having a truth-value. This predictions, again, corresponds to the intuitions. The present argument shows that the Russellian theory fails with respect to cases in which the DD does not have a unique denotation, while the other two theories we have considered have the advantage of making correct predictions relative to these cases. The more general lesson is that *any* theory on which a DD is an expression that introduces a semantic precondition of existence and uniqueness makes the correct predictions concerning 1 and 2.

§6.2. Failures of existence

I turn now to a discussion of the second kind of uses of DDs that lack a denotation, resulting from the fact that *no* individual fulfils the description in the context of utterance. This case has been discussed for a long time, starting with the debate between Russell (1905, 1957) and Strawson (1950, 1964) over the semantics of DDs. According to the Fregean theory when an utterance of a DD fails to denote a particular individual, the sentence containing the DD fails to express a proposition. On the other hand, the Russellian theory treats existence as part of the asserted content, in the sense discussed above.[5] The two theories make different predictions with respect to such cases of non-denoting DDs. The Fregean theory predicts that the utterance of a sentence of the form ‘The F is G’ when the DD lacks a denotation is truth-valueless, while the Russellian theory predicts that it is false. Strawson considers sentence 3

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[5] This is not precisely Russell’s own view, but rather our own reconstruction of a Russellian theory of DDs, as discussed in §2.4. For one thing, in our framework truth-conditions are assigned to *utterances* of sentence, following Strawson (1950). Russell however, assigns truth and falsity to *sentences*.

uttered “with a perfectly serious air” (1950: 330-1). He points out that the Russellian theory predicts that it is false, a prediction that does not match the intuitions.

3. # The present king of France is bald.

Intuitively, competent speakers do not judge sentence 3 as either true or false. It is safe to suppose that a competent speaker who is given the option of choosing between true, false, and neither true nor false (or lacking a truth-value), would choose the last option. This intuition is marked above with ‘#’ (as opposed to ‘T’ or ‘F’, which stand for intuition of true and false, respectively). As Strawson points out, the question of whether what she said is true or false does not arise: “we simply fail to say anything true or false because we simply fail to mention anybody by this particular use of that perfectly significant phrase. It is, if you like, a spurious use of the sentence, and a spurious use of the expression.” (1950: 331) Strawson (1950: 330, 332) proposes to treat DDs as referential expressions, such that an utterance of a sentence containing non-denoting DDs does not express a proposition, and does not have truth-conditions. Strawson’s idea does not coincide with the Fregean account of DDs: in the case of non-denoting DDs, Frege claims that the DD fails to have a reference (e.g. and the proposition fails to determine a truth-value). The Fregean proposal has been implemented in the present framework by appealing to *partial functions*, which are defined only for worlds in which existence and uniqueness are fulfilled. According to the Fregean theory the utterance of 3 is *truth-valueless*, as the condition of existence of a unique individual that fulfils the DD is not fulfilled. On the other hand, Strawson maintains that by uttering sentences containing non-denoting DDs we *fail to make a statement*, not that we make a statement that does not determine a truth-value. However, in our framework for calculating the extension of a sentence at a given possible world, the result of failing to express a proposition has the same effect as that of expressing a proposition that is not defined for the world of the context, i.e. that no truth-value can be assigned to the utterance.

In his reply to Strawson’s argument, Russell (1957: 389) points out that Strawson has been too quick in his rejection of the Russellian proposal. He does not deny the incongruence of his theory with the intuitions in the case of 3, but provides evidence that Strawson’s theory does not have “the support of common usage” either. He writes that an atheist who claims that 4 is *not false* just in order to escape religious persecution (as he holds that the sentence is actually truth-valueless) “would be regarded as a somewhat shifty character." Instead, the right thing for an atheist to say about 4 is that it is *false*, precisely because the DD is non-denoting.

4. The ruler of the Universe is great.

Russell seems not to be impressed by the distinction between false and truth-valueless in the case of natural language sentences such as 3 and 4. Instead, he suggests that we should subsume the intuitions of truth-valueless under the category of falsity, i.e. defining falsity as the absence of truth.[6]

In an attempt to defend the Russellian theory against Strawson's objection, Neale (1990: 27) proposes other more compelling examples of sentences containing non-denoting DD that we clearly judge as false, and not truth-valueless (the 'F' symbol is meant to be interpreted as marking the intuition of falsity):

5. F This morning my father had breakfast with the king of France.
6. F The king of France shot my cat last night.

These sentences constitute a problem for the Fregean: if no proposition is expressed, the utterance does not have truth-conditions, so it does not have a truth-value. Actually, Strawson (1954) admits that there are cases for which Russell's view conforms better to the intuitions. He even reinforces Russell's point with further examples:

> Suppose, for example, that I am trying to sell something and say to a prospective purchaser 'The lodger next door has offered me twice that sum,' when there is no lodger next door and I know this... And it would indeed be a lame defense for me to say, 'Well, it's not actually false, because, you see, since there's no such person, the question of truth and falsity doesn't arise.' (Strawson 1954: 225)

In conclusion, both the Russellian and the Fregean claim to have the support of intuitions in favour of their respective views, but truth-value judgements on sentences containing non-denoting DDs do not favour uniquely any of the two theories. Instead, the intuitions exhibit a significant variation. Naturally, defenders of the Russellian theory have tried to account for those cases that exhibit intuitions of lack of a truth-

[6] Russell seems to think that truth-value intuitions are in general of no special interest, and should not be taken at face value. Concerning sentence 3 above he writes: "[Strawson] admits that the sentence is significant and not true, but not that it is false. This is a mere question of verbal convenience... For my part, I find it more convenient to define the word "false" so that every significant sentence is either true or false." (1957: 388) However, operating with a stipulative definition of 'true' and 'false' has the undesirable consequence of undermining the methodology for testing semantic hypothesis by appealing to competent speakers' truth-value judgements, as the latter are not supposed to have intuitions about a stipulative notion of truth and falsity. A further problem is that if an utterance of a sentence contains an expression that lacks a semantic value, then the negation of that sentence also contains an expression that lacks a semantic value. Suppose we treat the former utterance as false, as Russell's stipulation suggests. Then its negation must be true, which contradicts the stipulation.

value, while Fregeans have tried to provide an explanation of the cases in which the intuition of falsity is strong. Usually, both camps appeal to pragmatic explanations of the data from intuitions, a strategy that allows them to leave unmodified the respective semantic accounts of DDs. Let me first briefly discuss a pragmatic proposal meant to defend the Russellian theory.

§6.3. A pragmatic defence of the Russellian theory

One pragmatic defence of the Russellian theory is offered in Grice's article "Presupposition and Conversational Implicature" (1981). Grice argues that the Russellian could offer a reply to Strawson's objections based on cases of non-denoting DDs. He argues that there are good reasons for the Russellian to postulate that existence and uniqueness are pragmatically presupposed by utterances of DDs: "the existential presuppositions seemingly carried by definite descriptions can be represented within a Russellian semantics, with the aid of a standard attachment of conversational implicature" (1981: 281) Grice's argument goes as follows. First, he notes that it is a consequence of the Russellian theory that the semantic value of an utterance of sentence 7 is the same as the semantic value of an utterance of sentence 8, if the context is the same.[7]

7. The King of France is bald.
8. There is at least one king of France and there is not more than one king of France and every king of France is bald.

As Grice notes, this is not the only "Russellian expansion" of the DD. However, Grice maintains that it is particularly insightful to focus on this Russellian expansion as "it sets out separately three distinct clauses, and each one of these can be false while both of the others are true." (1981: 273) The second step in explaining how the implicature of existence and uniqueness is derived is introducing a submaxim of Manner, which Grice claims is essential in deriving the implicature. This is a new submaxim of Manner, to be added to the initial submaxims of Manner introduced in Grice (1989a). It

[7] In fact, Grice does not prove this, but the equivalence of the respective semantic values can be easily proven. On a standard semantic account of the expressions involved, and treating the DD according to the Russellian account, the semantic value of 7, expressed with the help of FOL, is of the form:

(i) $\exists x(Fx \wedge \forall y(Fy \rightarrow x=y) \wedge Bx)$.

The semantic value of sentence 8 is of the form of a conjunction:

(ii) $(\exists x(Kx)) \wedge (\forall x(Kx \rightarrow \forall y(Ky \rightarrow x=y))) \wedge \forall x(Kx \rightarrow Bx)$.

It is easy to prove that these two expressions are equivalent.

reads as follows: "Frame whatever you say in the form most suitable for any reply that would be regarded as appropriate". Now, if 8 has the same semantic content as 7, then uttering 7 instead of 8 is a violation of this submaxim of Manner, given that 7 does not frame the proposition expressed in the most appropriate way. The addressee might want to question or reject any of the three conjuncts of 8. If you are asserting a conjunction of three propositions, then "it would be natural, on the assumption that any one of them might be challengeable, to set them out separately and so make it easy for anyone who wanted to challenge them to do so." (1981: 273) But the speaker *could* be observing the submaxim of Manner and *at the same time* assert 7 instead of 8 if she did not hold on to that assumption, that is, if she thought some of the conjuncts are not challengeable. If the speaker thinks that it is common knowledge that two of the conjuncts are true, then she would be complying with the respective submaxim of Manner if she did not utter a conjunction of three sentences, such as 8, but instead chose to express the same truth-conditions by uttering 7. So, a speaker who chooses 7 instead of 8 takes it for granted that two of the three conjuncts in 8 are true. But which two of them? Grice (1981: 274-275) argues that it is reasonable to think that the first two conjuncts – expressing existence and uniqueness – are the ones that the speaker normally would take for granted. Grice argues that this is so given that usually they are epistemically prior to evaluating the third conjunct. Usually one gets to figure out whether *all* Fs are G *after* having figured out *whether* there are Fs and *how many* of them there are. He writes: "it is prima facie not to be expected that you would find somebody in the position of being prepared to concede the generalization but being concerned about whether and how often that generalization is instantiated." (1981: 275) Grice goes on to argue that this implicature projects when embedding sentence 7 under negation, which makes the conversational implicature a good candidate for the status of a presupposition (i.e. a felt implication that the speaker takes for granted and which projects).

However, Grice's argument does not seem to stand careful scrutiny. Elbourne (2013: 78-80) points out several problems with it, but I shall not discuss here all the objections that Elbourne raises against the Gricean strategy. Its "most fundamental flaw" (2013: 78), according to Elbourne, is that, if the truth-condition of 7 and 8 are exactly the same, then it is not clear what benefits come from uttering 8 instead of 7, and why 8, but not 7, fulfils the newly introduced submaxim of Manner. According to the Russellian theory the semantic values of 7 and 8 are precisely the same. So, Elbourne writes, "whatever beautiful tripartite clarity is achieved by [7] is achieved by [8] too, at the level of semantic representation, whatever we take that to be." (2013: 78)

However, I think there are ways in which a proponent of this Gricean strategy could reply to this objection. She could argue that, although the two sentences are semantically equivalent, they encode – or "frame", as Grice puts it – the semantic information in different ways. As a consequence 8 does, but 7 does not, fulfil the newly introduced submaxim of Manner. To draw a parallel consider the contrast between the following sentences:

9. The suspect is a bachelor.
10. The suspect is a male and is not married.

Considering the utterance of these sentences in the context of a discussion between several policemen investigating a crime. Although the two sentences express the same semantic content and have the same truth-conditions, uttering 10 in the context in which the policemen want to list all relevant information they possess about the suspect does comply with the submaxim of Manner Grice introduces, while uttering 9 does not comply with this submaxim. This pragmatic norm says: "Frame whatever you say in the form most suitable for any reply that would be regarded as appropriate". The information that the suspect is male, and the information that the suspect is unmarried are two independent pieces of information, such that one might turn out to be true and the other false. The suspect might be a woman, or the suspect might turn out to be married. Uttering 9 in that context is semantically equivalent to uttering 10, but 9 does not frame what is said in the *most* suitable form for any reply that would be regarded as appropriate, such as, for instance, a reply that denies that he is not married but *not* that he is a male. A rejection of 9 only counts as rejecting that the suspect is a bachelor. Therefore, we have no reason to accept Elbourne's premise that whatever beautiful tripartite clarity is achieved by 7 it is achieved by 8 as well, just because they have the same semantic content (on the Russellian assumption). So, I think Elbourne's objection does not identify the fundamental flaw of the Gricean strategy.

