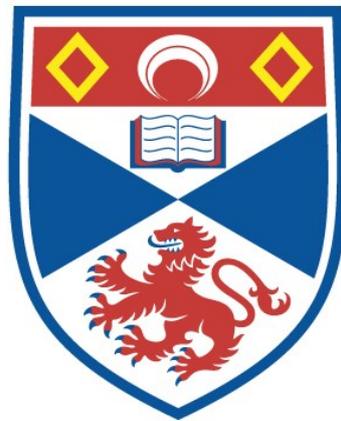


# QUANTIFIER EXPRESSIONS AND INFORMATION STRUCTURE

Poppy Mankowitz

A Thesis Submitted for the Degree of PhD  
at the  
University of St Andrews



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# Quantifier Expressions and Information Structure

Poppy Mankowitz



University of  
St Andrews

This thesis is submitted in partial fulfilment for the degree of

Doctor of Philosophy (PhD)

at the University of St Andrews

August 2018

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## Abstract

Linguists and philosophers of language have shown increasing interest in the expressions that refer to quantifiers: determiners like ‘every’ and ‘many’, in addition to determiner phrases like ‘some king’ and ‘no cat’. This thesis addresses several puzzles where the way we understand quantifier expressions depends on features that go beyond standard truth conditional semantic meaning.

One puzzle concerns the fact that it is often natural to understand ‘Every king is in the yard’ as being true if (say) all of the kings at the party are in the yard, even though the standard truth conditions predict it to be true if and only if every king in the universe is in the yard. Another puzzle emerges from the observation that ‘Every American king is in the yard’ sounds odd relative to contexts where there are no American kings, even though the standard truth conditions predict it to be trivially true. These puzzles have been widely discussed within linguistics and philosophy of language, and have implications for topics as diverse as the distinction between semantics and pragmatics and the ontological commitments of ordinary individuals. Yet few attempts have been made to incorporate discussions from the linguistics literature into the philosophical literature. This thesis argues that attending to the linguistics literature helps to address these puzzles. In particular, my solutions to these puzzles rely on notions from work on information structure, an often overlooked area of linguistics. I will use these notions to develop a new theory of the pragmatics of ordinary discourse, in the process of resolving the puzzles.

In the first two chapters, I provide accessible overviews of key notions from the literature on quantifier expressions and information structure. In the third chapter, I discuss the problem of contextual domain restriction. In the fourth chapter, I consider the problems posed by empty restrictors. In the final chapter, I tackle the issue of category mistakes.

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## **Related Publications**

A version of Chapter 3 is forthcoming in the journal *Mind & Language*.

# Contents

<b>Introduction</b>	<b>8</b>
<b>1 Quantifier Expressions</b>	<b>9</b>
1.1 Overview of Quantification	9
1.1.1 Quantifiers	9
1.1.2 Quantifier Expressions	12
1.1.3 Definites and Indefinites	14
1.1.4 'There'-Sentences	16
1.2 Analyses of 'There'-Sentences	19
1.2.1 Overview of Some Accounts	19
1.2.2 Barwise and Cooper (1981)	22
1.2.3 Keenan (2003)	24
1.2.4 Francez (2009, 2010)	26
<b>2 Topics and File Cards</b>	<b>30</b>
2.1 Defining Topics	30
2.1.1 Information Structure Overview	30
2.1.2 Clarifying 'Aboutness'	33
2.1.3 Topicable Items	34
2.1.4 Extant Systems of File Cards	36
2.2 Relating File Cards to the Domain	41
2.2.1 Different Candidates for File Cards	42
2.2.2 The Aboutness Criterion	45
2.2.3 The Anaphora Criterion	47
2.2.4 File Cards and Semantic Meaning	51
2.3 Identifying Sentence Topics	53
2.3.1 Identifying Focus	53
2.3.2 Focus as a Guide to Topic	57
2.3.3 Identifying Topics	59
2.3.4 Focus and the Common Ground	60
<b>3 Triggering Domain Restriction</b>	<b>65</b>
3.1 Domain Restriction and the Triggering Question	65
3.1.1 The Neglect of the Triggering Question	66
3.1.2 Anomaly as an Answer	68

3.1.3	Against Anomaly-Triggered Domain Restriction . . . . .	71
3.2	Domain Restriction and Information Structure . . . . .	73
3.2.1	IS-Sensitive Quantifier Expressions . . . . .	74
3.2.2	A Mechanism of Focus-Based Domain Restriction . . . . .	76
3.3	A Partial Answer to the Triggering Question . . . . .	80
3.3.1	The Partial Answer . . . . .	80
3.3.2	Applying the Partial Answer to Out-Of-Context Sentences . . . . .	82
3.3.3	Testing the Partial Answer . . . . .	84
3.4	Relating the Partial Answer to File Cards . . . . .	85
<b>4</b>	<b>Contingently Empty Restrictors</b>	<b>93</b>
4.1	The Problem of Contingently Empty Restrictors . . . . .	93
4.1.1	The Problem . . . . .	93
4.1.2	Semantic Accounts . . . . .	96
4.1.3	Processing Accounts . . . . .	98
4.1.4	Implicature Accounts . . . . .	101
4.1.5	Pragmatic Presuppositional Accounts . . . . .	104
4.2	Varieties of Topic-Sensitive, Presuppositional Accounts . . . . .	107
4.2.1	Sources of Presuppositions . . . . .	108
4.2.2	Against Inherent . . . . .	109
4.2.3	Against Inherent but Inactive . . . . .	111
4.2.4	Against Mixed . . . . .	112
4.3	An Inherited, Topic-Sensitive, Presuppositional Account . . . . .	114
4.3.1	Topicality-Triggered Existence Presuppositions . . . . .	114
4.3.2	The Problem of Monotone Decreasing DPs . . . . .	116
4.3.3	Against Inherent Presuppositions for 'The' . . . . .	122
4.4	The Account and the Three Desiderata . . . . .	126
4.4.1	Explaining Definite Variance and 'There' Acceptability . . . . .	126
4.4.2	Identifying Existentially Acceptable Occurrences of DPs . . . . .	132
<b>5</b>	<b>Category Mistakes</b>	<b>139</b>
5.1	Against Extant Accounts of Category Mistakes . . . . .	139
5.1.1	Category Mistakes . . . . .	140
5.1.2	Syntactic Accounts . . . . .	142
5.1.3	Semantic Accounts . . . . .	144
5.1.4	Pragmatic Accounts . . . . .	146
5.2	Accounting for 'Category Mistakes' . . . . .	149
5.2.1	The First Group of 'Category Mistakes' . . . . .	149
5.2.2	The Second Group of 'Category Mistakes' . . . . .	151
5.2.3	A Uniform Explanation . . . . .	155
	<b>Conclusion</b>	<b>159</b>

# Introduction

Quantifiers have been studied extensively within philosophy and logic. This has resulted in increasing interest amongst linguists and philosophers of language in the expressions that refer to quantifiers: determiners like ‘every’ and ‘many’, in addition to determiner phrases like ‘some king’ and ‘no cat’. This thesis addresses several puzzles where the way we understand quantifier expressions depends on features that go beyond the standard, truth conditional semantic meaning. It is important to resolve these puzzles not only because they have occupied philosophers for so long, but also in order to establish how linguists and philosophers of language should analyse quantifier expressions. My solutions to these puzzles rely on a number of notions from work on information structure, an area of linguistics that has been largely overlooked within philosophy. My exploration of these notions allows me to develop a new theory of the pragmatics of ordinary discourse in the process of resolving the puzzles. Furthermore, by drawing attention to notions related to information structure, this thesis lays the groundwork for applying such notions to additional problems within philosophy of language.

Since the work of Montague, the semantic meaning of a sentence is commonly given in terms of its *truth conditions*, which are stated relative to a contextually-determined *model* that includes a *domain* of individuals. For example, (1a) is standardly analysed as true if and only if the set of kings in the domain is a subset of the set of domain members that are in the yard, whereas (1b) is standardly analysed as true if and only if the set of kings in the domain has a non-empty intersection with the set of domain members that are in the yard:

1. (a) Every king is in the yard.  
(b) Some king is in the yard.

However, the way we use language is not fully captured by truth-conditional semantic meaning. For instance, when (1a) occurs as a response to different questions, different patterns of intonation are required. Consider the following contrasts, when the capitalised words are spoken with vocal emphasis, the parentheses indicate questions or information that are assumed relative to the context, and a question mark indicates that individuals are likely to deem an occurrence of a sentence odd:

2. (a) (Who is in the yard?)  
Every KING is in the yard.  
? Every king is in the YARD.  
(b) (Where is every king?)

? Every KING is in the yard.

Every king is in the YARD.

Extra-semantic features that affect the way we understand language are typically described as *pragmatic*. My focus will be on a particular area of pragmatics known as *information structure*, which investigates the way features such as intonation and syntactic structure are used to ‘package’ information. I will argue that several puzzles concerning quantifier expressions may be resolved by observations based on information structure, which I implement by developing an account of the way individuals ‘store’ the information expressed by language.