However, this does not mean that Grice is right. The main problem with Grice's argument is, I think, that it is not able to deal with the problem that the Russellian theory faces concerning the data, i.e. that component speakers lack a determinate intuition of either truth or falsity concerning 7. Let us first see how Grice's strategy is meant to achieve this. Grice does not explicitly discuss the truth-value intuitions that sentences such as 7 produce, but he does indicate (1981: 270) that his account is able to deal with such difficulties that the Russellian theory faces. We can only speculate about how the explanation is meant to work. Here is a suggestion: the speaker's choice of uttering 7 instead of 8 together with Grice's newly introduced submaxim of Manner indicate that the speaker takes it for granted (i.e. takes it to be common knowledge among the participants in the conversation) that the existential and uniqueness conditions are fulfilled, i.e. that there is a unique king of France. The speaker invites the addressee to consider only the third conjunct, the one she does not take for granted, which says that whatever is king of France is bald. But, as Grice points out, normally when considering the three conjuncts, the third one is evaluated for truth-value only if the first two conjuncts are determined to be true. Now, strictly speaking, the addressee *could* go on to evaluate the claim that every king of France is bald, even if she believes that there is no such person. But that is not the normal thing to do, given that normally a speaker claims that every king of France is bald only if she believes that there is a unique king of France. So the addressee's normal reaction is not to consider whether the latter conjunct is true, but to stop the evaluation of the assertion and point out to the speaker that what she takes for granted is in fact false. This explains why the failure of the presupposition interferes with our ability to evaluate the utterance of 7 for its truth-value and judge it as false. Instead, we tend to judge 7 as truth-valueless.

Now, I am not sure whether this explanation is compelling at all. I am only suggesting that this is how a Gricean might predict the data concerning 7, i.e. that speakers do not judge the utterance as either true or false. On this account, the utterance is actually false, but it is not judged as such because of the reasons exposed above.[8] However, the more important flaw of this Gricean account is that, contrary to what Grice (1981: 270) suggests, it is not capable to account for *all* the data. Even if the Gricean strategy might prove to successfully account for those cases in which non-denoting DDs trigger the kind of data we found for 7, the strategy overgenerates such predictions. Grice's strategy predicts that a speaker should have the same reaction for sentence 6, which also has a DD in subject position. But it is part of the original problem that the data is not uniform: 6 is intuitively judged as false. There is nothing in the pragmatic account that Grice sketches that makes it apply only to cases such as 7, and not to cases such as 6. That is, the Gricean strategy has an overgeneration problem:

[8] It must be mentioned that in the second part of the essay Grice raises doubts about the generality of his strategy of pragmatic derivation of presuppositions. As a result, he explicitly refuses to endorse the account, which he says to have "endeavoured to outline, without aligning myself with it" (1981: 281)

it is not sufficiently flexible to apply only to those cases that pose a problem to the Russellian theory, but not to those cases that are correctly predicted by the Russellian.

§6.4. A pragmatic defence of the Fregean theory

I turn now to the discussion of the pragmatic account that the defenders of the Fregean theory have proposed in order to account for those intuitions that do not square with the predictions of the Fregean theory. According to the Fregean theory, failures of existence always have as a result that the utterance does not have truth-conditions. What needs an explanation is why we intuitively judge sentences such as 5 and 6 above, but also 11 and 12 below, as having a determined truth-value.

11. F The king of France is sitting in that chair. (Lasersohn 1993: 113)

12. T The king of France is not sitting in that chair. (Lasersohn 1993: 114)

An utterance 11, uttered while pointing at an empty chair, is intuitively false, while an utterance of 12 is intuitively true. The explanation proposed in Lasersohn (1993), and developed in von Fintel (2004) and Elbourne (2013) invokes what Lasersohn calls "the pragmatics of verification" (1993: 114). The idea is that utterances of sentences that contain a term that fails to have a denotation, and which do not have determined truth-conditions, are judged to be false if we have additional reasons (independently of the lack of denotation of the term) to believe the sentence could not be true. Here is how Lasersohn (1993) explains the idea:

> Why is it that someone who points at an empty chair and says *The king of France is sitting in that chair* seems to be saying something false? I would like to suggest that it is because *even if we suspend our knowledge that there is no king of France, there is no way of consistently extending our information to include the proposition that the king of France is sitting in the chair*. […] In contrast, if we suspend our knowledge that there is no king of France, our information may then be extended either to include the proposition that the king of France is bald, or to include the proposition that the king of France is not bald. (1993: 116)

That is, according to the strategy, even if there is a king of France, the utterance is still not true, for reasons that are independent of the existence or inexistence of a unique king of France (i.e. that no one is sitting in the salient chair). von Fintel (2004) discusses Lasersohn's suggestion and points out that the reasoning that leads to the truth-value intuition is not simple counterfactual reasoning. We are not simply evaluating the sentence with respect to a counterfactual possibility:

> the reasoning cannot actually be running on ordinary counterfactual lines, because it is not too hard to imagine a scenario where, if there were a king of France, he would indeed be sitting in that chair. Nevertheless, even if I had such counterfactual beliefs, the sentence would still be judged FALSE if the chair is obviously in fact empty. (von Fintel 2004: 282)

Looking at the details of the pragmatic account Lasersohn and von Fintel propose helps clarify the sense in which the account is "epistemic". I follow here the presentation in von Fintel (2004). The basic idea is that sentences are assessed with respect to a given body of information D, which is a consistent set of propositions available to the speaker for evaluating the sentence. A preliminary approach to the conditions under which a sentence is judged as true, and respectively, as false (but which does not yet account for the troublesome intuitions in cases such as 11 and 12) says that a sentence is judged as true or false in the following conditions (von Fintel 2004: 281):[9]

Acceptance: Accept a sentence Φ as TRUE with respect to a body of information D iff for all worlds w compatible with D: $||\Phi||(w) = 1$.

Rejection: Reject a sentence Φ as FALSE with respect to a body of information D iff for all worlds w compatible with D: $||\Phi||(w) = 0$.

In other words, accept a sentence Φ as true iff it is entailed by the body of information D, and reject it as false iff its negation is entailed by D. These rules take care of cases in which sentences are judged as true or false. A consequence of these clauses is that if neither Φ nor ¬Φ is entailed by D (i.e. if there are worlds for which Φ is true and worlds for which Φ if false, and/or worlds for which Φ is not defined) then Φ will be judged as neither true nor false. Sentences 11 and 12 are not defined for the actual world (a world compatible with D), and therefore the prediction is that they are judged as neither true nor false. The clauses for Acceptance and Rejection must then be complicated to include the idea that Lasersohn introduced. Consider again sentence 11: Lasersohn's idea is that the sentence is judged as false because even if there is a king of France, 11 is not true. So we must revise the body of information D in order to add the proposition

[9] In formulating these clauses von Fintel talks about accepting and rejecting *sentences*, but the context of the discussion makes it clear that he is talking about *utterances* of sentences, or sentences *in context*.

that there is a unique king of France to the body of information D that we use to evaluate the sentence. The clause for revision is the following (von Fintel 2004: 281):

> *Revision*: For any body of information D and any proposition π, rev_π(D), the revision of D so as to entail π, is a body of information that is as much like D as possible but that entails π. If D already entails π, rev_π(D) = D.

The details of the revision of the body of information are the following (von Fintel 2004: 283):

> *Common-sense epistemic revision*
>
> Remove ¬π from D.
>
> Remove any proposition from D that is incompatible with π.
>
> Remove any proposition from D that was in D just because ¬π was in D.
>
> Add π to D.
>
> Close under logical consequence.

Now, the clause for Rejection is modified correspondingly as follows:

> *Rejection (revised)*: Reject a sentence Φ (with presupposition π) as FALSE with respect to a body of information D iff for all worlds w compatible with rev_π(D): ||Φ||(w) = 0.

Here by saying that sentence Φ has presupposition π von Fintel means that the sentence Φ has a *semantic* presupposition of the kind the Fregean postulates for DDs, i.e. a presupposition that works as a precondition for the sentence containing the DD to have a semantic value. Rejection (revised) is meant to explain why we judge sentences such as 11 as false: revising D by adding to it the proposition that there is a unique king of France has the effect that an utterance of 11 is *no longer judged as truth-valueless* (i.e. it has a truth-value relative to rev_π(D)); moreover, rev_π(D) entails that 11 is *false* (i.e. an utterance of 11 is false relative to all worlds compatible with rev_π(D)); finally, given Rejection (revised), 11 is *judged as false*, because in all the worlds compatible with rev_π(D) sentence 11 is false, as there is no one sitting in the salient chair.

von Fintel does not propose a revised version of the clause for Acceptance, as he does not consider sentences such as 12, which are intuitively judged as *true*, although they are semantically truth-valueless on the Fregean semantics for DDs. However, it is easy to see what such a modified clause for Acceptance looks like, given the revised clause for Rejection.

Acceptance (revised): Accept a sentence Φ (with presupposition π) as TRUE with respect to a body of information D iff for all worlds w compatible with rev_π(D): ||Φ||(w) = 1.

The truth-conditions of (an utterance of) sentence 12 are the following:[10]

$||[s \ldots]||^{w,a} =$

= there is a unique $x \in D_e$ such that x is king of France in w.1 iff it is not the case that the king of France is sitting in that chair in w

The Fregean semantics for the DD in 12 predicts that the utterance of the sentence is truth-valueless relative to the relevant body of information D, which entails that there is no king of France; the competent speaker who evaluates 12 goes on to revise the body of information D, the result being rev_π(D), which entails the existence of a unique king of France; given Acceptance (revised), sentence 12 is judged as true, given that in all the worlds compatible with rev_π(D), sentence 12 is true.

What about a sentence such as 3 ('The king of France is bald.')? According to the present pragmatic theory, the sentence is judged as truth-valueless: after revising the body of information D so as to entail that there is a unique king of France, it is not the case that relative to all worlds compatible with rev_π(D) the sentence is true, or that it is false in all these worlds. Instead, in some worlds compatible with rev_π(D) the king of France is bald, but in others it is not. Therefore, the sentence will not be judged as either true or false.

This version of the pragmatic mechanism takes care of most of the cases in which the truth-value intuitions are different than what the Fregean theory predicts. However, von Fintel argues that there are cases about which the account still does not make the right predictions. Consider the following sentence:

13. F The king of France is on a state visit to Australia this week. (von Fintel 2004: 284)

Sentence 13 judged as false, although this is not what we expect on the present version of the account: we revise the body of information D so as to add the proposition that there is a unique king of France, then we evaluate 13 with respect to rev_π(D). Now, it is not the case that in all worlds compatible with rev_π(D) the sentence is false. Instead, there are worlds in which the king of France is on a state visit to Australia. Therefore,

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[10] The reader is referred to the discussion of sentences in which a DD interacts with negation in chapter 5. The LF of 12 is analogous to the LF 24.2 in chapter 5, the semantic value of which is computed there step by step. So here I skip the steps of the calculation.

given Rejection (revised), the prediction is not that the sentence is judged as false, but rather as neither false nor true. However, the sentence is intuitively false. This case seems to be problematic to the account because the only reason we have to believe that the sentence is false is that there is no unique king of France. That is, we do not have any independent reason, as in the previous cases. Still there is a significant difference between 13 and 3 according to von Fintel (2004), and it is the following:

> In the case of [13] but not in the case of [3], there is a *contextually salient* entity whose properties (known or not known) are *in principle* enough to falsify the sentence… The idea then is that the rejection strategy can be based on facts that we know must be there (since we know that the presupposition of the sentence is false) *and* that we know could be established by examining an entity that everyone involved agrees exists. (2004: 286)

Consequently, von Fintel proposes to modify the strategy for revising D in the following way:

Revised version of the revision of D:

Remove ¬π from D.

Remove any proposition from D that is incompatible with π.

Remove any proposition from D that was in D just because ¬π was in D, *unless it could be shown to be true by examining the intrinsic properties of a contextually salient entity.*

Add π to D.

Close under logical consequence.

By examining the intrinsic properties of the contextually salient entity, in this case Australia, we can show (in principle) that σ: *no king of France is on a state visit to Australia this week*. According to the above revision procedure we do not remove proposition σ from D. And so σ is part of rev_π(D), the body of information relative to which we evaluate 13. It is easy to see now that Rejection (revised) predicts that sentence 13 is judged as false, which corresponds to the intuition.

von Fintel (2004) goes on to make a further refinement to the strategy of revision of D, and Elbourne (2013: 91-103) suggests yet other revisions. However, I am not going to present and discuss them here, as my purpose here is not finding the best version of this pragmatic strategy.

The exposition of the pragmatic account is not complete without addressing the issue of the justification of the clauses for Acceptance and Rejection, without which the account falls short of providing a full explanation of the intuitions triggered by 11 and 12. As von Fintel points out, the reasoning that gets us to the truth-value judgement is not simple counter-factual reasoning. We do not simply evaluate 11 with respect to a possible world in which there is a unique king of France. Instead, the revision of the information base D is more complex, as we have seen. However, it does have a counterfactual element, as we add into rev_π(D) the non-actual claim that there is a unique king of France, which we know to be false. The inevitable question is then: why do we go from judging 11 as *false relative to rev_π(D)* to judging it as *false* (relative to D)? von Fintel proposes the following answer:

> Perhaps, the best explanation for the pattern of judgments discussed here can be achieved by assuming that we are dealing with intuitions about possible conversational moves... We get squeamishness if the only way to reject the speaker's sentence is by challenging its presupposition… Now, if the sentence has entailments that we could in principle falsify independently of discussing its presupposition, we are still in business. It is much easier to see these examples as false, because we do not necessarily have to engage in a debate about the mistaken presupposition. (2004: 295)

Let me turn now to the initial question that concerns us here, which is the choice between competing theories of DDs. The initial problem we started with is that both the Russellian and the Fregean theory square badly with intuitions, because in both cases there are truth-value intuitions that are different from what the semantic theory predicts. However, at this point it looks like the Fregean is in a better situation: while the Gricean pragmatic strategy for explaining the non-Russellian truth-value intuitions fails, the Fregean does have at her disposal a pragmatic theory sufficiently robust to explain the non-Fregean truth-value intuitions.

What about the third theory we have considered from the beginning, the B&C proposal? The B&C theory assigns the following semantic value of the definite article:

$$||the||^{a,w} = \lambda f_{<e,t>} \text{ and } \exists x(f(x)=1 \wedge \forall y(f(y)=1 \rightarrow y=x)).[\lambda g_{<e,t>}.1 \text{ iff } \forall x(f(x)=1 \rightarrow g(x)=1)]$$

While this proposal is rarely considered in the literature, it is relevant to see in the present context whether it faces a similar problem with truth-value intuitions as the Fregean and the Russellian theory do. The B&C theory has in common with the Fregean theory that its intension is a partial function, which is not defined for contexts in which there is no unique individual that fulfils the descriptions (although it is different from the Fregean theory in that it assigns to ‘the’ an extension of the same type, <<e,t>,<<e,t>, t>>, the same as the Russellian theory, and not of type <<e,t>,t>, as the Fregean does). For that reason it predicts the same truth-value judgements as the Fregean theory for all the extensional contexts such as 11 and 12, in which an utterance of a sentence contains a non-denoting DDs. The pragmatic strategy that Lasersohn and von Fintel propose gives the same promising results when combined with the B&C theory. Consider again sentences 11 and 12 (repeated here as 14 and 15, respectively):

14. F The king of France is sitting in that chair.

15. T The king of France is not sitting in that chair.

Sentence 14 lacks a truth-value on the B&C theory. The pragmatic account predicts that D is revised so as to include the proposition that there is a unique king of France. We then evaluate 14 with respect to rev_π(D). On the B&C theory, we get that an utterance of sentence 11(14) is true if *every king of France is sitting in that chair,* if there is a unique king of France*; undefined,* otherwise. Evaluating 11(14) relative to rev_π(D), the sentence turns out false with respect to all worlds compatible with rev_π(D). Given Rejection (revised), the sentence is judged as false, a prediction that coincides with the intuitions. It is easy to see that we get the right result for sentence 12(15) as well, using this time the clause for Acceptance (revised). And the same for sentence 13.

§6.5. Conclusions

I have discussed in this chapter the predictions that the various theories of DDs considered here make for those contexts in which the use of the DD fails to denote a particular individual. First, I discussed failures of uniqueness, and focused on the argument Ramachandran (1993) proposes. I argued that it does not provide a compelling objection against the version of the Russellian theory discussed here (improved by adding the Stanley and Szabó account of domain restriction to it). Subsequently I offered a modified version of Ramachandran’s argument, concluding that the Russellian theory makes incorrect predictions about uses of DDs in contexts in which uniqueness fails.

Second, I considered contexts in which the DD fails to denote an individual because nothing fulfils the description. Such non-denoting uses of DD trigger a variety of truth-value intuitions, some conforming to the Russellian theory, and some to the Fregean. Both the Russellians and the Fregeans have offered pragmatic accounts meant to account for the divergence of some truth-value intuitions from those that their favourite theory predicts. I have argued that the pragmatic account that Grice offers in defence of the Russellian theory fails, and so the Russellian theory is left with no account why non-denoting DDs do not always trigger the intuitions it predicts. On the other hand, the Fregeans have developed a sophisticated pragmatic account to deal with the corresponding intuitions. This is a second reason to prefer the Fregean theory to the Russellian. In the end I pointed out that the B&C theory has the same theoretical virtues as the Fregean, and so it is a candidate to be seriously considered. The B&C theory is generally ignored in the literature, but I have found no good reasons to ignore it. On the contrary, the present discussion indicates that there are good reasons to prefer it to the Russellian theory.

Chapter 7: The existential import of DD's

§7.1. The argument

In this last chapter I address data concerning the embedding of DDs in propositional attitude verbs. In particular, I focus on an argument that purports to show that the existential import of DDs is not part of the asserted content. The argument is proposed by Heim (1991) and developed by Kripke (2005: 1023), Elbourne (2005: 109–112; 2010, 2013: 150-171) and Schoubye (2013). Let me first present the argument and then discuss its merits. I present it using the framework for compositional semantics I adopted in this thesis (and not the semantic framework that Heim or Elbourne use). However, as I hope will become clear later on, the argument does not depend on this particular choice.

Consider the following sentences, where a sentence containing a DD in subject position is embedded in a propositional attitude report (i.e. it is the argument of a propositional attitude verb). It is important for the argument that the propositional attitude verb considered be *non-doxastic* (i.e. not expressing belief or disbelief):

1. Hans hopes that the ghost in his attic will be quiet tonight.
2. Hans wonders whether the ghost in his attic will be quiet tonight. (Elbourne 2010: 2)
3. Ponce de Leon hopes the fountain of youth is in Florida. (Neale 1990: 27, modified)

The argument could be run for any of these sentences. I focus in what follows on sentence 1, because this is one of the sentences that are usually discussed in the relevant literature. First of all, notice that the superficial form (PF) of 1 is ambiguous, as the DD may take either wide scope or narrow scope relative to the propositional attitude verb at the level of LF.[1] The two LFs of 1 are the following:

1.1 $[_S\ [_N$ Hans$]\ [_{VP}\ [_V$ hopes$]\ [_S\ [_C$ that$]\ [_S\ [_{NP}$ the ghost in his attic$]\ [_{VP}$ will be quiet tonight$]]]]]$

1.2 $[_S\ [_{NP}$ the ghost in his attic$]\ [_S\ [\lambda_1]\ [_S\ [_N$ Hans$]\ [_{VP}\ [_V$ hopes$]\ [_S\ [_C$ that$]\ [_S\ [_{NP}\ t_1]\ [_{VP}$ will be quiet tonight$]]]]]]]$

[1] This parallels the case of sentences in which DDs interact with negation or modal operators. See the discussion in chapter 5, especially sentences 24 and 28, respectively.

Sentence 1 introduces certain complications, given the occurrence of 'his' in the DD, which is context-dependent and, in particular, anaphoric on 'Hans'. For that reason it is more convenient to run the argument on, say, sentence 3. However, I go on to use sentence 1 in what follows, because this is one of the sentences that Elbourne and others discuss. However, I follow them in ignoring the aforementioned complication, which is not relevant to the present purposes (in particular, I treat 'ghost in his attic' as if it were a simple CN).

Consider now 1.1. On the Russellian analysis of the DD, we get:

$||\text{the ghost in his attic}||^{a,w} = \lambda g_{<e,\,t>}.1$ iff there is a unique $x \in D_e$ such that x is a ghost in Hans's attic, and g(x)=1

$||[_S\ [_{NP}$ the ghost in his attic$]\ [_{VP}$ will be quiet tonight$]]||^{a,w} = 1$ iff there is a unique $x \in D_e$ such that x is a ghost in Hans's attic, and x will be quiet tonight

I assume that the complementizer has a vacuous semantic value:

$||[_C \text{ that}]||^{a,w} = \lambda t_{<t>}.t$

For 'hopes' consider the following semantic value of type <<s,t>,<e,t>>, in line with the one for 'believes' given in chapter 1:

$||\text{hopes}||^{a,w} = \lambda p_{<s,\,t>}.[\lambda x_{<e>}.1$ iff p(w')=1 for all w' compatible with what x hopes in w]

Therefore, the truth-conditions of 1.1 are:

$||[_S\ldots]||^{a,w} =$

$= [\lambda p_{<s,\,t>}.[\lambda x_{<e>}.1$ iff p(w')=1 for all w' compatible with what x hopes in w]](λw.1 iff there is a unique $x \in D_e$ such that x is a ghost in Hans's attic in w, and x will be quiet tonight in w)(Hans) =

$= [\lambda x_{<e>}.1$ iff, for all w' compatible with what x hopes in w, there is a unique $x \in D_e$ such that x is a ghost in Hans's attic in w', and x will be quiet tonight in w'](Hans) =

= 1 iff, for all of Hans's hope worlds, there is a unique $x \in D_e$ such that x is a ghost in Hans's attic in w', and x will be quiet tonight in w'

That is, the utterance of 1.1 is true iff *Hans hopes that there is a unique ghost in his attic and it will be quiet tonight*. This is the *de dicto* reading of 1. I skip the calculation of the semantic value of 1.2 in the interest of space.[2] The result for 1.2 is the *de re*

[2] The reader is referred to the calculation of the semantic value of 28.2 in chapter 6, which parallels that of 1.2. In that case the DD is in the scope of a modal operator.

reading of 1. On this disambiguation, an utterance of 1 is true iff *there is a unique ghost in Hans's attic, and Hans hopes that it will be quiet tonight*.

Now, the scenario in which 1 is uttered is by hypothesis such that the speaker does not believe in ghosts. Therefore, of the two different readings of sentence 1, the one that captures the intuitive truth-conditions cannot be the *de re* reading of 1 (which results from interpreting the LF 1.2), for this entails that the speaker commits herself to the existence of ghosts, which in fact she doesn't: 1 can be true and felicitous even when the speaker does not believe in ghosts, and there are none. So, it must be the *de dicto* reading (which results from interpreting LF 1.1) that captures the intuitive truth-conditions.

The next step in the argument is to notice that the Russellian assigns intuitively *incorrect* truth-conditions to 1, on the *de dicto* reading of it. Elbourne makes the following comment:[3] when uttering 2,

> we are not saying that Hans [hopes], among other things, [that] there is exactly one ghost in his attic; it sounds rather as if Hans is *assuming* that there is exactly one ghost in his attic and *[hopes]* only [that] it will be quiet tonight. (2013: 151)

Making a similar observation about 1, we can conclude that the Russellian interpretation of the LF 1.2 fails to capture the intuitive reading of 1. Given that the Russellian interpretation of 1.1 (the *de re* reading) also fails to capture the intuitive truth-conditions, and that 1.1 and 1.2 are the only available hypotheses a Russellian has concerning the logical form of 1, the Russellian theory makes incorrect predictions.

In order to evaluate this argument against the Russellian theory, and especially in view of an objection that I discuss below, it is useful to be more explicit about what exactly is the data here, and how it conflicts with the Russellian theory. The following is my own reconstruction of the Heim-Elbourne argument. First, notice that Elbourne identifies in the above quote two intuitions concerning the utterance of 1 in the given scenario:

i) that Hans *does not hope that there is a unique ghost in his attic* and

[3] Elbourne's original comment is about sentence 2, not sentence 1. However, his comment applies *mutatis mutandis* to sentence 1. I am discussing here sentence 1, not 2, because the semantics of 'wonders' introduces special problems that are easily avoided if we focus on a propositional attitude that is similar to belief. The attitude of hoping is similar to belief in a crucial aspect: what one hopes is *consistent*, at least under certain cognitive idealizations. But what one wonders is not: I may wonder whether p and also wonder whether not-p. And I may wonder whether p and wonder whether q when p and q are incompatible. This makes it much more complicate to introduce a semantic value for 'wonders'. Definitely, it cannot be as simple as the one we introduced above for 'hopes', on the model of 'believes'.

ii) that Hans *assumes (or believes) that there is a ghost in his attic*.

Elbourne complains that the Russellian *de dicto* truth-conditions of 1 predict something inconsistent with these two observations. But, we must ask, are they truth-conditionally relevant? Let us start with (i). The given scenario is such that Hans believes that there is ghost in his attic, and, given his plan to spend the night studying, he hopes that the ghost in the attic will be quiet tonight. In what follows I reconstruct the argument by identifying its different premises and inferential steps. This will prove helpful later on. The argument based on (i) could be reconstructed as follows (call it Argument-I):

P1. In the given scenario Hans *believes that there is a unique ghost in his attic*.