One puzzle concerns the fact that sentences are frequently understood as if they make a more restricted claim than the one they appear to literally express. For example, it is often natural to understand (1a) as true when all of the kings from some salient group (say, the kings at the party) are in the yard, even if some other kings (say, the ones visiting France) are not in the yard. This puzzle of *contextual domain restriction* has received a lot of recent attention, both in semantics and philosophy of language (e.g. Westerståhl (1985), Partee (1989), von Stechow (1994), Roberts (1995), Eckardt (1999), Geurts and van der Sandt (1999), Bach (2000), Herburger (2000), Stanley and Szabó (2000), Stanley (2002), Breheny (2003), Martí (2003), Kratzer (2004), Bach (2005) and Rast (2013)). One reason this puzzle has gained so much attention is that it serves as a locus for debates about what aspects of our understanding of natural language should be incorporated into semantics versus pragmatics.

A second puzzle concerns the fact that occurrences of sentences where a determiner applies to an expression that denotes the empty set generally sound odd, even though their semantics predict them to be acceptable. Consider the following, relative to a world where there are no American kings:

3. (a) ? The American king is in the yard.
- (b) ? Every American king is in the yard.

The problems posed by *empty restrictors* have been discussed by linguists and philosophers alike (e.g. Russell (1905), Strawson (1964), Donnellan (1966), Kripke (1980), De Jong and Verkuyl (1984), Lappin and Reinhart (1988), Lasnik (1993), Abusch and Rooth (2004), Peters and Westerståhl (2006) and Geurts (2007)). A resolution of this problem has been thought of as integral to an adequate analysis of definite descriptions, in addition to an account of the nature and behaviour of presuppositions.

A third puzzle emerges from the fact that ‘there’-sentences are often treated as semantically equivalent to non-‘there’-sentences. The acceptability of (1a) and (1b) therefore predicts the acceptability of (4a) and (4b); however, it seems odd to utter (4b) out of the blue:

4. (a) There is some king in the yard.
- (b) ? There is every king in the yard.

Linguists have treated the puzzles surrounding the analysis of ‘there’-sentences as fertile ground for exploring the properties of different quantifiers (e.g. Milsark (1974), Barwise and Cooper (1981), Prince (1988), Abbott (1992), Zucchi (1995), Ward and Birner (1995), McNally (1997), Keenan (2003), Beaver et al. (2005) and Francez (2010)). Given that ‘there’-sentences are frequently used to issue claims about what exists, an analysis of the way we understand

such sentences is essential to an account of how we understand existence claims. Yet the impact of analyses of 'there'-sentences on metaphysics has not been widely appreciated.

A fourth puzzle emerges from the fact that moving an expression to clause-initial position can affect the way the sentence in which it occurs is understood. For example, (5a) is much easier to understand as acceptable and false than (5b) is, even though they both have the same truth conditions as 'Some American king is in the yard':

5. (a) As for the yard, some American king is there.
- (b) ? As for some American king, he's in the yard.

Work on information structure treats this puzzle as one that concerns *topicality* (e.g. Halliday (1967), Gundel (1975), Reinhart (1981)). Differences in topicality also affect the way we understand pronouns, hence an engagement with this notion is crucial in order to make sense of common features of language use.

Finally, since it is natural to consider (1a) and (1b) acceptable, the prediction seems to emerge that individuals should deem other sentences where 'every king' or 'some king' combines with a well-formed predicate acceptable. Standard semantics predict that (6a) and (6b) should be judged acceptable and necessarily false, but it is instead natural to consider them odd:

6. (a) ? Every king is a table.
- (b) ? Some king is prime.

The problem of *category mistakes* is perhaps the most widely-discussed of these puzzles within philosophy of language (e.g. Ryle (1938), Fodor and Katz (1963), Chomsky (1965), van Fraassen (1971), Thomason (1972), Lappin (1981), Asher (2011) and Magidor (2013)). A solution to this puzzle has been considered crucial to the development of an adequate account of natural language, while also holding potential implications for ordinary concepts and ontological categories.

My thesis aims to address these puzzles by developing an account of various pragmatic features of quantifier expressions. In the first two chapters, I will lay the groundwork for this account by providing an overview of the linguistics literature on quantifier expressions and information structure. These expository chapters are important not only because they introduce the mechanisms that I will use to address the puzzles associated with quantifier expressions, but also because they provide an accessible overview of a number of notions that have been largely neglected by mainstream philosophy of language. The final three chapters address the puzzles more directly.

In the first chapter, I begin by endorsing the semantic analysis of quantifier expressions familiar from contemporary theories of generalized quantifiers. Several properties have been used to divide the class of quantifier expressions into two categories, and I will isolate a pair of categories by means of the labels '*definite*' and '*indefinite*'. I then discuss a major problem in the study of generalized quantifiers, which concerns the identification of those expressions that may occur in 'there'-sentences without special contextualisation (the '*existentially acceptable*' quantifier expressions). I will conclude that the best analysis of 'there'-sentences should pair the semantics given by Keenan (2003) or Francez (2009) with

an identification of the class of existentially acceptable occurrences of quantifier expressions that is sensitive to pragmatic factors.

In the second chapter, I clarify the information structure-theoretic notion of a *sentence topic*. A central proposal of my thesis is that differences in the way individuals understand quantifier expressions correspond to differences in their choice of topic. I will define a ‘topic’ as the indicator of the item that an occurrence of a sentence is about, and hold that occurrences of sentences with topical determiner phrases are about arbitrary minimal witness sets of those phrases’ extensions. I will then model the effects of different choices of topic by means of a structured common ground where the information expressed by occurrences of sentences is stored on *file cards* that serve as representations of aboutness items.

The third chapter tackles the question of when individuals reach domain restricted understandings with respect to occurrences of quantifier expressions (*‘the Triggering Question’*). I will argue that a domain restricted understanding of an occurrence of a determiner phrase headed by ‘every’ or ‘most’ arises if and only if the information expressed by the relevant occurrence of the sentence is stored on a file card representing a proper subset of the determiner phrase’s restrictor’s extension. This view allows me to develop a partial answer to the Triggering Question that supplies accurate empirical predictions, in addition to identifying three strategies that individuals use to reach particular domain restricted understandings.

The aim of the fourth chapter is to determine the correct analysis of quantifier expressions with restrictors that interlocutors perceive to contingently denote the empty set. Individuals’ responses to such quantifier expressions are known to vary depending on whether the determiner involved is definite or indefinite (*‘Definite Variance’*), and whether the quantifier expression occurs in a ‘there’-sentence (*‘There Acceptability’*). I will argue that the problem of contingently empty restrictors is resolved by the view that determiner phrases inherit a pragmatic existence presupposition from being construed as topical. I will model this proposal by means of structured common grounds, arguing that occurrences of topical determiner phrases cannot be associated with file cards when their restrictors are perceived to denote the empty set, leading to the inevitable failure of the existence presupposition. This explains Definite Variance and ‘There’ Acceptability when combined with the view that the likelihood of understanding the DP of an out-of-context sentence as topical depends on whether the determiner is definite and on the structure of the sentence. A new generalisation pertaining to a link between information storage and the understanding of ‘there’-sentences will also emerge from the discussion in this chapter.

In the final chapter, I consider the analysis of so-called ‘category mistakes’. I make the novel observation that Definite Variance and ‘There’ Acceptability data arise with respect to an important class of sentences that are traditionally thought to exhibit category mistakes. I then show how no extant account of category mistakes is able to predict the unexpected data. I develop the proposal that the sentences traditionally classified as exhibiting category mistakes comprise a proper subclass of the sentences that are prone to exhibit *storage problems*, insofar as it is often difficult to store the information expressed by occurrences of them within a common ground. I conclude that there is no class of ‘category mistakes’ consisting of all and only the sentences that involve some unique defect.

By the end of the final chapter, four aims should have been achieved. Firstly, I will have supplied solutions to the long-standing philosophical puzzles with which this thesis is directly concerned. Secondly, several insights about the correct semantic and pragmatic

analysis of quantifier expressions will have emerged. Thirdly, I will have proposed a new model of the pragmatics of ordinary discourse. Fourthly, by drawing attention to certain notions from information structure, I will make these notions available to be applied by philosophers of language to a broad range of problems.

# Chapter 1

## Quantifier Expressions

The purpose of this chapter is to *provide an overview of the analysis of quantifier expressions within linguistics and philosophy of language*. It will be found that several properties have been used to divide the class of quantifier expressions into two categories. Despite the different theoretical backgrounds of these distinct ways of dividing the class of such expressions, the different means of division result in a pair of categories that exhibit significant overlap. I will go on to refer to this pair of categories with the labels ‘*definite*’ and ‘*indefinite*’.

In §(1.1), I will provide a general overview of quantification, endorsing an approach based on theories of generalized quantifiers. §(1.2) will consist of a detailed discussion of ‘*there*’-sentences, since a major problem in the study of generalized quantifiers concerns the identification of those quantifier expressions that may occur in ‘*there*’-sentences without special contextualisation (the *existentially acceptable* quantifier expressions). This discussion not only clarifies the nature of ‘*there*’-sentences, which are structures that will re-appear several times in future chapters, but also brings to light several important properties that have been attributed to quantifiers.

### 1.1 Overview of Quantification

I will begin by discussing the history of the study of quantifiers, before endorsing the definition of ‘*quantifier*’ proposed by contemporary theories of generalized quantifiers (§(1.1.1)). I will then discuss the natural language expressions that denote quantifiers, namely determiners and determiner phrases (§(1.1.2)). I will briefly summarise the property of definiteness, which has been attributed to a variety of quantifier expressions over the years, before adopting the labels ‘*definite*’ and ‘*indefinite*’ to refer to two lists of determiners for the remainder of the thesis (§(1.1.3)). The notion of ‘*there*’-sentences shall then be introduced (§(1.1.4)).

#### 1.1.1 Quantifiers

In defining the notion of a quantifier, and tracing the history of the study of quantifiers, it is important to begin with the observation that ‘[t]here is no theory-neutral way of defining quantification, or even of delineating the class of quantifiers’.<sup>1</sup> This complicates the

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<sup>1</sup>Bonevac (2012), p.63.

investigation of the historical study of quantifiers, since the definitions proffered frequently endorse concepts and capture items that are incompatible with alternative definitions. To solve this complication, I intend to trace the history of the study of quantifiers by describing the notions and definitions developed in three areas generally considered to belong to such a history: *Aristotelian logic*, *first-order logic* and *theories of generalized quantifiers*. I will then endorse the definition given by theories of generalized quantifiers, due to its greater sophistication, before characterising further useful notions developed in such theories.

Within *Aristotelian logic*, and for centuries afterwards, enquiry centred on the formal properties of propositions expressed by sentences containing the terms ‘every’, ‘some’, ‘no’ (equivalently, ‘every ... not’) and ‘not every’ (equivalently, ‘some ... not’). The meanings of sentences including these ‘classical’ quantifier expressions have long been known to interact in such a way that a proposition featuring one of the terms allows the inference of certain propositions featuring the other terms.<sup>2</sup> For example, the proposition that every A is a B allows us to infer that no As are not Bs. Aristotle gave the meanings of sentences of this form through inference patterns of the following form, where each ‘ $Q_i$ ’ represents one of the classical quantifier expressions, and A, B and C represent other parts of sentences:

$Q_1$  A B

$Q_2$  B C

$Q_3$  A C

The primary limitation of the Aristotelian approach was the representation of sentence parts by means of propositional letters; this meant that inferences such as the one from ‘Every king lives in New York’ to ‘Every tall king lives in New York’ could not be captured within the system, due to their being represented as, respectively, ‘Every A B’ and ‘Every C B’.<sup>3</sup>

At the end of the 19th century, the development of *first-order logic* allowed a greater number of quantificational inferences to be captured, by supplementing the propositional letters relied upon to represent parts of sentences in Aristotelian logic with a more fine-grained representational system, which broke down sentence-parts into predicates and the objects to which they apply. The idea of a quantifier as an operator applying to a domain of discourse originated with Peirce (1885), who distinguished ‘a pure Boolean expression referring to an individual and a Quantifying part saying what individual this is’.<sup>4</sup> The main developments in the first-order approach to quantifiers were effected in Frege (1879). Frege distinguished between functions, arguments, and the terms denoting them. For Frege, first-level functions take objects as arguments, whereas second-level functions take first-level functions as arguments, and so on. A predicate ‘ $P$ ’, denoting a first-level function, may be written alongside a variable ‘ $x$ ’ representing the function’s argument. Frege then developed the idea of a quantifier as a variable-binding operator, defining ‘ $\forall xP(x)$ ’ to be true if and only if the function denoted by ‘ $P$ ’ yields the value *true* when applied to any object. Frege furthermore

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<sup>2</sup>Though the classically accepted inferences are slightly different to those accepted by most modern accounts of generalized quantifiers. For example, ‘every’ was traditionally thought to have existential import, in the sense that the proposition that every A is a B allows us to infer that some As are Bs. However, accounts of generalized quantifiers tend to treat the proposition that every A is a B as trivially true in a situation where there are no As. (Peters and Westerståhl (2006), p.24.)

<sup>3</sup>Bonevac (2012), p.107.

<sup>4</sup>Peirce (1933), p.227.

had the insight that quantifier expressions may be treated as having their own denotations; within Aristotelian logic and earlier systems of first-order logic, quantifier expressions were assigned meanings only through the meanings of sentences within which they occurred. For Frege,  $\forall x\Psi(x)$  denoted a second-level function which truthfully applies to those first-level functions that apply to every object.

Despite these developments, first-order logic treatments of quantifiers faced certain inherent problems. The primary limitation of the analysis of quantification within first-order logic is that it cannot be extended to those non-classical quantifier expressions that are used to make certain claims about the cardinalities of sets, such as 'an even number of', 'an infinite number of' and 'most'.<sup>5</sup> Another problem faced by first-order logic was that a quantifier was represented as *monadic*, operating on a single formula.<sup>6</sup> Thus despite the fact that, in a sentence of the form 'Every N  $\beta$ ', 'Every N' functions as a syntactic constituent, there is no particular part of a first-order representation of the sentence that acts as the extension of this constituent.

*Theories of generalized quantifiers*, primarily developed in Mostowski (1957), Lindström (1966), Barwise and Cooper (1981), and Barwise et al. (1985), addressed the problems of first order-logic approaches by analysing the meanings of the classical quantifier expressions as *second-order relations between sets of individuals*. Quantifiers defined in this model-independent manner are known as *global quantifiers*, and each global quantifier associates a *local quantifier* with each model, which is defined solely with respect to the sets of individuals within the model's domain. The distinction between global and local quantifiers is important in order to capture the meanings of natural language terms, since the same model-independent relation is denoted by each use of a given quantifier expression, but all uses of natural language quantifier expressions occur relative to a contextually-determined domain of discourse. The model-theoretic construal of the semantic meaning of quantifier expressions differs from the earlier inferential one characteristic of the Aristotelian approach due to the integral use of the notions of truth and denotation, rather than a reliance on the epistemic notion of a proof.<sup>7</sup> It differs from the Fregean first-order approach on the grounds that quantifiers are treated as *relational*, operating on multiple arguments rather than single formulae; this means that, not only do quantifier expressions have denotations, but the application of a quantifier expression to its first argument also has a denotation.

In light of the model-theoretic definition of the classical quantifier expressions in terms of set-theoretic notions, it became natural to treat *any* second-order relation between sets of individuals as a quantifier. This means that there is an uncountable number of global quantifiers, rather than solely those that give the meaning of 'every', 'some', 'no' and 'not every'.<sup>8</sup> Moreover, this conception of a *generalized quantifier* (a quantifier that need not be expressible in first-order logic) renders the analysis of this plethora of quantifiers and their properties a more manageable endeavour.

Although the most common approach within theories of generalized quantifiers treats them as relations, a *functional* approach is also possible. While there is no ontological signif-

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<sup>5</sup>See discussion in Rescher (1962), Lewis (1975) and Peters and Westerståhl (2006).

<sup>6</sup>Bonevac (2012), p.112.

<sup>7</sup>Peters and Westerståhl (2006), p.29.

<sup>8</sup>This is the case because the number of global quantifiers is the number of functions from domains to local quantifiers, and this will be at least the number of domains, which is uncountable (Peters and Westerståhl (2006), p.81).

ificance to the choice between a relational and functional definition of quantifiers, since there is no impact on the structure of domains, only the latter approach allows quantifiers to be *partially defined*.<sup>9</sup> That is, when a local quantifier  $Q_D$  is viewed as a function, it may fail to return a value for certain subsets of  $D$ . However, when  $Q_D$  is thought of as a second-order relation, every subset of  $D$  is either a member or a non-member of the relation. Although it is unclear whether partially defined quantifiers are relevant to the meaning of natural language expressions, it seems undesirable to rule out this possibility through one's definition of a quantifier. Furthermore, it will be seen in §(1.2.2) that a particular definition of quantifier strength crucially depends on the possibility of partially defined quantifiers. I shall therefore use definitions that treat quantifiers as denoting functions, whilst occasionally switching to relational terminology when it helps to clarify an idea.

The functional perspective defines a quantifier as follows, distinguishing between type  $\langle 1 \rangle$  and type  $\langle 1, 1 \rangle$  quantifiers:

**Definition of Functional Type  $\langle 1 \rangle$  and  $\langle 1, 1 \rangle$  Quantifiers:** Where  $Q$  associates with each domain  $D$  a function  $Q_D$  from a proper or improper subset of  $\mathcal{P}(D)$  (the set of subsets of  $D$ ) to  $\{0, 1\}$  (the set of truth values), we call  $Q$  a *global type  $\langle 1 \rangle$  quantifier* and  $Q_D$  a *local type  $\langle 1 \rangle$  quantifier*.

Where  $Q$  associates with each domain  $D$  a function  $Q_D$  from a subset of  $\mathcal{P}(D)$  to a function from a subset of  $\mathcal{P}(D)$  to  $\{0, 1\}$ , we call  $Q$  a *global type  $\langle 1, 1 \rangle$  quantifier* and  $Q_D$  a *local type  $\langle 1, 1 \rangle$  quantifier*.