P2. One cannot both *believe* that p and *hope that* p. The two propositional attitudes seem mutually exclusive.

P3. So, in the given scenario *it is not the case that Hans hopes that there is a unique ghost in his attic*. (from P1 and P2)

P4. The Russellian *de dicto* truth-conditions for 1 predict that 1 is true iff Hans *hopes that there is a unique ghost in his attic and it is quiet tonight*.

P5. So, the Russellian *de dicto* truth-conditions for 1 predict that 1 is true only if *Hans hopes that there is a unique ghost in his attic*. (from P4)

P6. So, on the Russellian *de dicto* truth-conditions for 1, the utterance of 1 is predicted to be false. (from P3 and P5)

P7. However, intuitively the *de dicto* reading of 1 is true.

C. Therefore, the Russellian *de dicto* truth-conditions for 1 are incorrect. (from P6 and P7)

Given that the Russellian *de re* reading of 1 is also intuitively false in the given scenario (as the speaker does not commit herself to the claim that there is a unique ghost in Hans's attic), the final conclusion is that the Russellian analysis of 1 fails.

This is the first one of the two points that Elbourne mentions. The other aspect in which the Russellian *de dicto* truth-conditions clash with the intuitive truth-conditions concerns the felt implication of 1 that (ii). That is, uttering 1, i.e. that Hans *hopes that* the ghost in his attic will be quiet tonight, implies that Hans *believes* (or assumes) that there is a ghost in his attic. The Russellian *de dicto* truth-conditions of 1 do not capture this implication. There is nothing in the Russellian analysis of 1 that predicts the sentence has this implication. But, again, is this implication truth-conditionally relevant? Maybe it should be accounted for by appealing to a pragmatic mechanism, and not to semantic theory. If an utterance of a sentence S has an implication p, one way to evaluate whether this implication is truth-conditionally relevant is the following: we consider a scenario in which we know that p is false, but we have no information concerning (other) aspect of the truth-conditions of S. If we judge S as false or truth-valueless, then p is *prima facie* relevant to the truth-conditions of S (given that the knowledge that p is false is the only basis for our truth-value judgement about S).[4] So, consider a scenario in which in 1 is uttered, and in which Hans *does not believe* there is a unique ghost in his attic (and so the implication is false). We have no further information relative to the content of Hans's attitude of hoping, or whether he hopes anything at all. In such a context we judge the utterance of 1 as *not true*.[5] This truth-value judgement concerning 1 depends on what is, and what is not, in Hans's *belief* box. If it only depended on what is in Hans's *hope* box, then we would not be able to make any judgement whatsoever about the truth of 1 (as by hypothesis we don't know what is in that box). So the implication must be truth-conditionally relevant. So, this is how the argument based on (ii) could be reconstructed in detail (call it Argument-II):

P1'. Hans does not believe there is a unique ghost in his attic (by hypothesis).

P2'. We have no information about the content of Hans's attitude of hoping, or whether he hopes anything at all (by hypothesis).

P3'. The utterance of 1 in this scenario is intuitively judged as *not being true*.

P4'. The only basis for reaching this verdict is the information we do have in the context, expressed by premise P1'.

C'. Therefore, the implication of 1 that *Hans believes there is a unique ghost in his attic* is truth-conditionally relevant. (from P1' to P4')

P5'. The Russellian *de dicto* truth-conditions for 1 predict that 1 is true iff Hans *hopes that there is a unique ghost in his attic and it is quiet tonight*.

P6'. The *de dicto* Russellian analysis of 1 does not predict this implication that *Hans believes there is a unique ghost in his attic* (from P5').

C*'. The Russellian *de dicto* analysis of 1 is incorrect (from C' and P6').

Alternatively, we could argue for the conclusion C*' by observing that on the Russellian *de dicto* reading 1 is predicted to be *true* in the given context, as Hans's beliefs have no relevance to the Russellian truth-conditions of 1. This together with P3' leads to the conclusion C*'.

[4] It is only *prima facie* relevant, because it might still be the case that the truth-value judgement has a pragmatic source.

[5] Intuitively, it is also not judged as false. I come back to this issue later.

Let us go back for a moment to premise P3'. The intuition expressed in this premise, that an utterance of 1 in the given scenario is not intuitively true, might be disputed. The following example might help strengthen this intuition. Consider the utterance of sentence 4 in a context in which it is known that John *does not believe* there is a king of France. In such a context sentence 4 will not be judged as true either.

4. John hopes the king of France is wise.

It cannot be true that John hopes this if we know he does not believe there is a king of France. Sentence 4 carries the implication that John believes that there is a unique king of France, and this implication is truth-conditionally relevant.

It is also relevant to notice that the felt implication projects. Consider embedding sentence 4 under negation, as in 5:

5. John does not hope the king of France is wise.

Intuitively, sentence 5 also has the implication that John believes that there is a unique king of France. The implication is, again, truth-conditionally relevant. Sentence 5 is not judged as true in a context in which it is common knowledge that John does not believe there is a king of France. Given that John does not believe that there is a unique king of France, it is not true that he hopes, and not true that he does not hope that the king of France is wise. Instead, a competent speaker would not judge 4 and 5 as either true or false.[6] And the same is true for 6, which is the negation of 1:

6. Hans does not hope that the ghost in his attic will be quiet tonight.

So, the implication (ii) of 1 has the status of a presupposition, as it is a felt implication that projects. Moreover, the presupposition is truth-conditionally relevant. Therefore, we have reasons to treat it as a semantic *precondition* for utterances of sentences such as 1 and 6 to have a semantic value at all. The problem for the Russellian *de dicto* analysis of 1 and 6 is that it does not predict the existence of this implication. Instead, on this analysis, the utterance of 1 is true (instead of truth-valueless), while the utterance of 6 is false (again, instead of truth-valueless).

It is useful to formulate in general terms two requirements on any theory of DDs that the Heim-Elbourne considerations support, given the arguments we have reconstructed above. These are the following (where W stands for a non-doxastic propositional attitude, 'h' is a proper name, and 'F' and 'G' are CNs):

R1: The *de dicto* reading of sentences of the form 'h W that the F is G' do not

[6] Arguably, the utterance of 5 might be judged as *true* if followed by '… because he does not believe there is a king of France.' But if no such remark follows we do not judge it as either true or false.

have the truth-conditions: true iff *h W that there is a unique F, and it is G*.

R2: Sentences of the form 'h W that the F is G' introduce the semantic precondition that *h believes that there is a unique F*.

The two requirements are supported by the two different arguments based on the two observations that Elbourne makes about sentences such as 1. R1 is the generalization of the conclusion C of Argument-I for all sentences of the form mentioned. R2 is based on the partial conclusion C' of Argument-II together with the observations made concerning the projection behaviour of the implication.[7] Distinguishing these arguments as I have done above helps notice that there is not one Heim-Elbourne argument, but *two* arguments against the Russellian theory. The arguments support two requirements, none of which is fulfilled by the theory.

In what follows I look at how other theories of DDs fare with respect to these requirements. I start with R2.

§7.2. Requirement R2: the Fregean theory and alternatives

On the Fregean theory, we get:

||the ghost in his attic||^{a,w} = there is exactly one $x_{<e>}$ such that x is a ghost in Hans's attic. the unique $x_{<e>}$ such that x is a ghost in Hans's attic

So,

||[$_S$ [$_{NP}$ the ghost in his attic] [$_{VP}$ will be quiet tonight]]||^{a,w} =

= there is exactly one $x_{<e>}$ such that x is a ghost in Hans's attic in w. 1 iff the unique $x_{<e>}$ such that x is a ghost in Hans's attic will be quiet tonight

Finally, the truth-conditions of the de dicto reading of 1, that is, 1.1, are:

||[s…]||^{a,w} =

= [$\lambda p_{<s,\ t>}$.[1 iff p(w') = 1 for all w' compatible with what Hans hopes in w]](λw.(there is exactly one $x_{<e>}$ such that x is a ghost in Hans's attic in w. 1 iff the unique $x_{<e>}$ such that x is a ghost in Hans's attic will be quiet tonight))

= 1 iff for all of Hans's hope worlds w' the following proposition is true: λw'.(there is a unique ghost in Hans's attic in w'.1 iff the unique ghost in Hans's attic will be quiet tonight in w')

[7] R1 and R2 are not directly requirements that a theory of DDs must fulfil. They are requirements concerning complex sentences that have DDs among their components. Later on I argue that R1 and R2 support particular requirements that theories of DDs must fulfil.

As this shows, the proposition that constitutes the argument of the propositional attitude verb is a function from possible worlds that is defined only for those worlds in which there is exactly one ghost in Hans's attic. For that proposition to be true it must be case that both the precondition and the condition are fulfilled. We get the following truth-conditions for 1:

> 1 iff for all of Hans's hoping worlds w', there is a unique ghost in Hans's attic in w', and the unique ghost in Hans's attic will be quiet tonight in w'.

That is, 1.1 is true iff Hans hopes that there is a unique ghost in Hans's attic and it would be quiet tonight. These truth-conditions correspond to the Fregean *de dicto* reading of sentence 1.[8] But they are identical with the truth-conditions we obtained when using the Russellian theory. And this is to be expected, as the difference between the Russellian and the Fregean analysis does not show up in giving the conditions under which sentence embedded in 1, that is 7, is *true*:

7. The ghost in Hans's attic will be quiet tonight.

On both the Fregean and the Russellian theory an utterance of 7 is true relative to the same set of worlds. The difference only shows with respect to those worlds in which the utterance is not true.

Now, this means that the Fregean theory appears to have precisely the same problem as the Russellian does, given that the Fregean truth-conditions for 1.1 do not fulfil requirement R2 either. Or so the theory predicts, given the semantic values that we gave above to the expression in the LF 1.1. But maybe the semantic value for the non-doxastic propositional attitude verbs such as 'hopes' is not the one we have been using so far. Let us look again at the projection behaviour that these verbs have concerning the presuppositions of their sentential complements. This issue has been treated in the literature. Karttunen (1974: 189) is one of the first to discuss it. He introduces the following condition for propositional attitude verbs, where the expression '$B_a(X)$' stands for the set of beliefs attributed to an individual *a* in a context X: "If v is of type II, context X satisfies-the-presuppositions-of "v(*a*, A)" only if $B_a(X)$ satisfies-the-

[8] Notice that the Fregean truth-conditions for 1.1 are not the same as those for 1.2. Same as the Russellian theory, the Fregean predicts that sentence 1 is ambiguous. On the *de re* reading (corresponding to LF 1.2) the precondition introduced by the DD (i.e. that there be a unique ghost in Hans's attic) becomes a precondition for the entire sentence to have a semantic value. I do not look at this reading in detail because, same as the Russellian analysis of 1.2, it entails (as a matter of a semantic precondition, this time) that *there is a unique ghost in Hans's attic*. And so this is not the intended reading (by hypothesis the speaker does not believe in ghosts). It is not the reading the Heim-Elbourne argument invokes.

presuppositions-of A.” He adds: “To satisfy the presuppositions of [8], a context must ascribe to John a set of beliefs that satisfy-the-presuppositions-of ‘Nixon will stop protecting his aides’.” (1974: 189)

8. John fears that Nixon will stop protecting his aides.

Now, Karttunen’s claims quoted here are theoretical claims. What they mean exactly depends on what Karttunen means by ‘presupposition’, ‘context’ and ‘a context satisfying-the-presuppositions-of a sentence’. By ‘presupposition’ he means a precondition that a sentence introduces for that needs to be fulfilled in the context of utterance for the utterance to be felicitous (1974: 181), akin to the notion of presupposition$_2$ that we introduced in chapter 5. He defines ‘context’ as “whatever the speaker chooses to regard as being shared by him and his intended audience.” (1974: 182) He defines the notion of satisfaction as follows: “Context X *satisfies-the-presuppositions-of* A just in case X entails all of the basic presuppositions of A” (1974: 184) This is of course very different from the Fregean notion of presupposition as a semantic precondition.

However, what is relevant to our purposes here is not Karttunen’s theoretical account the phenomenon, but Karttunen’s *observations* concerning the projection patterns of presuppositions triggered by expressions embedded in propositional attitude verbs. He observes that propositional attitude verbs and speech act verbs are “opaque” with respect to the presuppositions of their complements. That is, they do not allow the presuppositions of the embedded sentences to project. However, propositional attitude reports do introduce a presupposition. Consider sentence 9:

9. John stopped smoking.

This introduces the presupposition that *John used to smoke*. Now consider sentence 10, which results from embedding 9 in a propositional attitude report:

10. Mary believes that John stopped smoking.

According to Karttunen (1974: 189), 10 presupposes that *Mary believes that John used to smoke*. Also he notes that any of the sentences that result by replacing ‘believes’ in 10 with “*fear*, *think*, *want* etc.” (1974: 188) also have the same implication, i.e. that *Mary believes that John used to smoke*.[9] This seems to be correct. Indeed, as Elbourne (2013: 158) points out, it seems infelicitous to add that Mary does not believe that John

[9] Stalnaker (1988: 156-157) makes similar observations concerning the projection patterns of presuppositions of sentences embedded in belief attributions, which he casts in his own pragmatic framework for discussing presupposition projection. Heim (1992: 184) subscribes to Karttunen’s proposal and develops a pragmatic explanation of the projection pattern of such presuppositions.

drank, as in 11.