A global quantifier is classified as being of *type  $\langle n_1, \dots, n_k \rangle$*  when it associates with each  $D$  a  $k$ -ary second-order relation over  $D$ , where the  $i$ th argument is an  $n_i$ -ary relation between individuals in  $D$ . The two most frequently discussed types are  $\langle 1 \rangle$  and  $\langle 1, 1 \rangle$ , defined above. These types are discussed frequently due to the fact that all natural languages contain expressions that denote type  $\langle 1, 1 \rangle$  quantifiers, and most natural languages contain expressions that denote type  $\langle 1 \rangle$  quantifiers.<sup>10</sup> A countably infinite number of other types of quantifiers are possible, though it is debatable as to whether there are natural language expressions that denote quantifiers other than types  $\langle 1 \rangle$  and  $\langle 1, 1 \rangle$ . Hence only quantifiers of type  $\langle 1 \rangle$  and  $\langle 1, 1 \rangle$  will be discussed in the following.

### 1.1.2 Quantifier Expressions

I shall refer to something as a '*quantifier expression*' if it is a natural language expression that denotes a quantifier, and it occurs in sentences alongside an expression that is understood as denoting an appropriate argument for the quantifier. The second conjunct is intended to exclude the numerous natural language expressions that *can* plausibly be analysed in terms of quantifiers (e.g. modals, tense, attitude verbs, etc.), on the grounds that these expressions tend to occur in sentences without an expression that denotes the set of things over which they quantify (e.g. possible worlds, times, etc.).<sup>11</sup> Quantifier expressions are useful in natural language when we wish to talk about 'quantity of things or amounts of stuff'.<sup>12</sup>

<sup>9</sup>Peters and Westerståhl (2006), p.84.

<sup>10</sup>*Ibid.*, p.11.

<sup>11</sup>*Ibid.*, pp.15-6.

<sup>12</sup>*Ibid.*, p.2.

As earlier stated, type  $\langle 1 \rangle$  and  $\langle 1, 1 \rangle$  quantifiers are the only ones for which it is universally accepted that natural language quantifier expressions exist that denote them. Determiner phrases are the paradigm case of the former, and determiners are the paradigm instance of the latter. A *determiner* is an expression that forms a syntactic constituent with a *noun phrase* (hereafter, 'NP'), yielding a *determiner phrase* (hereafter, 'DP'). The NP argument of the DP is often referred to as the determiner's *restrictor*, and the lexical material with which the DP combines to form a sentence is the determiner's *nuclear scope*. When making general claims about quantifier expressions, I will often use 'Det' 'N' and ' $\beta$ ' schematically, as items that may be replaced with, respectively, a determiner, restrictor and nuclear scope.

Since Montague's work on generalized quantifiers, it has become standard to assume that every item traditionally analysed as an NP projects a DP, and to analyse all DPs as denoting quantifiers. Hence certain expressions that lack overt determiners are nevertheless treated as quantifier expressions. This uniformly quantificational approach to DPs is compelling in light of arguments given in Montague (1973) pertaining to the distributional parallels between overtly quantificational DPs such as 'every man' and expressions such as proper names and pronouns.

An occurrence of a sentence with a determiner is classified as true if and only if the type  $\langle 1, 1 \rangle$  quantifier denoted by the determiner relative to the domain applies to the set denoted by the restrictor to give a function that yields the value 1 when applied to the set denoted by the nuclear scope. An occurrence of a sentence containing a DP listed in the lexicon, rather than a DP constructed from a determiner and a common noun (e.g. 'everything', 'someone', proper names, etc.), will be classified as true if and only if the type  $\langle 1 \rangle$  quantifier denoted by the DP relative to the domain applies to the set denoted by the nuclear scope to yield the value 1. The conditions an argument must meet if a quantifier is to end up yielding the value 1 is specified by the particular quantifier involved. For example, the truth conditions of the classical quantifier expressions are given as follows, where ' $Q_{Det}$ ' represents the quantifier denoted by a determiner 'Det' and  $A, B$  are subsets of a domain  $D$ :

$$(Q_{every})_D(A)(B) = 1 \text{ iff } A \subseteq B$$

$$(Q_{some})_D(A)(B) = 1 \text{ iff } A \cap B \neq \emptyset$$

$$(Q_{no})_D(A)(B) = 1 \text{ iff } A \cap B = \emptyset$$

$$(Q_{not-every})_D(A)(B) = 1 \text{ iff } A - B \neq \emptyset$$

It is worth considering the way in which the meaning of a simple example composes, with reference to the ideas about classifying quantifiers described within this section. Take our example to be 'Every tree is red'. Here are some facts about the denotations and meanings of the constituents of the sentence:

- An occurrence of 'Every' denotes the global type  $\langle 1, 1 \rangle$  quantifier  $Q_{every}$ , which associates with each domain  $D$  a local type  $\langle 1, 1 \rangle$  quantifier  $(Q_{every})_D$ .
- Relative to a particular  $D$ ,  $(Q_{every})_D$  is a function from each  $A \subseteq D$  to a local type  $\langle 1 \rangle$  quantifier  $(Q_{every})_D(A)$ ; in relational terms:  $(Q_{every})_D = \{\langle A, B \rangle : A \subseteq B\}$ .

- Where ‘tree’ denotes the set  $T$ , an occurrence of the DP ‘Every tree’ denotes  $(Q_{every})_D(T)$ .  $(Q_{every})_D(T)$  is a function from each  $B \subseteq D$  to a value in  $\{1, 0\}$ ; in relational terms:  $(Q_{every})_D(T) = \{B : T \subseteq B\}$
- Where ‘is red’ denotes the set  $R$ , an occurrence of the sentence ‘Every tree is red’ denotes  $(Q_{every})_D(T)(R)$ . By the definition of  $Q_{every}$ ,  $(Q_{every})_D(T)(R) = 1$  if and only if  $T \subseteq R$ .

It should be clear that theories of generalized quantifiers build the semantic meanings of sentences that include quantifier expressions in a systematic way, assigning meanings to each part of the sentence. They furthermore provide a semantic meaning for every natural language quantifier expression, due to the uncountable number of global quantifiers they have at their disposal. Finally, the distributional parallels noted by Montague (1973) between DPs with overt determiners and expressions such as proper names provide significant motivation to treat all DPs as denoting quantifiers. For these reasons, I will take an important desideratum of this thesis to be the preservation of the view that *all DPs denote second-order relations between sets of individuals*.

### 1.1.3 Definites and Indefinites

As discussed in the introduction, there are often significant differences in the way sentences of the form ‘Det<sub>1</sub> N  $\beta$ ’ and ‘Det<sub>2</sub> N  $\beta$ ’ are naturally understood, when the only difference between the sentences is the choice of determiner. A range of properties have been used to divide determiners into two classes based on their behaviour in particular settings. One of the first properties used to divide the natural language determiners was definiteness. Due to the historical importance of this means of classification, and the utility of employing the labels ‘definite’ and ‘indefinite’ to refer to two lists of determiners, this subsection will elaborate the notion in some detail.

The notion of definiteness originated with observations related to the interpretation of the definite article ‘the’ and indefinite article ‘a(n)’. While DPs formed from both articles were traditionally analysed as singular terms used to pick out an individual, there is a difference between the two articles that is difficult to articulate. For example:

1. (a) A king is outside.  
(b) The king is outside.

While an occurrence of (1b) seems to suggest that there is a unique king, or that there is a particular king familiar to interlocutors, an occurrence of (1a) suggests no such thing. Accordingly, theorists have attempted to analyse the difference between the definite and indefinite article in terms of the properties of *uniqueness* and *familiarity*.

Russell (1905) was the first to link uniqueness to the definite article. He assigned a logical form governed by the existential quantifier to sentences with definite and indefinite articles alike. However, the logical forms of sentences featuring the definite article additionally specified that there is no individual in the restrictor’s extension distinct from the witness to the existential quantifier. Hence Russell’s truth conditions for sentences containing the definite article require its restrictor to denote a set that contains a single individual, whereas

those containing the indefinite article do not. For example, a Russellian analysis of (1a) and (1b) would be as follows:

(1a)  $\exists x(\text{King}(x) \wedge \text{Outside}(x))$

(1b)  $\exists x(\text{King}(x) \wedge [\forall y(\text{King}(y) \rightarrow x = y) \wedge \text{Outside}(x)])$

This approach faces certain problems. For instance, it is possible to use the definite article in cases where its restrictor's extension appears to contain multiple items, such as when 'A king is outside the door' is issued relative to a context where there is more than one door. The main alternative approach views familiarity as the distinctive property of the definite article. Such an approach is traced to Christophersen (1939), before being elaborated in greater detail in Heim (1982) and Heim (1983). Heim held that the use of a DP headed by the definite article requires that the DP denotes an entity that has already been referred to in the discourse, whereas the use of a DP headed by the indefinite article requires that the entity is being picked out for the first time in the discourse. For example, Heim would analyse (1a) and (1b) roughly as follows (see §(2.1.4) for a more detailed discussion of her approach):

(1a)  $\text{King}(x) \wedge \text{Outside}(x)$  (*where x is a new variable*)

(1b)  $\text{King}(x) \wedge \text{Outside}(x)$  (*where x is an old variable*)

An approach based on familiarity can handle the use of the definite article in cases where the restrictor's extension contains multiple items, since it is possible for the requirement to be fulfilled that an item in the restrictor's extension has been previously referred to within the conversation. However, new problems arise for the familiarity approach. For instance, there are cases where a definite article forms a DP that denotes something that has not been explicitly mentioned, such as when 'Yan approached a house and opened the front door' occurs relative to a context where neither the house nor the door has been previously mentioned. Some attempts have therefore been made at developing a view that invokes both uniqueness and familiarity, including Hawkins (1984) and Abbott (1999) (who attempt to derive familiarity from uniqueness), and Szabó (2000) and Roberts (2003) (who attempt to derive uniqueness from familiarity).