11. Mary believes that John has stopped smoking. But she does not believe he John used to smoke.

The utterance of 11 sounds inconsistent. This indicates that the first sentence in 11 does carry the presupposition that Mary believes that John used to smoke. And the same felt inconsistency is generated by sentence 12 below, where the first sentence is 1.

12. Hans hopes that the ghost in his attic will be quiet tonight. But Hans does not believe he has a ghost in his attic.

Elbourne (2013) takes the pragmatic account of presupposition projection that Karttunen (1974) proposes and combines it with the Fregean theory, concluding that together they predict that an utterance of 1 carries the presupposition that *Hans believe* there is a unique ghost in his attic. He comments:

> Following Karttunen, then, we can postulate that the presupposition that there is exactly one ghost in Hans's attic, carried by the sentence embedded in [1]…, contributes to a presupposition carried by the whole sentence to the effect that Hans believes that there is exactly one ghost in his attic. This, again, seems to be in accordance with our intuitions. (2013: 158-159)

Although this seems correct, it does not explain all that we need to explain. I have argued above that the presupposition that sentence 1 carries is truth-conditionally relevant. It is a precondition for the whole sentence to have a semantic value. The pragmatic account of presupposition does not give us this conclusion. However, we do obtain it if we introduce a more sophisticated semantic value for the propositional attitude verb in sentence 1. We need to postulate a semantic value for 'hopes' that introduces the precondition that Hans believes that so-and-so. For that, we need a notation that allows us to represent propositions that are *partial* functions from possible worlds to truth-values. We add a new symbol for the variables for propositions, one that allows us to represent propositions that are partial functions: $c.p_{<s,t>}$, where c stands for the condition that a world must fulfil for the partial function to assign a semantic value to the world, and p is the main condition (the contribution of the sentence to the asserted content).[10] So, the new semantic value for 'hopes' will be:

$||\text{hopes}||^{a,w} = \lambda c.p_{<s,\, t>}.[\lambda x_{<e>}.[$x believes in w that c.1 iff c.p(w')=1 for all w' compatible with what x hopes in w]]

[10] So far we represented propositions as, for instance, $p_{<s,\, t>}$. This notation is not abandoned here, but should be interpreted as a particular case of the most general notation introduced, for which the condition c is fulfilled for all worlds.

The truth-conditions for 1.1 that we obtain above for 1.1 with the Russellian theory of DDs do not change by replacing the semantic value of 'hopes' with the one just introduced. On the Russellian theory the proposition expressed by the embedded sentence in 1.1 does not have a semantic precondition, and so the difference between the latter semantic value for 'hopes' and the former one is irrelevant. So, the above objections to the Russellian theory are still in place. But we cannot say the same for the Fregean theory. Following the same steps of the calculation of the semantic value of the LF 1.1 that we went through above, and using the Fregean theory of DDs, we get the following truth-conditions:

$||[_s \ldots]||^{a,w}$ =

= Hans believes in w that there is a unique ghost in his attic. 1 iff all of Hans's hope worlds w' are such that there is a unique ghost in Hans's attic in w', and the unique ghost in Hans's attic will be quiet tonight in w'.

This means that the LF 1.1 has a precondition for having a semantic value, according to which it must be the case that Hans believes in w that there is a unique ghost in his attic. This shows that the Fregean theory, combined with the above semantic value for 'hopes' accounts for R2, i.e. the requirement that sentence 1 introduces the semantic precondition that Hans believes that there is a unique ghost in his attic.

Not only the Fregean theory fulfils requirement R2. So does the B&C theory, which also introduces a precondition for the DD to have a semantic value relative to a context of utterance. As discussed in chapter II, according to this theory the meaning of 'the' is the following:

$||the||^{a,w} = \lambda f_{<e,t>}$ and there is a unique $x_{<e>}$ such that f(x)=1.[$\lambda g_{<e,t>}$.1 iff every x is such that f(x) =1 it is also such that g(x)=1]

The conclusion of this discussion is that any theory of DD's that introduces such a semantic precondition fulfils the requirement R2, and only such theories do. That is, we can formulate the following requirement R2 imposes on a theory of DDs:

R2': The semantic value of the definite article should have the following form:

$||the||^{a,w} = \lambda f_{<e,t>}$ and there is a unique $x_{<e>}$ such that f(x)=1.**Φ**

(where **Φ** is whatever truth-condition a theory of DD postulates)

Given the newly introduced semantic value for 'hopes', such a theory allows for the propositional attitude ascription to have the semantic precondition that the subject *believes* that there is a unique individual that satisfies the noun. Similar semantic values for other non-doxastic propositional attitude verbs, such as 'wonder', 'desire', 'want', ‘fear’ etc., give us the general solution we need to fulfil the requirement R2, when combined with a theory of DD that has the formed mentioned.

Also, notice that the formulation in R2’ of the general form a semantic theory for the definite article should have is compatible with theories of DD that take ‘the’ to have the semantic type <<e,t>,e>, such as the Fregean theory, but also theories that take ‘the’ to be a binary generalized quantifier, such as the B&C theory, having the type <<e,t>,<<e,t>,t>>. It is even possible to devise a version of the Russellian theory of DDs that fulfils requirement R2’ by introducing such a semantic precondition. Such a hypothesis would be as follows:

$||\text{the}||^{a,w} = \lambda f_{<e,t>}$ and there is a unique $x_{<e>}$ such that $f(x)=1.[\lambda g_{<e,t>}.1$ iff there is a unique $x_{<e>}$ such that $f(x)=1$, and $g(x)=1]$

However, as I argue in the next section, this version of the Russellian theory still does not pass the test of providing correct truth-conditions to sentences such as 1.

Alternatively, one might remark that the B&C theory is in a sense a Russellian theory. It has in common with the Russellian theory not only that it treats the definite article as a generalized quantifier, but also that it includes in the truth-conditions of a sentence of the form ‘The F is G’ the three conditions: existential import, the uniqueness condition and the universal condition.[11] It differs from the Russellian theory in that it distributes these three conditions between the semantic precondition and the main truth-condition in a different way.

§7.3. Requirement R1: the Neale-Kaplan objection

Before looking at whether different theories of DDs fulfil the requirement R1, I look at an objection in the literature meant to defend the Russellian theory from the Heim-Elbourne argument. Several authors have objected to it, arguing that it is based on a logical mistake. Neale (2005) writes:

> The following objection to Russell’s theory (which one hears with alarming frequency) involves a logical mistake: On Russell’s account, ‘the author of

[11] As already noticed, the truth-conditions that a Russellian theory ascribes to a sentence of this form have the following structure:

(i) $1 \text{ iff } \exists x(Fx \,\&\, \forall y(Fy \rightarrow x=y) \,\&\, Bx)$.

These are equivalent to a conjunction of three claims: an existential claim, a uniqueness claim and a universal claim, respectively:

(ii) $1 \text{ iff } (\exists x(Kx)) \,\&\, (\forall x(Kx \rightarrow \forall y(Ky \rightarrow x=y))) \,\&\, \forall x(Kx \rightarrow Bx)$.

> Waverley is present' is equivalent to 'exactly one thing authored Waverley and that person is present'; so if George IV wonders (and asks) whether the author of Waverley was present, he wonders (and asks) whether exactly one person authored Waverley and that person is present'; but (the objection goes), the analysis is incorrect because George IV is not wondering (or asking) whether exactly one person authored Waverley! The mistake is this: 'George IV wonders whether p and q' does not entail 'George IV wonders whether p'. (2005: 846)

Indeed, sentences expressing propositional attitudes do not support entailments of this kind. Kaplan (2005: 985) makes the same point Neale makes using the following example to illustrate the alleged mistake:

13. Diogenes wished to know whether there were honest men.
14. Diogenes wished to know whether there were men.

The Heim-Elbourne argument incurs in a similar mistake, according to Kaplan. Kaplan's example shows that in general, if p entails q, then 'John W that/whether p' does not entail 'John W that/whether q', where 'W' expresses a non-doxastic propositional attitude verb. In general this inference is not valid. Moreover, it shows this for the particular case in which p and q are existential quantifier sentences. This is the case for the Russellian analysis of the sentences embedded in the propositional attitude reports in sentences 15 and 16 as well.

15. Hans hopes that there is a unique ghost in his attic and it will be quiet tonight.
16. Hans hopes that there is a unique ghost in his attic.

Non-doxastic propositional attitudes do not license an entailment from sentence 15 to sentence 16.

Now the question is whether the Heim-Elbourne argument actually commits this mistake. The inference from P4 to P5 in Argument-I does commit this logical mistake. For that reason the first argument of the two reconstructed above is not valid. That argument, as presented above relies on the inference from 15 to 16. The truth-conditions of sentence 15 are the same as the *de dicto* Russellian truth-conditions of an utterance of sentence 1 (or, as Elbourne puts it, 15 is the Russellian *de dicto* "paraphrase" of sentence 1). Given that 16 is false in the given scenario – the argument goes – 15 must also be false. However, Neale and Kaplan point out, this is an invalid inference. It would only be valid if 16 actually followed from 15, but it does not.

Now, it is important to notice that the Neale-Kaplan objection does not affect the discussion of the implication (ii). That is, it affects Argument-I, but it does not affect

Argument-II. Given that Argument-I supports the requirement R1, this is left without support. However, it does not affect R2. And so it does not affect in any way the discussion and the conclusions reached in the previous section. Argument-II does not rely at any step on making the invalid inference. The reconstruction of this argument that I proposed above helps see this clearly. It is important to point this out because usually the literature discusses this objection in relation to *the* Heim-Elbourne argument, and does not distinguish between the two different arguments and the two different requirements that they impose on any theory of DDs. One notable exception is Schoubye (2013: 500-515), who distinguishes the two arguments and looks at the consequences that each of them has for a theory of DDs.[12]

I discuss in what follows Elbourne's (2010, 2013) reply to the Neale-Kaplan objection. Elbourne's strategy (2013: 155) is to propose a reformulation of the initial argument (still not distinguishing Argument-I and Argument-II). Consider the following sentences:

17. I am unsure whether there is a ghost in my attic.
18. I hope that there is an entity such that it is a ghost in my attic and nothing else is a ghost in my attic and it is being noisy.
19. I hope that the ghost in my attic is being noisy.

Elbourne argues that the argument should be formulated as follows: suppose a speaker utters 17; now, notice that "Native speakers judge that Hans's propositional attitudes are consistent if he continues with [18] above, but inconsistent if he continues with [19]." (2013: 155) So, the two utterances cannot have the same truth-conditions. Given that the truth-conditions of an utterance of 18 are the same as the *de dicto* Russellian truth-conditions of an utterance of sentence 19, the truth-conditions of 19 are *not* the *de dicto* Russellian ones.

Does this reply help with the Neale-Kaplan objection? Notice that an implicit premise of the argument is that the above inconsistency judgements are to be accounted for in terms of the truth-conditions of the sentences uttered. But this does not seem to be a problematic premise: indeed, to say that 17 and 19 are inconsistent is to say that the

[12] The conclusions that I have driven so far from these arguments concerning the requirements they impose on any theory of DD are similar to the conclusions he arrives at. However, they differ (at least) in details of presentation and implementation (such as the particular framework for semantics I am using here).

two cannot be true relative to the same context.[13]

The problem is that Elbourne's argument that relies on these inconsistency judgements does not address the Neale-Kaplan objection to Argument-I. As I pointed out before, Elbourne does not distinguish Argument-I from Argument-II. But the two need to be separated, as they concern different dimensions of the meaning of the sentences discussed. Argument-II, as we have seen, supports the conclusion R2, that sentences of the form 'h W that the F is G' introduce the semantic precondition that *h believes that there is a unique F*. This conclusion is not affected by the Neale-Kaplan objection. If Argument-II goes through, then sentence 19, but not sentence 18, has the semantic precondition that *I believe that there is a unique ghost in my attic*. This precondition must be fulfilled for sentence 19 to be true. But this proposition is inconsistent with the one expressed by 17. Hence, on the basis of R2 we can account for the inconsistency between 17 and 19. The explanation why 17 and 18 are not incompatible is simply that 18 does not introduce the above mentioned semantic precondition. This means that the above argument offers further support to R2. A theory that fulfils R2 explains the inconsistency judgements, while it is not clear how a theory that does not fulfil R2 could explain them.