It is frequently thought that the property characteristic of the definite article, whatever it is, is also a property of certain other determiners. However, it is not obvious how to extend the property of uniqueness or familiarity to those DPs that have not traditionally been thought to denote an individual. Peters and Westerståhl (2006) (pp.150-1) adapt a definition of definiteness originally from Barwise and Cooper (1981) to render it applicable to any quantifier, rather than solely those denoted by DPs headed by the definite or indefinite article. This extends the notion of definiteness to DPs headed by 'the *n*' (where *n* is a cardinal), possessives, proper names and bare plurals (on their generic reading). The class of definite DPs is often extended even further, on the basis of distributional parallels between the traditionally accepted definite DPs and those headed by determiners such as 'every'. I will take the following to be the lists of generally accepted definite and indefinite DPs (where 'N' represents any NP), based on Abbott (2008) (pp.123-4):

### **Definite DPs:**

Pronouns

Demonstratives

'The N', 'The *n* N' (where '*n*' is any cardinal, e.g. 'three')

Possessives

Proper names

'Every N', 'Each N', 'All N'

Bare NPs (understood generically)

DPs formed from any Boolean combination consisting entirely of definite DPs

### **Indefinite DPs:**

'Several N', 'Few N'

'Many N'

'Some N'

'A(n) N'

'Most N'

'No N'

'*n* N'

'At least *n* N'

'At most *n* N'

Bare NPs (understood existentially)

DPs formed from any Boolean combination consisting entirely of indefinite DPs

In order to distinguish two classes of DPs in a theory-neutral manner, I shall use the terms '*definite DP*' and '*indefinite DP*' to refer to instances of DPs from each list respectively. I will also refer to the determiner that heads an (in)definite DP as an '*(in)definite determiner*'. My usage of these terms should not be taken to imply that there is some syntactic or semantic property possessed by all and only the definite or indefinite DPs. My usage also does not extend to any instances of DPs absent from this list. Finally, note that §(1.1.4) will provide motivation to move 'Most N' from the second list to the first.

#### **1.1.4 'There'-Sentences**

'There'-sentences pose a puzzle that has led to the investigation of various properties that may be used to divide the class of determiners. I shall discuss these constructions at length, since both 'there'-sentences and the divisions their consideration has motivated will be important in future sections.

An English sentence in *canonical form* has the general form 'Det N (be)  $\beta$ ', consisting of a subject DP 'Det N' followed by a verb phrase ('VP') '(be)  $\beta$ '. In contrast, '*there*-sentences' have the general form 'There be Det N ( $\beta$ )', where 'there' and an appropriate form of the

verb 'be' precede a *post-copular* DP 'Det N' and an optional *coda* ' $\beta$ ' (a VP, adjectival phrase ('AP') or prepositional phrase ('PP') external to the NP, conveying further restrictions).<sup>13</sup> I will describe a sentence with the form 'Det N (be)  $\beta$ ' as a *canonical variant* of one with the form 'There be Det N  $\beta$ ' when the lexical items that replace 'Det N' and ' $\beta$ ' are the same for each sentence. This definition permits neutrality on the issues of whether every 'there'-sentence has a canonical variant, and whether the semantic analysis of a 'there'-sentence and its canonical variant are equivalent.

'There'-sentences present a puzzle insofar as some of them sound marked when opening a discourse or presented out-of-context. For example, while (2a) – (2c) are acceptable as discourse-openers or out-of-context, (3a) – (3c) are not:

2. (a) There are three kings in the yard.  
 (b) There is some prime below twenty.  
 (c) There are no boys called 'Yan'.
3. (a) ?There is the king in the yard.  
 (b) ?There is every prime below twenty.  
 (c) ?There is Yan.

Yet no significant contrast is discernible between canonical variants:

- (2a)' Three kings are in the yard.  
 (3a)' The king is in the yard.

Furthermore, (3a) – (3c) are rendered acceptable when they are considered relative to a suitable context. Note that, here and in future sections, I will use parentheses to convey information that is assumed to be present at the context relative to which a sentence occurs, either due to its being implicit or its being explicitly issued before the target sentence:

- (3a)" (The party guests include several kings.) There is the king in the yard. There is also the king in the kitchen.  
 (3b)' (Prime numbers may be categorised according to the type of value our function maps them to.) There is every prime below twenty. Then there is every prime over twenty.  
 (3c)' (Who is available to attend to the king?) There is Yan.

Given the differences between the marked 'there'-sentences (e.g. (3a) – (3c)) and the unmarked ones (e.g. (2a) – (2c)), some have claimed that the two types of 'there'-sentence involve different syntactic constructions or semantic analyses. In order to distinguish between the two types of 'there'-sentence, I will use terminology that is intended to be neutral on the nature of the difference. I will follow common practice in the literature by referring to those 'there'-sentences that are acceptable out-of-context as '*existential* 'there'-sentences', a phrase reflecting the idea that occurrences of these sentences are naturally paraphrased

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<sup>13</sup>Peters and Westerståhl (2006), p.214-5.

by a sentence of the form ‘Det N (with property  $\beta$ ) exists relative to the model’. The most neutral term to use to refer to those ‘there’-sentences that are unacceptable out-of-context is ‘contextualised ‘there’-sentences’ (based on the terminology of Abbott (1992)).<sup>14</sup>

It turns out that the property of being an existential or contextualised ‘there’-sentence largely depends on the post-verbal DP. I will call an occurrence of a DP ‘*existentially acceptable*’ if and only if it may occur in the post-verbal position of an existential ‘there’-sentence. The definite DPs listed in the previous subsection are almost always existentially unacceptable, an observation that led Milsark (1974) to describe the incompatibility between the post-verbal position of existential ‘there’-sentences and certain DPs as a ‘*definiteness restriction*’. However, Milsark perceived there to be several problems with characterising existential unacceptability solely in terms of a definiteness restriction. Firstly, such an approach would be deficient in explanatory adequacy, unless it included an explanation of the reason that the property of definiteness is the one that correctly characterises the precluded class of DPs. Secondly, Milsark found the very notion of definiteness to be problematic, due to disagreement in the literature about exactly which DPs are definite and how to characterise the property (as discussed in §(1.1.3)). Finally, Milsark noted that the correspondence between indefiniteness and existential acceptability is imperfect, since ‘most N’ is generally treated as an indefinite DP, but occurrences of it are nevertheless existentially unacceptable.<sup>15</sup> Hence it is clear from Milsark’s observations that dividing DPs on the basis of their definiteness does not serve to informatively identify the existentially acceptable and unacceptable occurrences of DPs.

### Summary of §(1.1)

After giving an overview of the analysis of quantifiers and quantifier expressions, I endorsed the approach advanced by contemporary theories of generalized quantifiers, where all determiners denote second-order relations between sets of individuals. Upholding this approach will be an important desideratum of subsequent chapters. I then observed that a number of properties may be used to divide natural language determiners into two classes based on their behaviour in particular settings. One such division isolates a class of definite DPs from a class of indefinite DPs. However, the historical disagreement about the property underlying this division, in combination with Milsark’s skepticism about the potential for any property of definiteness to illuminate the behaviour of different DPs in ‘there’-sentences, raises doubts about the theoretical utility of a division between definite and indefinite DPs. Nevertheless, I shall continue to use the terms ‘definite’ and ‘indefinite’ as convenient labels to pick out the classes of DPs given in the lists in §(1.1.3); though I shall move DPs headed by ‘most’ to the list of *definite* DPs, due to Milsark’s observation that such DPs pattern with the others on my list of definite DPs with respect to existential acceptability. Finally, this section introduced the problem posed by ‘there’-sentences, whereby only certain ‘existentially acceptable’ occurrences of DPs are felicitous in the post-verbal position of existential ‘there’-sentences. There is a vast literature on ‘there’-sentences, which has clarified many important properties of DPs, determiners and quantifiers; the following section will therefore be devoted to this topic.

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<sup>14</sup>Abbott’s own term, ‘contextualised *existentials*’, would seem to assume that such sentences *do* involve the same construction as existential ‘there’-sentences.