In conclusion, Elbroune's argument based on the inconsistency judgements does not offer independent support for the conclusion of Argument-I, nor does it refute the Neale-Kaplan objection to this argument. So, Elbourne's reply is not a reply at all to this objection. It does nothing to restore that Argument-I, or to offer independent support to its conclusion, that is, R1. Given that the objection manages to cut the support that Argument-I offers to R1, the question becomes whether there is any other way in which R1 could be defended.

I propose in what follows an argument based on inconsistency judgments that is different from Elbourne's argument and does support R1. Consider a speaker who utters 20 and then goes on to utter 21, or alternatively, 22.

20. Hans believes there is a unique ghost in his attic.

21. Hans hopes that the ghost in his attic will be quite tonight.

22. Hans hopes that there is a unique ghost in his attic and it is quite tonight.

[13] If there may be further doubts about this, we could simply modify the argument by making the proposition that 17 expresses part of the common ground in the context of utterance. Now notice that uttering sentence 18 in this context may be judged as true or false, while uttering sentence 19 cannot be judged as true. On the basis of this difference in truth-value judgements it could be argued that that the Russellian analysis of 19 fails. But in what follows I discuss Elbourne's own formulation of the argument.

Uttering 22 after 20 is intuitively inconsistent. However, uttering 21 after 20 does not trigger an intuition of inconsistency. This shows that the truth-conditions of the 21 and 22 are not the same. Given that the truth-conditions of 22 are the same as the *de dicto* Russellian truth-conditions of 21, the truth-conditions of 21 are *not* the *de dicto* Russellian ones. Alternatively, we could formulate the argument without appealing to judgements of inconsistency, but only to truth-value intuitions. Here is how (call this Argument-I'):

P1''. Consider a scenario in which it is known that Hans *believes that there is a unique ghost in his attic*.

P2''. We have no information about the content of Hans's attitude of hoping, or whether he hopes anything at all (by hypothesis).

P3''. In this scenario, the utterance of 21 is *not judged intuitively as either true or false* (as the relevant information is not available).

P4''. In this scenario, the utterance of 22 is intuitively judged as *false*.

P5''. Therefore, 21 and 22 do not have the same truth-conditions (from P3'' and P4'').

P6''. The truth-conditions of 22 are the same as the Russellian *de dicto* truth-conditions of 21.

C. Therefore, The Russellian *de dicto* analysis of sentence 21/1 is incorrect (from P5'' and P6'').

This is the same conclusion that Argument-I led to. However, this time the argument that supports it no longer commits the fallacy Neale and Kaplan point at. Generalizing this conclusion to any sentence of the form of 1/21, we get the requirement R1:

R1: Sentences of the form 'h W that the F is G' do not have the truth-conditions: true iff *h W that there is a unique F, and it is G*.

§7.4. An improved version of R1

As the reader probably has already noticed the requirement R1 is fulfilled by any theory of DDs (together with the standard assumptions about the semantic values of the other expressions in the sentence) that fulfils R2. If a theory of DDs introduces a semantic precondition for the DD to have a semantic value, then a sentence of the form 'h W that the F is G' *does not* have the truth-conditions mentioned in R1. Instead, it will have the truth-conditions: true if *h believes that there a unique F that is G. Φ* (where what comes before full stop is the precondition, and Φ expresses the rest of truth-conditions, according to the notation used so far). So, R1 is superfluous, once we accept R2.

However, the above argument supports a different requirement that a theory of DDs must fulfil. Given P1'', the semantic precondition of 21 is fulfilled (and known to be fulfilled) in the given scenario. So, the existence of this precondition of 21 does not affect our truth-value judgement about 21 at all, and so it cannot explain the difference in truth-value judgments. The only other possible difference between 21 and 22 is in the analysis of the sentence embedded in the propositional attitude verb (i.e. the embedded sentence that expresses the proposition that is to be found in Hans's hope box). So we can continue the above argumenta as follows:

P7''. The difference between the intuitive truth-value judgments about 21 and 22 (given P3'' and P4'') is not explained by the semantic precondition that 21 introduces (as this is fulfilled in the context, given P1'').

P8''. The semantic precondition of 21 is due to the semantic precondition that the DD in 21 introduces and the semantic value of 'hope' (see the discussion in the previous section).

P9''. Therefore, the semantic precondition that the DD in 21 introduces cannot explain the difference of intuitive truth-value judgments (from P7'' and P8'').

C''. Therefore, the explanation of the difference of intuitive truth-value judgments about 21 and 22 needs to be explained by a difference in the non-presuppositional part of the semantic value of the embedded sentences.

The conclusion C'' of this argument supports the following requirement on a theory of DD:

R1': Sentences of the form 'The F is G' do *not* have the truth-conditions:

Ω. 1 iff there is a unique F, and it is G

(where Ω is whatever semantic precondition the DD introduces).[14]

In conclusion, the merits of the argument proposed (Argument-I') is to establish R1'. While R1 follows from R2, and so it does not impose any substantial requirement on a theory of DDs, R1' is independent of R2 (and R2'). Also notice that R2' is a

[14] We cannot go on to derive from this a *general* condition on the contribution of the definite article to asserted content, as we did in the case of R2' for the semantic precondition, because that contribution depends on the semantic type that we assign to the definite article, so it does not have a general form.

requirement on the semantic *precondition* that a DD introduces, and R1' is a requirement on its contribution to the *asserted content* of an utterance a sentence containing a DD. The two requirements concern different dimensions of the meaning of the sentences discussed. These two issues are in principle independent: a theory might correctly predict the asserted content but not the semantic precondition, or the other way around.

Concerning the Russellian theory, R1' offers a different reason to reject it from the reason offered by R2'. It also offers a reason to reject the proposal suggested above for a version of the Russellian theory that introduces a semantic precondition expressing existence and uniqueness. Any theory that does not comply with R1 will make incorrect predictions about the truth-conditions of sentence 1.

What about the theory proposed in Szabó (2000: 30) and Ludlow and Segal (2004: 421) and briefly mentioned in chapter 2. This proposal shares with the Russellian theory the lack of a semantic precondition, and differs from the Russellian in dropping the uniqueness condition. It assigns to 'the' the following semantic value, recast in the present framework:

$||\text{the}||^{a,w} = \lambda f_{<e,\,t>}.[\lambda g_{<e,\,t>}.1$ iff there is an $x_{<e>}$ such that $f(x)=1$ and $g(x)=1]$

Such a theory fails to meet requirement R2'. But does it meet requirement R1'? It does, given that R1' only rules out a proposal that makes uniqueness part of the asserted content, which is not the case for this view. But it is easy to see that we can build an argument analogous to Argument-I' which supports the following requirement that does rule out this proposal.

R3: Sentences of the form 'The F is G' do not have the truth-conditions:

Ω. 1 iff there is an F, and it is G.

The only difference between R1' and R3 is that the latter does not include a uniqueness condition in the formulation of the truth-conditions. We obtain an argument that supports R3 by making small changes to Argument-I'. Thus, we need to replace sentence 22 with sentence 23 in the formulation of the argument, and replace any mention of the Russellian theory with the mention of the Szabó/Ludlow and Segal proposal.

23. Hans hopes that there is a ghost in his attic and it is quite tonight.

The Fregean theory fulfils both requirements R1' and R3. Moreover, it does not seem possible to devise a similar argument that would support the conclusion that the Fregean truth-conditions for sentence 21/1 are incorrect.

What about the B&C theory? Again, it fulfils both requirements R1' (it does not assert existence and uniqueness) and R3 (it does not assert existence, but not uniqueness). But is it possible to build an argument analogous to Argument-I' that rules out this theory (same as we suggested could be done to support R3 and rule out the Szabó/Ludlow and Segal proposal)? Such an argument that parallels Argument-I' would rely on the truth-value judgments elicited by 1/21 (repeated here as 24), and 25:

24. Hans hopes that the ghost in his attic will be quite tonight.

25. Hans hopes that every ghost in his attic is quite tonight.

But such an argument does not go through, as the premise corresponding to P4'' does not obtain: in a scenario in which it is known that Hans believes that there is a unique ghost in his attic, and in which we have no information about the content of Hans's attitude of hoping, we do not judge an utterance of 25 as false. In fact, we find no contrast between the truth-value judgments about the utterances 24 and 25. A competent speaker would not form a judgement as to the truth or falsity of these sentences as long as no information concerning Hans's hope box is available. This means that it does not seem to be possible to rule out the B&C theory in the same way as we ruled out the Russellian and other quantificational theories of DDs. Notice that this is so not in virtue of the feature that this theory shares with the Fregean theory, i.e. that it introduces a semantic precondition. The requirements that we are considering at this point (R1', R3 and similar) do not target the semantic precondition dimension of meaning, but concern asserted content.

To sum up, the results we reached in this chapter are of two kinds: on the one hand, I have offered a reformulation of the arguments based on Heim's and Elbourne's observations and of the requirements that these arguments support that any theory of DDs must fulfil. I do not claim to have reached *novel* conclusions by arguing in favour of R1' and R2'. As I pointed out above, Schoubye (2013: 500f) reaches the same conclusions. However, I claim to have presented the arguments that lead to R1' and R2' in a way that allowed us to see how the Neale-Kaplan objection could be avoided. As I have argued above, Elbourne (2013) does not manage to do so.

On the other hand, I have argued that R2' rules out any theory of DDs that does not introduce a semantic precondition of existence and uniqueness, including the Russellian theory, but also the Szabó/Ludlow and Segal theory. Requirement R1' also rules out the Russellian theory, and a version of it (that is, R3) rules out the

Szabó/Ludlow and Segal proposal. The Fregean and the B&C theories fulfil both requirements.

Conclusions

Let me briefly repeat here the main points that we have been discussing in the chapters of the thesis. In chapter 1 I have introduced a framework for doing compositional semantics for natural language, mostly inspired in Heim and Kratzer (1998) and Fintel and Heim (2011). After introducing the concepts of force, content and truth-conditions, I have discussed a number of issues concerning the methodology of natural language semantics, as well as the theoretical desiderata that we aim to achieve. The main desideratum is that of assigning correct truth-conditions to utterances of natural language sentences. The data that we have been using throughout the thesis to test semantic hypothesis is data from the competent speakers' truth-value judgements. The rest of the chapter consisted mainly in introducing the formal apparatus of the theory.

In the chapter 2 I offer a reconstruction within the theoretical framework introduced in chapter 1 of three classical theories of DDs: the Russellian theory, the Fregean theory, and the Barwise and Cooper theory. As a result of the discussion, I have proposed for each theory a hypothesis concerning the semantic value of the definite article that captures its main syntactic and semantic features that the theory assigns to it.

Chapter 3 focuses on incomplete DDs. We started with the observation that the incompleteness problem for DDs affects not only the Russellian theory, but also the Fregean and B&C theories. I have argued that the syntactic variable approach to QDR proposed by Stanley and Szabó (2000a) offers a solution to the incompleteness problem. The solution is equally applicable to the various theories of DDs introduced. The argument in this chapter does not offer a reason to favour one theory of DDs among the various ones discussed. Its upshot is merely negative: it shows there are no reasons to favour one theory over the others when it comes to solving the incompleteness problem.

Chapter 4 focuses on the referential/attributive distinction. A discussion of referential uses within our framework for truth-conditional semantics faces the problem that the data that it typically invoked in discussions of referential uses is data concerning intuitions of singularity, which are not part of our methodology, as introduced in chapter 1. The data that results from "translating" singularity intuitions into truth-value judgments does not pose any special problems for the theories of DDs considered so far. However, it also does not do justice to the kinds of phenomena that motivate a Referentialist approach to the semantics of DDs. The notion of a content that is singular is not captured in our framework, but the notion of rigid designation is. I argue, following a suggestion in Neale (2004), that there are independent reasons why the Russellian theory predicts that a DD is a rigid designator when it is used referentially. The proposal is applicable not only to the Russellian theory, as Neale does, but also to the Fregean and the B&C theories. The theoretical advantages of this treatment of referential uses are that it does not involve postulating an ambiguity, and that it helps solve the underdetermination problem for the case of referential uses of DDs.