<sup>15</sup>Peters and Westerståhl (2006), p.225.

## 1.2 Analyses of ‘There’-Sentences

The purpose of this section is two-fold: firstly, to attain some sense of how ‘there’-sentences should be analysed, in preparation for their appearance in several subsequent chapters. A second purpose is to consider some of the properties that have emerged in the literature on ‘there’-sentences as a means to distinguish between definite and indefinite determiners. As discussed in the previous subsection, ‘there’-sentences are structures that are acceptable out-of-context with certain post-verbal DPs, whilst requiring a special context with others. Traditional analyses of ‘there’-sentences attribute to them a syntax and semantics that permits both the identification of the class of existentially acceptable occurrences of DPs and an explanation of the property underlying existential acceptability (e.g. Milsark (1974)). However, some more recent approaches attempt to address the syntax and semantics of ‘there’-sentences without predicting or explaining which post-verbal DPs are acceptable (e.g. Francez (2009)). Other approaches attempt to characterise the property underlying existential acceptability without committing to any particular syntactic or semantic analysis of ‘there’-sentences (e.g. Beaver et al. (2005)). Hence it is difficult to categorise accounts on the grounds of either their analysis of ‘there’-sentences or their analysis of existential acceptability. Furthermore, the number of accounts that have been proposed over the years renders an exhaustive literature review impractical relative to current purposes.

I will therefore provide a detailed overview of only those accounts of ‘there’-sentences that include a semantic analysis of ‘there’-sentences, and are furthermore able to withstand a number of criticisms. I will begin by providing quick arguments against those accounts that I deem insufficiently promising to discuss in detail (§(1.2.1)). I will then discuss two views that argue for an incompatibility between the semantics of existential ‘there’-sentences and some property of existentially unacceptable occurrences of DPs: Barwise & Cooper’s (1981) view that existentially acceptable DPs are *weak* (§(1.2.2)), and Keenan’s (2003) view that existentially acceptable DPs are *intersective* (§(1.2.3)). Finally, I will describe a view that gives a detailed semantic analysis of ‘there’-sentences but refrains from identifying the existentially acceptable occurrences of DPs: Francez’s (2009, 2010) view that codas are *sentential modifiers* (§(1.2.4)).

I will assume that those accounts that attempt to identify the existentially acceptable DPs should attain *descriptive* and *explanatory* adequacy in this task, insofar as they should successfully characterise the class consisting of all and only the existentially acceptable occurrences of DPs and should furthermore explain why membership of this class corresponds to acceptability in the post-verbal position. I will conclude that the semantic analyses of ‘there’-sentences given by Keenan (2003) and Francez (2009) seem equally promising, but neither account includes an adequate identification of the class of existentially acceptable occurrences of DPs. A pragmatic account of existential acceptability appears to be necessary to capture the role of contextual factors in the felicity of ‘there’-sentences with definite post-verbal DPs; however, no extant pragmatic accounts assign a semantics to ‘there’-sentences compatible with the treatment of DPs as denoting generalized quantifiers.

### 1.2.1 Overview of Some Accounts

This subsection provides brief overviews of and objections to the accounts proposed by Milsark (1974, 1977), Prince (1981, 1988), Abbott (1992, 1993), Zucchi (1995), Ward and Birner

(1995), McNally (1997) and Beaver et al. (2005). A discussion of these accounts additionally brings to light the importance of contextual factors in explaining existential acceptability.

Milsark (1974, 1977) claims that the semantics of 'there'-sentences differs from that of their canonical variants with respect to a requirement that the determiner specify a cardinality. He thinks that only some occurrences of determiners specify a cardinality, and these cardinal occurrences of 'determiners' function as predicates rather than quantifier expressions.<sup>16</sup> An occurrence of a DP is existentially acceptable if and only if its 'determiner' is cardinal. While Milsark gave the first extensive analysis of 'there'-sentences, a certain feature of his analysis is fundamentally incompatible with the approach to DPs advanced in this section: he assigns existentially unacceptable occurrences of DPs a non-quantificational analysis. Given my arguments pertaining to the desirability of upholding the view that *all* DPs denote quantifiers, this is sufficient to exclude Milsark's analysis of 'there'-sentences from current consideration.

Zucchi (1995) isolates a class of presuppositional DPs, which are defined only relative to contextually restricted domains that entail the non-emptiness of their restrictors. He then associates 'there'-sentences with a felicity condition that precludes them from being asserted when their post-verbal DP is presuppositional, allowing him to claim that an occurrence of a DP is existentially acceptable if and only if it is non-presuppositional. Zucchi's account may be set aside due to a number of powerful objections offered in Keenan (2003). In addition to questioning the descriptive adequacy of Zucchi's approach, Keenan criticises its explanatory adequacy; for example, he observes that Zucchi provides no clear criteria for recognising a presuppositional DP, or for establishing when the felicity condition for a presuppositional DP holds.

McNally (1997) assigns a semantics to 'there'-sentences that requires post-verbal DPs to denote a property, which she construes as a nominalized function (a special kind of individual). McNally's identification of the class of existentially acceptable occurrences of DPs involves two independent components. Firstly, she claims that irreducibly quantificational DPs (e.g. 'every N', 'most N', etc.) cannot be interpreted as nominalized functions, which predicts occurrences of them to be existentially unacceptable for semantic reasons. While she thinks that the remaining definite DPs (e.g. 'the N', proper names, etc.) may be interpreted as denoting nominalized functions, she attributes felicity conditions to such DPs that are incompatible with felicity conditions that she assigns to 'there'-sentences, rendering occurrences of such DPs existentially unacceptable for pragmatic reasons. Given that her account crucially depends on the view that existentially acceptable occurrences of DPs, proper names and 'the'-headed DPs denote individuals, this approach is clearly incompatible with theories of generalized quantifiers.

Abbott (1992, 1993) claims that the function of 'there'-sentences is to draw the hearer's attention to the existence, absence or location of the denotation of the DP, which she takes to be an individual or individuals. She therefore claims that it is pragmatically infelicitous to issue 'there'-sentences where the occurrence of the post-verbal DP presupposes the existence of its referent, unless the context is one where a cooperative speaker would draw attention to individuals that were already assumed to exist. Such contexts typically involve requests for individuals to fulfill a certain role, since using a 'there'-sentence to draw attention to individuals that are already assumed to exist then becomes an indirect, polite

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<sup>16</sup>Milsark (1977), p.201.

way to suggest the suitability of that individual for the relevant role.<sup>17</sup> Hence an occurrence of a DP is existentially acceptable if and only if it does not presuppose the existence of its referent, though existentially unacceptable occurrences of DPs may felicitously occur in contextualised 'there'-sentences. Several other accounts follow Abbott in claiming that 'there'-sentences present items associated with the post-verbal DP as new, including Prince (1981), Prince (1988) and Ward and Birner (1995). The trouble with all such accounts is that they require a DP to denote an individual or set of individuals, rendering them incompatible with my commitment to theories of generalized quantifiers.

Nevertheless, Abbott's account of 'there'-sentences was the first to explore and explain the kind of contextualisation required to render contextualised 'there'-sentences felicitous (namely, requests for individuals to fulfill a particular role). Her account also involves the crucial insight that the existential acceptability of an occurrence of a DP cannot be entirely reduced to lexical properties of its determiner. She observes that, while occurrences of DPs headed by definite determiners generally presuppose the existence of their referents, some occurrences of DPs headed by definite determiners do not appear to presuppose their referents, which predicts their felicity in *existential* 'there'-sentences. For example, 'cataphoric definites' that contain sufficient descriptive content to uniquely identify their referents (e.g. 'There are those who would claim that definites are impossible in existentials') and 'exclamatory superlatives' (e.g. 'There is the most charming king in the garden') involve determiners that normally yield existentially unacceptable occurrences of DPs (e.g. 'the', 'the most'), but appear not to presuppose the existence of their referents and are accordingly existentially acceptable. As argued by Ward and Birner (1995) (p.723), 'the wide range of definite postverbal [DPs] that occur in *there*-sentences and the sensitivity of those [DPs] to contextual constraints argue for a pragmatic account of the phenomenon'. That is, a descriptively and explanatorily adequate identification of existentially acceptable occurrences of DPs must display at least a degree of sensitivity to pragmatic factors.

Finally, Beaver et al. (2005) propose that speakers use unmarked constructions when the DP in question is a prototypical grammatical subject, whereas speakers resort to the use of marked constructions when 'the unmarked option of realizing [DPs] as subjects in copular constructions is for some reason unavailable'.<sup>18</sup> It follows that a prototypical subject DP will normally occur in canonical constructions, whereas a non-prototypical subject DP will normally occur in marked constructions such as 'there'-sentences, with a hearer's use of a particular DP in the atypical construction's generating some sense of infelicity. An occurrence of a DP is then existentially acceptable to the degree that it is a non-prototypical subject. While the authors take the determiner that heads a DP to be an important factor in establishing its prototypical subjecthood, they think that a range of additional pragmatic factors affect the likely subjecthood of an occurrence of a DP, such as topicality and animacy. The fact that Beaver et al. (2005) propose an explanation of existential acceptability without providing a syntactic or semantic analysis of 'there'-sentences renders their account unsuitable for current purposes. Furthermore, the explanatory adequacy of their proposal may be questioned. That is, Beaver et al. (2005) give no explanation for why prototypical subjecthood should depend on properties such as animacy or topicality. They also do not elaborate the circumstances that license the inclusion of a definite post-verbal DP in a contextualised

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<sup>17</sup>Abbott (1992), p.10.