In Chapter 5 and 6 I look at non-denoting DDs, i.e. DDs for which either uniqueness or existence fails to be satisfied. In chapter 5 I distinguish between two phenomena that are usually discussed in the literature under the label of *presuppositions*: one concerns the existence of a felt implication that projects; the other concerns the existence of certain felicity conditions that project. I argue that these phenomena are both triggered by sentences containing DDs. I then consider the predictions that the various theories we have considered make for simple sentences containing DDs, and for sentences that result after embedding them in negation, interrogative mood, modal operators and conditionals. We saw that the Russellian theory accounts for the felt implication of existence and uniqueness of the salient readings these sentences, but fails to account for the (in)felicity intuitions. The Fregean theory and the B&C theory are in better position to deal with this kind of data. However, this discussion does not count as a refutation of the Russellian theory, in as much as the data to explain are not data concerning the truth-conditions, and it is not out of question that the Russellian could appeal to a pragmatic account of those intuitions. The conclusion suggested is only that the Fregean and the B&C theory have *more* explanatory power than the Russellian theory.

Chapter 6 deals with the truth-value intuitions triggered by utterances of sentences containing improper DDs. With respect to failures of uniqueness, I discuss Ramachandran's (1993) argument against the Russellian theory, and offer an improved version of this argument. I take it that this version of the argument provides a compelling objection against the Russellian theory. With respect to failures of existence, the Fregean and the B&C theorist are again in a better position to account for the complex pattern of truth-value intuitions than the Russellian.

In chapter 7 I address data concerning the embedding of DDs in propositional attitude verbs. I discuss in detail the objection proposed by Heim (1991) against the Russellian theory. Reconstructed carefully, one can identify two separate arguments based on Heim's and Elbourne's observations, which support different requirements that any theory of DDs must fulfil. I argue that both these requirements rule out the Russellian theory, while the Fregean and the B&C theories fulfil them.

The conclusion that this discussion leads to is that the Russellian theory is in general less prepared to account for the kinds of truth-conditional data we have considered. The conclusions of chapters 6 and 7, and partially those of chapter 5, all indicate that the Russellian theory is the worst option. This is not entirely a novel conclusion, as most of the arguments against the Russellian theory discussed here have been present in the literature for a long time. The main positive contribution of this thesis is to point out that the B&C theory has the same theoretical virtues that the Fregean theory has with respect to accounting for the range of data considered. It is a candidate to be seriously considered. However, it is generally ignored in the literature, for no good reason. At the same time, the popularity of the Russellian theory is, as the discussion of its merits shows, undeserved.

Resumen

El enfoque de esta tesis es la semántica de las descripciones definidas. Resumiré brevemente los principales puntos que hemos discutido en los capítulos de la tesis. En el capítulo 1 he introducido un marco para hacer semántica composicional para el lenguaje natural, inspirado en Heim y Kratzer (1998) y Fintel y Heim (2011). En el capítulo 2 ofrezco una reconstrucción en el marco teórico presentado en el capítulo 1 de tres teorías clásicas acerca de las DDs: la teoría de Russell, la teoría de Frege, y la teoría Barwise y Cooper. Capítulo 3 se centra en las DDs incompletas. Argumento que el enfoque de la variable sintáctica propuesto por Stanley y Szabó (2000a) ofrece una solución al problema de incompletitud.

Capítulo 4 se centra en la distinción entre usos referenciales y atributivos. Una discusión del uso referencial dentro de nuestro marco para la semántica de condiciones de verdad se enfrenta a un problema: los datos que suelen invocarse en las discusiones de los usos referenciales son datos relativos a las intuiciones de singularidad, que no son parte de nuestra metodología, como se introdujo en el capítulo 1. Argumento, a raíz de una sugerencia de Neale (2004), que la teoría russelliana predice que una DD es un designador rígido cuando se usa referencialmente.

En el capítulo 5 y 6 enfoco los datos relativos a las DDs que no denotan. En el capítulo 5 distingo entre dos fenómenos que son generalmente discutidos en la literatura bajo la etiqueta de *presuposiciones*. Las oraciones que contienen DD exhiben ambos tipos de presuposiciones. La conclusión sugerida es que la teoría de Frege y la teoría B&C tienen más poder explicativo de la teoría russelliana.

Capítulo 6 trata de las intuiciones de valores de verdad provocados por oraciones que contienen DDs que no denotan. Con respecto a los fallos de unicidad, discuto el argumento de Ramachandran (1993) en contra de la teoría russelliana, y ofrezco una versión mejorada de este argumento. Con respecto a los fallos de existencia, argumento que la teoría de Frege y la de B&C están de nuevo en una mejor posición que la russelliana para dar cuenta de la compleja estructura de las intuiciones acerca de valores de verdad.

En el capítulo 7 analizo los datos relativos a la incorporación de las DD en oraciones que contienen verbos de actitud proposicional. Discuto en detalle la objeción propuesta por Heim (1991) en contra la teoría russelliana. Reconstruidos con cuidado, se pueden identificar dos argumentos separados basados las observaciones de Heim y de

Elbourne, que apoyan dos requisitos diferentes que cualquier teoría de las DDs debe cumplir. Argumento que estos dos requisitos descartan la teoría russelliana, mientras que las teorías de Frege y la de B&C los cumplen.

La conclusión a la que lleva esta discusión es que la teoría russelliana es en general menos preparada para dar cuenta de los tipos de datos que hemos considerado. La principal contribución positiva de esta tesis es la de señalar que la teoría de B&C tiene las mismas virtudes teóricas que la teoría de Frege con respecto a la gama de datos que hemos considerado. Es un candidato que merece ser considerado seriamente. Sin embargo, es generalmente ignorado en la literatura, sin una buena razón. Al mismo tiempo, la popularidad de la teoría russelliana es, como la discusión de sus méritos muestra, inmerecida.

References

Abbott, B. (2010) *Reference*, Oxford: Oxford University Press.

Amaral, F. S. (2008) "Definite descriptions are ambiguous", *Analysis* 68(300), 288-297.

Asher, N. (2011) *Lexical Meaning in Context: A Web of Words*, Cambridge: Cambridge University Press.

Austin, J. L. (1962) "How to do Things with Words: The William James Lectures" delivered at Harvard University in 1955. J. O. Urmson (ed.), Oxford: Clarendon.

Barwise, J. and Cooper, R. (1981) "Generalized quantifiers and natural language", *Linguistics and Philosophy*, 4, 159–219.

Bach, K. (1987) *Thought and Reference*, Oxford: Oxford University Press.

Bach, K. (1994) "Ramachandran vs. Russell", *Analysis*, 54 (3), 183-186.

Bach, K. (1994) "Conversational Impliciture", *Mind and Language*, 9 (2), 124-162.

Bach, K. (2000) "Quantification, qualification and context: a reply to Stanley and Szabó", *Mind and Language* 15 (2&3), 262–283.

Bach, K. (2002) "Seemingly Semantic Intuitions", in J. K. Campbell, M. O'Rourke, and D. Shier (eds.), *Meaning and Truth*, New York: Seven Bridges Press, 21-33.

Bach, K. (2004) "Descriptions: Points of Reference", in M. Reimer and A. Bezuidenhout (eds.), *Descriptions and Beyond*, Oxford: Oxford University Press.

Bach, Kent (2007a) "Referentially Used Descriptions: A Reply to Devitt", *European Journal of Analytic Philosophy*, Vol. 3, No. 2.

Bach, Kent (2007b) "The Main Bone of Contention", *European Journal of Analytic Philosophy*, Vol. 3, No. 2.

Bach, K. (2010) "Getting a Thing into a Thought", in R. Jeshion (ed.), *New Essays on Singular Thought*, Oxford: Oxford University Press, 39-63.

Böer, S. E. and Lycan, W. G. (1976) "The Myth of Semantic Presupposition", in A. Zwigy (ed.) *Papers in Nonphonology* (Working Papers in Linguistics 21), Columbus: Ohio State University, 1-93.

Buchanan, R. and Ostertag, G. (2005) "Has the problem of incompleteness rested on a mistake?", *Mind*, 114 (456), 889-913.

Burge, T. (1977) "Belief *De Re*", *Journal of Philosophy,* 74, 338-362.

Carnap, R. (1947a) *Meaning and Necessity*, Chicago: University of Chicago Press.

Enlarged edition 1956.

Carnap, R. (1947b) "Meaning and Synonymy in Natural Language", in Carnap, R. (1947), Supplement to *Meaning and Necessity*.

Chierchia, G. and McConnell-Ginet, S. (1990) *Meaning and Grammar*. Cambridge, MA: MIT Press.

Chomsky, N. (1957) *Syntactic Structures*, Mouton.

Church, A. (1941) *The Calculi of Lambda-Conversion*, Series: Annals of Mathematics Studies, Volume 6, Princeton: Princeton University Press.

Cruse, D. A. (1986) *Lexical Semantics*, Cambridge: Cambridge University Press.

Davidson, D. (1979) "Moods and Performances", reprinted in Davidson (1984), *Inquiries into Truth and Interpretation*, Oxford: Clarendon Press.

Dever, J. (2012) "Formal Semantics", in M. García-Carpintero and M. Kölbel (eds.), *The Continuum Companion to the Philosophy of Language*. London: Continuum International Pub.

Devitt, M. (2004) "The Case for Referential Descriptions", in M. Reimer and A. Bezuidenhout (eds.), *Descriptions and Beyond*, Oxford: Oxford University Press.

Devitt, M. (2007a) "Referential Descriptions and Conversational Implicatures", *European Journal of Analytic Philosophy*, Vol. 3, No. 2.

Devitt, M. (2007b) "A Note on Bach", *European Journal of Analytic Philosophy*, Vol. 3, No. 2.

Donnellan, K. S. (1966) "Reference and definite descriptions", *Philosophical Review*, 75 (3), 281-304.

Donnellan, K. S. (1968) "Putting humpty dumpty together again", *Philosophical Review,* 77 (2), 203-215.

Elbourne, P. (2005) *Situations and Individuals*, Cambridge, MA: MIT Press.

Elbourne, P. (2008) "The argument from binding", *Philosophical Perspectives,* 22 (1), 89-110.

Elbourne, P. (2010) "The existence entailments of definite descriptions", *Linguistics and Philosophy*, 33(1), 1–10.

Elbourne, P. (2013) *Definite Descriptions*, Oxford: Oxford University Press.

Fara, D. G. (2001) "Descriptions as predicates", *Philosophical Studies*, 102, 1–42.

Fintel, K. von (1994) *Restrictions on quantifier domains*, Dissertation, University of Massachusetts at Amherts.

Fintel, K. von (2004) "Would you believe it? The King of France is back! (Presuppositions and truth-value intuitions)", in M. Reimer and A. Bezuidenhout (eds.), *Descriptions and Beyond*, Oxford: Oxford University Press, 315–341.

Fintel, K. von and Heim, I. (2011) *Intensional Semantics*, retrieved from http://web.mit.edu/fintel/fintel-heim-intensional.pdf.

Frege, G. (1891) "Function and Concept", reprinted in M. Beaney (ed.) (1997), *The Frege Reader*, Oxford: Blackwell, 130-148.

Frege, G. (1892) "Uber Sinn und Bedeutung", *Zeitschrift fur Philosophie und philosophische Kritik*, C, 25–50. English Translation: "On Sense and Meaning", in B. McGuinness (ed.), *Frege: collected works*, Oxford: Blackwell, 157–177.

Frege, G. (1918) "The Thought", reprinted in P.F. Strawson (ed.) (1967) *Philosophical Logic*, Oxford: Oxford University Press.

García-Carpintero, M. (2010) "Norms of Presupposition", in L. Baptista and E. Rast (eds.), *Meaning and Context*, Berlin: Peter Lang.

Gillon, B. S. (2004) "Ambiguity, Indeterminacy, Deixis, and Vagueness: Evidence and Theory", in S. Davis and B. S. Gillon (eds.), *Semantics: A Reader*, Oxford: Oxford University Press, 157-190.

Glanzberg, M. (2006) "Quantifiers", in E. Lepore and B. Smith (eds.), *The Oxford Handbook of Philosophy of Language*, Oxford University Press, 794—821.

Green, M. (2014) "Speech Acts", *The Stanford Encyclopedia of Philosophy* (Winter 2014 Edition), E. N. Zalta (ed.), URL = http://plato.stanford.edu/archives/win2014/entries/speech-acts/.

Grice, P.H. (1969) "Vacuous Names", in D. Davidson, J. Hintikka (eds.), *Words and Objections*, Dordrecht: Reidel, 118-145.

Grice, H. P. (1975) "Logic and Conversation," in J. Cole and J. Morgan (eds.) *Syntax and Semantics, Vol 3: Speech Acts*, New York: Academic Press; reprinted in Grice (1989a), 22-40.

Grice, H. P. (1981) "Presupposition and Conversational Implicature", in P. Cole (ed.) *Radical Pragmatics*, New York: Academic Press, 183–98; reprinted in Grice (1989a), 269-282.