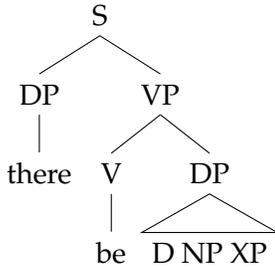
<sup>18</sup>Beaver et al. (2005), p.21.

‘there’-sentence. Nevertheless, their observations provide further evidence in favour of a pragmatic explanation of existential acceptability over an account that reduces existential acceptability to a lexically encoded property of determiners.

In sum, none of these briefly considered accounts provide a semantic analysis of ‘there’-sentences that is compatible with theories of generalized quantifiers, whilst simultaneously providing a descriptively and explanatorily adequate account of existential acceptability. Nevertheless, good evidence has emerged that a descriptively and explanatorily adequate identification of existentially acceptable occurrences of DPs must display some sensitivity to pragmatic factors.

### 1.2.2 Barwise and Cooper (1981)

Barwise and Cooper (1981) treat all post-verbal material in ‘there’-sentences as internal modifiers of the determiner’s NP argument, therefore denying that ‘there’-sentences ever have codas (according to my usage of the term). They assign them the following syntactic structure:



This syntactic structure is motivated by the semantics they assign to ‘there’-sentences. Note that ‘ $[[\alpha]]$ ’ is used for the semantic interpretation of  $\alpha$ . I will often use the subscript ‘ $c$ ’ to represent a context, which I take to establish a model  $M$  with a domain  $D$ :

$$[[\text{There be Det N } \beta]]_c = 1 \text{ iff } [[\text{Det}]]_c([[N]]_c \cap [[\beta]]_c)(D) = 1.$$

Given that the second argument of the post-verbal DP’s denotation is invariably treated as the domain of the model, it follows that post-verbal material may only contribute to the quantifier’s first argument, which is the reason for its inclusion in the restrictor at the syntactic level.

Barwise and Cooper (1981) identify the existentially acceptable occurrences of DPs as those that denote *weak* quantifiers, giving the following definitions:

**Definition of Positive Strong Quantifier:**  $Q$  is *positive strong* iff, for any domain  $D$  and any  $A \subseteq D$  (including when  $A = \emptyset$ ) for which  $Q_D(A)$  is defined,  $A \in Q_D(A)$ .

**Definition of Negative Strong Quantifier:**  $Q$  is *negative strong* iff, for any domain  $D$  and any  $A \subseteq D$  (again, including  $\emptyset$ ) for which  $Q_D(A)$  is defined,  $A \notin Q_D(A)$ .

Note the crucial role of the functional perspective on quantifiers in these definitions, which rely on the potential for a type  $\langle 1, 1 \rangle$  quantifier to be undefined with respect to some set. We then say that  $Q$  is *strong* if and only if it is either positive strong or negative strong, and it is

*weak* if and only if it is not strong. We may also describe occurrences of quantifier *expressions* as ‘strong’ or ‘weak’, depending on the status of the quantifier that they denote.

Barwise & Cooper’s semantics cause ‘there’-sentences with strong determiners to express trivial claims, which they use to explain the existential unacceptability of strong DPs. That is, when the post-verbal determiner is positive strong, a tautology will result regardless of the NP it applies to and the features of the model, and when the post-verbal determiner is negative strong, a contradiction will result.<sup>19</sup> In contrast, when the post-verbal determiner is weak, the value of the sentence will depend on the interpretation of the NP.<sup>20</sup> Their explanation of the ban on strong post-verbal DPs in existential ‘there’-sentences is that issuing such sentences would violate a Gricean maxim, ‘be informative’. It is only in the case of weak determiners that existential ‘there’-sentences express contingent, and hence informative, claims. The potential for contextualised ‘there’-sentences is explained by the idea that, relative to special contexts, asserting a trivial proposition may be used to ‘implicate’ something informative, such as the availability of some items for a particular role.

A foundational objection to Barwise and Cooper (1981) concerns the syntactic form they assign to ‘there’-sentences. It has been widely argued (e.g. by Milsark (1974), Abbott (1993), Francez (2009)) that many ‘there’-sentences have codas that cannot plausibly be treated as NP-internal material. For example, Abbott (1993) observes that the material occurring after the post-verbal determiner in the sentence ‘There is a girl who knows you interested in this problem’ cannot be construed as a single complex NP, on the grounds that it cannot occur as part of a subject DP (e.g. ?‘A girl who knows you interested in this problem is in the yard’). However, their semantics crucially depend on the syntactic form they postulate, since it is unclear how material that is NP-external at the syntactic level could contribute solely to the interpretation of the NP at the semantic level.

Barwise & Cooper’s proposal has also been heavily criticised by Keenan, firstly due to deficiencies in descriptive adequacy. Keenan (1987) pointed out that determiners that denote *trivial quantifiers*, which are those quantifiers that either relate every pair of subsets of a domain or no pair of subsets of a domain, pose counter-examples to their proposal. That is, determiners such as ‘at least zero’ and ‘either zero or else more than zero’ (i.e. those that are trivial because they require the intersection between the sets denoted by the restrictor and the nuclear scope to be empty-or-non-empty) are positive strong, yet yield existentially acceptable occurrences of DPs. Determiners of the form ‘fewer than zero’ (i.e. those that are trivial due to requiring the intersection between the sets denoted by the restrictor and the nuclear scope to have a negative cardinality) are negative strong and yield existentially acceptable occurrences of DPs.<sup>21</sup>

<sup>19</sup>To see this, note that  $\llbracket N \rrbracket_D$  is always a live-on set for  $(Q_{Det})_D(\llbracket N \rrbracket_D)$  (see §(2.2.1) for a definition of ‘live-on’ sets). It follows that  $D \in (Q_{Det})_D(\llbracket N \rrbracket_D)$  iff  $D \cap \llbracket N \rrbracket_D \in (Q_{Det})_D(\llbracket N \rrbracket_D)$ , iff  $\llbracket N \rrbracket_D \in (Q_{Det})_D(\llbracket N \rrbracket_D)$  (given that  $\llbracket N \rrbracket_D \subseteq D$ ). But this latter condition *always* holds when  $Q_{Det}$  is positive strong, and it *never* holds when  $Q_{Det}$  is negative strong.

<sup>20</sup>For example, compare ‘Every king is a member of the domain’ (true in every model, since ‘every’ is positive strong), ‘Neither king is a member of the domain’ (false in every model (where it is defined), since ‘neither’ is negative strong) and ‘Many kings are members of the domain’ (true in a model iff the number of kings surpasses the threshold to count as ‘many’, since ‘many’ is weak).

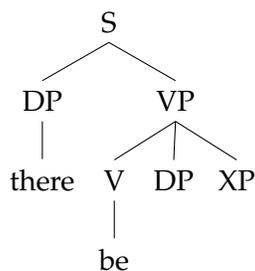
<sup>21</sup>For example,  $(Q_{at-least-zero})_D(A)$  is plausibly defined for every  $A \subseteq D$ , and  $(Q_{at-least-zero})_D(A)(A) = 1$  whether  $A$  is non-empty or empty; therefore ‘at least zero’ is positive strong. Yet occurrences of DPs that denote this quantifier are existentially acceptable, as illustrated by the acceptability (if pragmatic bizarreness) of an occurrence of the sentence ‘there are at least zero kings in the yard’ relative to a context where the speaker does

Keenan (1987) also objected to Barwise & Cooper's definition of strength on methodological grounds. He claims that their construal of quantifiers as partial functions creates a problem of having to decide in a principled way how to distinguish cases where determiners' denotations fail to have sets in their domain from cases where they assign sets a trivial value such as the empty set. However, Barwise & Cooper fail to describe a principled way for making this decision. This is troublesome firstly because it is difficult to classify the strength of those determiners that Barwise & Cooper refrained from explicitly classifying. Secondly, the risk emerges that a determiner will be classified according to strength on the basis of an ad hoc decision regarding the sets on which it is defined, in order to cause its classification to accord with its behaviour with respect to existential 'there'-sentences. This concern about unprincipled classification is most evident with respect to the determiners 'no', 'some', 'a' and 'at least one': were their denotations to be deemed undefined with respect to the empty set, then they would come out as strong. Keenan (1987) (p.158) observed that we rarely consider the value of occurrences of sentences with known empty restrictors, which means that 'the crucial decision in classifying determiners like *no* and *some* as weak requires judgements on the denotation of [DPs] precisely under conditions in which we would not normally use the [DP]'.