Grice, H. P. (1989a) *Studies in the Way of Words*, Cambridge MA: Harvard University Press.

Grice, H. P. (1989b) "Further Notes on Logic and Conversation", in Grice (1989a), 41-57.

Hamblin, C. L. (1973) "Questions in Montague Grammar," *Foundations of Language* 10.

Hawthorne, J. and Manley, D. (2012) *The Reference Book*, Oxford: Oxford University Press.

Heim, I. (1983) "File-Change Semantics and the Familiarity Theory of Definiteness", in R. Bäuerle et al. (eds.), *Meaning, Use and Interpretation of Language*, Berlin: de Gruyter, 164–190.

Heim, I. (1992) "Presupposition Projection and the Semantics of Attitude Verbs", *Journal of Semantics*, 9, 183–221.

Heim, I. (1993) "Interrogative Semantics and Karttunen's Semantics for 'Know'", in R. Buchalla and A. Mitwoch (eds.) *IATL 1 Proceedings of the Ninth Annual Conference*, 128-145.

Heim, I. (2000) "Notes on Interrogative Semantics", retrieved from http://www.sfs.uni-tuebingen.de/~astechow/Lehre/Wien/WienSS06/Heim/interrogatives.pdf.

Heim, I (2011) "Definiteness and indefiniteness", in C. Maienborn, K. von Heusinger and P. Portner (eds.), *Semantics: An International Handbook of Natural Language Meaning*, De Gruyter Mouton.

Heim, I. and Kratzer, A. (1998) *Semantics in Generative Grammar*, Blackwell Textbooks in Linguistics, Oxford: Blackwell.

Kadmon, N. (2001) *Formal Pragmatics: Semantics, Pragmatics, Presupposition, and Focus*, Wiley-Blackwell.

Karttunen, L. (1973) "Presuppositions of Compound Sentences", *Linguistic Inquiry*, 4, 167–193.

Karttunen, L. (1974) "Presuppositions and Linguistic Context", *Theoretical Linguistics*, 1, 181–194.

Kaplan, D. (1969) "Quantifying In", in D. Davidson and J. Hintikka (eds.), *Words and Objections*, Dordrecht: Reidel, 206-242.

Kaplan, D. (1970) "What is Russell's Theory of Descriptions?", in W. Yourgrau and A. D. Breck (eds.), *Physics, Logic, and History*, Routledge, 277-295.

Kaplan, D. (1989) "Demonstratives – An Essay on the Semantics, Logic, Metaphysics, and Epistemology of Demonstratives and Other Indexicals", in J. Almog, J. Perry and H. K. Wettstein (eds.): *Themes from Kaplan*, Oxford: Oxford University Press, 524–526.

Kaplan, D. (2005) "Reading 'On Denoting' on its Centenary", *Mind*, 114, 934-1003.

Kölbel, M. (2011) *Objectivity, Relativism and Context Dependence*, Fernuniversität Hagen.

Kratzer, A. (1986) "Conditionals", *Chicago Linguistics Society*, 22(2), 1–15.

Kratzer, A. (2004) "Covert Quantifier Domain Restrictions", *Talk at the Milan Meeting*, Palazzo Feltrinelli, Gargnano.

Kripke, S. (1977) "Speaker's Reference and Semantic Reference," *Midwest Studies in Philosophy*, 2, 255–276.

Kripke, S. (1980) *Naming and Necessity*, Harvard University Press.

Kripke, S. (2005) "Russell's Notion of Scope", *Mind*, 114, 1005–1037.

Lasersohn, P. (1993) "Existence presuppositions and background knowledge", *Journal of Semantics*, 10(2), 113–122.

Lewis, D. (1970) "General Semantics", *Synthese*, 22: 18–67.

Lewis, D. (1975) "Languages and Language", in K. Gunderson (ed.), *Minnesota Studies in the Philosophy of Science*, Volume VII, Minneapolis: University of Minnesota Press, 3–35.

Ludlow, P. (2013) "Descriptions", *The Stanford Encyclopedia of Philosophy* (Fall 2013 Edition), E. N. Zalta (ed.), URL = http://plato.stanford.edu/archives/fall2013/entries/descriptions/.

Ludlow, P. and Segal, G. (2004). "On a unitary semantical analysis for definite and indefinite descriptions", in M. Reimer and A. Bezuidenhout (eds.), *Descriptions and Beyond*, Oxford: Oxford University Press.

May, R. (1987) "Logical form as a level of linguistic representation", in E. Lepore (ed.), *New Directions in Semantics*, Academic Press.

Mostowski, A. (1957) "On a Generalization of Quantifiers", *Fundamenta Mathematicae,* 44, 12–35.

Neale, S. (1990) *Descriptions*, Cambridge, MA: MIT Press.

Neale, S. (1994) "What is logical form?", in D. Prawitz and D. Westerståhl (eds.), *Logic and Philosophy of Science in Uppsala*, Kluwer, 583—598.

Neale, S. (2000) "On being explicit: comments on Stanley and Szabo, and on Bach", *Mind and Language*, 15 (2&3), 284–294.

Neale, S. (2004) "This, That, and the Other", in M. Reimer and A. Bezuidenhout (eds.), *Descriptions and Beyond*, Oxford: Oxford University Press.

Neale, S. (2007) "Heavy Hands, Magic, and Scene-Reading Traps", *European Journal of Analytic Philosophy*, vol.3, no.2, 1-81.

Neale, S. (forthcoming) "Implicit Reference (Hidden Indexicality?)", in *Meaning and Other Things: Essay in Honor of Stephen Schiffer*, G. Ostertag (ed.), MIT Press.

Ostertag, G. (2008) "Review of Stanley, Jason 2007 *Language in Context: Selected Essays*, OUP, in Notre Dame Philosophical Reviews", retrieved from http://ndpr.nd.edu/news/23529-language-in-context-selected-essays/.

Peacocke, C. (1975) "Proper Names, Reference and Rigid Designation", in S. Blackburn (ed.), *Meaning, Reference and Necessity*, Cambridge: Cambridge University Press.

Portner, P. (2009) *Modality*, Studies in Semantics and Pragmatics, Oxford: Oxford University Press.

Predelli, S. (1998) "I Am Not Here Now", *Analysis*, 58, 107-115.

Ramachandran M. (1993) "A Strawsonian Objection to Russell's Theory of Descriptions" *Analysis*, 53(4), 209-212.

Ramachandran, M. (1995) "Bach on behalf of Russell", *Analysis*, 55(4), 283-287.

Recanati F. (1993) *Direct Reference: From Language to Thought*, Oxford: Blackwell.

Recanati, F. (2004) *Literal Meaning*, Cambridge: Cambridge University Press.

Recanati, F. (2010) "Singular Thought: In Defence of Acquaintance", in R. Jeshion (ed.), *New Essays on Singular Thought*, Oxford: Oxford University Press, 141-189.

Reimer, M. (1992) "Incomplete descriptions", *Erkenntnis* 37(3), 347-363.

Reimer, M. (1998) "Donnellan's Distinction/Kripke's Test", *Analysis*, 58(2), 89-100.

Rothschild, D. (2007) "Presuppositions and scope", *Journal of Philosophy*, 104(2): 71-106.

Russell, B. (1903) *The Principles of Mathematics*, Cambridge: Cambridge University Press.

Russell, B. (1905) "On Denoting", *Mind*, 14, 479–493.

Russell, B. (1912) *The Problems of Philosophy*, Barnes and Noble Books.

Russell, B. (1918) "The Philosophy of Logical Atomism", Routledge Classics.

Russell, B. (1919) "Descriptions" from *Introduction to Mathematical Philosophy*, reprinted in A. P. Martinich (ed.) (1996), *The Philosophy of Language*, third edition, Oxford: Oxford University Press.

Russell, B. (1957) "Mr. Strawson on referring", *Mind* 66 (263), 385-389.

Salmon, N. (2010) "Three Perspectives on *Quantifying In*", in R. Jeshion (ed.), *New Essays on Singular Thought*, Oxford: Oxford University Press, 64-76.

Schiffer, S. (1995) “Descriptions, indexicals, and belief reports: Some dilemmas (but not the ones you expect)”, *Mind* 104(413), 107-131.

Schoubye, A. J. (2011), *On Describing*, PhD Dissertation.

Schoubye, A. J. (2012) “Against the argument from convention”, *Linguistics and Philosophy*, 35(6), 515-532.

Schoubye, A. (2013) “Ghosts, Murderers, and the Semantics of Descriptions”, *Noûs* 47(3), 496-533.

Searle, J. (1975) “Indirect Speech Acts,” in P. Cole and J. L. Morgan (eds.), *Syntax and Semantics*, Vol. 3, *Speech Acts* New York: Academic Press.

Searle, J. (1978) “Literal Meaning”, *Erkenntnis* 13 (1), 207–224.

Sennet, A (2002) “An ambiguity test for definite descriptions”, *Philosophical Studies*, 111(1), 81–95.

Sennet, A. (2015) “Ambiguity”, *The Stanford Encyclopedia of Philosophy* (Spring 2015 Edition), Edward N. Zalta (ed.), forthcoming URL = http://plato.stanford.edu/archives/spr2015/entries/ambiguity.

Sher, G. (1991) *The Bounds of Logic: a Generalized Viewpoint*, Cambridge, MA: MIT Press.

Soames, S. (1989) “Presupposition”, in D. Gabbay and F. Guenther (eds.), *Handbook of Philosophical Logic*, Dordrecht: Reidel, vol. IV, 553–616.

Soames, S. (2005) “Naming and Asserting”, in Z. G. Szabó (ed.), *Semantics Versus Pragmatics*. Oxford: Oxford University Press, 356-382.

Soames, S. (2010) *Philosophy of Language*, Princeton University Press.

Stalnaker, R. (1974) “Pragmatic Presuppositions”, in M. Munitz and P. Unger (eds.), *Semantics and Philosophy*, New York University Press, 197-214; reprinted in Stalnaker (1999), 47-62.

Stalnaker, R. (1988) “Belief attribution and context”, in R. H. Grimm and D. D. Merrill (eds.), *Contents of Thought*, University of Arizona Press, 140-156; reprinted in Stalnaker (1999), 150-166.

Stalnaker (1999), *Context and Content: Essays on Intentionality in Speech and Thought*, Oxford: Oxford University Press.

Stainton, R. J. (1999) “Interrogatives and Sets of Answers”, *Crítica* 31(91), 75-90.

Stojanovic, I. (2002) “Incomplete Definite Descriptions, Demonstrative Completion and Redundancy”, in K. Striegnitz, et al. (eds.), *Special Issue: The Language Sections of the ESSLLI-01 Student Session, Human Language Technology*

Theses.

Strawson, P. F. (1950) “On Referring”, *Mind*, 59, 320–344.

Strawson, P. F. (1964) “Identifying reference and truth-values”, *Theoria*, 30, 96–118; reprinted in Strawson (1974) *Logico-linguistic Papers*, London: Methuen, 75–95.

Stanley, J. C. (2002) “Nominal restriction”, in G. Peter and G. Preyer (eds.), *Logical Form and Language*, Oxford: Oxford University Press, 365—390.

Stanley, J. C. (2007) “Introduction”, in *Language in Context: Selected Essays*, 1-29. Oxford: Oxford University Press.

Stanley, J. C. and Szabó, Z. G. (2000a) “On Quantifier Domain Restriction”, *Mind and Language*, 15(2&3), 219-261.

Stanley, J. C. and Szabó, Z. G. (2000b) “Reply to Bach and Neale”, *Mind and Language*, 15(2&3), 295–298.

Szabó, Z. G. (2000) “Descriptions and uniqueness”, *Philosophical Studies*, 101(1), 29-57.

Travis, C. (1997) “Pragmatics”, in B. Hale and C. Wright (eds.), *A Companion to the Philosophy of Language*, Oxford: Blackwell.

Zwicky, A. M. and Jerrold, M. S. (1975) “Ambiguity Tests and How to Fail Them”, in Kimball (ed.), *Syntax and Semantics*, 4, New York: Academic Press, 1–36.

Westerståhl, D. (2011) Edition “Generalized Quantifiers”, *The Stanford Encyclopedia of Philosophy*, Edward N. Zalta (ed.), URL = http://plato.stanford.edu/archives/sum2011/entries/generalized-quantifiers/.

Wettstein, H. K. (1981) “Demonstrative reference and definite descriptions”, *Philosophical Studies*, 40(2), 241-57.

Whitehead, A. N. and Russell, B. (1910) *Principia Mathematica*, Vol. 1. Cambridge: Cambridge University Press.

Wittgenstein, L. (1922) *Tractatus Logico-Philosophicus*, London: Routledge and Kegan Paul Ltd.