Keenan also criticises the explanatory adequacy of Barwise and Cooper (1981), claiming that trivial truth cannot explain the absence of an existential understanding of a 'there'-sentence in all cases: for although the sentences 'There are either zero or else more than zero kings in the garden' and 'There is every king in the garden' are both (arguably) trivially true, the former is nonetheless interpretable as an existential 'there'-sentence. Given that Barwise & Cooper's analysis of 'there'-sentences displays deficiencies with respect to syntactic form, methodology, descriptive adequacy and explanatory adequacy, there is little extant support for their approach. Nevertheless, Barwise & Cooper were the first to provide an analysis of 'there'-sentences compatible with theories of generalized quantifiers, in addition to defining the important property of quantifier strength.

### 1.2.3 Keenan (2003)

Keenan assigns 'there'-sentences the following syntactic structure:



His semantics are then as follows:

$$\llbracket \text{There be Det N } \beta \rrbracket_c = 1 \text{ iff } \llbracket \text{Det} \rrbracket_c(\llbracket \text{N} \rrbracket_c)(\llbracket \beta \rrbracket_c).$$

For 'there'-sentences without a coda, the second argument of the denotation of the post-verbal determiner is just the domain of the model.

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not know whether or not there are any kings in the yard.

While Keenan (1987) made use of a formal definition of Milsark’s property of cardinality in order to identify the class of existentially acceptable DPs, Keenan (2003) instead employs the property of *intersectivity*, proving that the cardinal DPs are a proper subset of the intersective ones.<sup>22</sup> Keenan’s updated account thus invokes the following property:

**Definition of Intersective Quantifier:** A type  $\langle 1, 1 \rangle$  quantifier  $Q$  is *intersective* iff, for all  $D$  and all  $A, B \subseteq D$ ,  $Q_D(A)(B)$  iff  $Q_D(A \cap B)(B)$ .

Keenan (2003) then defines the class of existentially acceptable occurrences of DPs as the class of occurrences of Boolean compounds of DPs built from the class of Boolean compounds of lexical intersective determiners (along with specified numerals, such as ‘more than six’), where a *lexical intersective determiner* is one listed in the lexicon that denotes an intersective quantifier.<sup>23</sup> Keenan’s explanation of the reason that intersectivity dictates existential acceptability derives from adapting a view advanced in Zucchi (1995): that the coda provides the domain for the interpretation of ‘there’-sentences. Keenan takes this *coda condition* to mean that individuals outside the extension of the coda material are irrelevant to the truth value of the sentence. Keenan then proves that the coda condition cannot be satisfied by a non-intersective determiner. This is the case because intersectivity means that it is only the part of the first argument that is included in the second argument that determines whether the quantifier’s relation holds. Hence a quantifier is unaffected by the addition of new individuals to its first argument that fail to be members of its second argument if and only if it is intersective. For example, the truth value of an occurrence of a sentence of the form ‘There be Det kings in the yard’ is affected by extending  $D$  to include kings that are not in the yard if and only if ‘Det’ is non-intersective. Keenan then attributes the ban on non-intersective DPs in post-verbal position to the idea that the coda condition has been *grammaticized*, by which he means that it has been encoded in the rules of English grammar.

It is worth explicitly pointing out that the interpretation Keenan assigns to existential ‘there’-sentences is semantically equivalent to the one given by Barwise and Cooper (1981) whenever the DP is both intersective and conservative.<sup>24</sup> That is, for quantifiers denoted by all such DPs, it holds that  $(Q_{Det})_D(A)(B) = 1$  iff  $(Q_{Det})_D(A \cap B)(D) = 1$ . It is frequently claimed that all natural language determiners denote conservative quantifiers, in which case Keenan’s semantics would assign the same interpretations as those assigned by Barwise & Cooper. However, Keenan (2003) argues that ‘only’, ‘just’ and ‘mostly’ are non-conservative determiners that yield existentially acceptable occurrences of DPs. If he is correct, then the two sets of truth conditions diverge with respect to ‘there’-sentences that include such determiners. On the other hand, Peters and Westerståhl (2006) (pp.219-20) argue that ‘only’

<sup>22</sup>Note that Keenan (2003) refers to the property normally called ‘intersectivity’ as ‘conservativity on the second argument’ (which he uses to characterise existential acceptability), before referring to the property of being conservative on both arguments as ‘intersectivity’. I have deviated from his terminology in order to uphold the usual names.

<sup>23</sup>He refrains from directly defining the set of intersective determiners as those determiners that denote intersective quantifiers on the grounds that determiners such as ‘either all or not all’ denote intersective quantifiers but fail to form existentially acceptable occurrences of DPs; his more convoluted definition correctly classifies ‘either all or not all’ as a non-member of the class of determiners that form existentially acceptable occurrences of DPs on the grounds that it fails to be a Boolean compound of lexical intersective determiners.

<sup>24</sup>A type  $\langle 1, 1 \rangle$  quantifier  $Q$  is *conservative* iff, for all  $D$  and all  $A, B \subseteq D$ ,  $Q_D(A)(B)$  iff  $Q_D(A)(A \cap B)$ . An occurrence of a DP is conservative iff it is headed by a determiner that denotes a conservative quantifier.

and ‘just’ function more like modifiers than determiners, and that ‘mostly’ is best classified as a quantificational adverb. It is beyond the scope of current concerns to explore whether there are non-conservative, intersective determiners that form existentially acceptable DPs.

The descriptive adequacy of Keenan’s account has been questioned with respect to the determiners ‘many’ and ‘few’, which are often thought to allow both an intersective understanding and a non-intersective one. For the intersective understanding, it is asserted that the cardinality of the intersection of the extensions of the restrictor and nuclear scope is greater (for ‘many’) or smaller (for ‘few’) than some contextually determined  $n$ . For the non-intersective understanding, it is asserted that the cardinality of the intersection of the extensions of the restrictor and nuclear scope is greater (for ‘many’) or smaller (for ‘few’) than some  $n$  *contextually determined in proportion to the cardinality of the quantifier’s first argument*; thus on this reading, switching the quantifier’s arguments may alter the truth value. The trouble is that Keenan’s analysis predicts that only the intersective readings of ‘many’ and ‘few’ are existentially acceptable. Peters and Westerståhl (2006) claim that sentences of the form ‘There be many<sub>non-int</sub> N  $\beta$ ’ are in fact acceptable, as evidenced by the possibility of understanding the sentence ‘There are many<sub>non-int</sub> kings who are Europeans’ as true at the same time as understanding ‘There are many<sub>non-int</sub> Europeans who are kings’ as false.

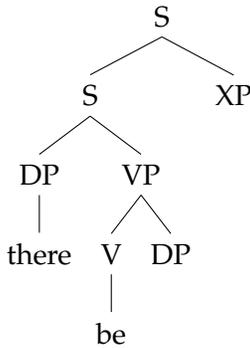
Keenan (1987) explicitly discusses this problem regarding ‘many’ and ‘few’, though he construes it in terms of their having a *non-transparent* reading (i.e. one where replacing one of the determiner’s arguments with a co-extensional expression is not guaranteed to preserve the extension of the occurrence of the sentence). Keenan acknowledges that ‘many’ and ‘few’ (along with other non-transparent determiners such as ‘a surprisingly high number of’) form existentially acceptable occurrences of DPs, and that his analysis does not predict this. His suggested solution is to analyse these determiners as involving a transparent intersective determiner together with some non-transparent value judgement claim, before extending the definitions so that a basic determiner counts as intersective if and only if its transparent part is intersective.

The explanatory adequacy of Keenan’s proposal may be questioned on the grounds that he fails to explain the potential for contextualised ‘there’-sentences, explicitly excluding them from consideration in both Keenan (1987) and Keenan (2003). Nevertheless, his account is seemingly compatible with attributing the potential for contextualised ‘there’-sentences either to the non-equivalence of the syntactic structures underlying existential and contextualised ‘there’-sentences, or to some contextually mediated pragmatic re-analysis of a syntactically ill-formed ‘there’-sentence.

It is therefore clear that the descriptive and explanatory adequacy of Keenan’s (2003) account is able to withstand common objections.

#### 1.2.4 Francez (2009, 2010)

The syntactic form attributed to ‘there’-sentences by Francez (2009) and Francez (2010) diverge from that of all accounts previously discussed, since ‘there’-sentences are assigned a syntactic structure where codas are sentential modifiers:



Francez assigns coda-less ‘there’-sentences semantics that may be presented in the following simplified form, where  $\lambda$ -operators indicate the requirement for appropriately typed items to replace the variables they bind:

$$\llbracket \text{There be Det N} \rrbracket_c = \lambda R_{\langle e,t \rangle} \cdot [\llbracket \text{Det} \rrbracket_c(\llbracket \text{N} \rrbracket_c)(R)].$$

Francez (2009) (p.9) thus claims that the argument of a post-verbal DP (represented by ‘R’) is implicit, in the sense of being an argument ‘whose presence is required semantically, but which is not contributed by anything in the surface structure’. For coda-less ‘there’-sentences, Francez (2010) takes the context to supply a value for the argument of the post-verbal DP. Crucially, Francez’s analysis of codas as sentential modifiers allows him to claim that the argument of the post-verbal DP is contributed by the coda when present, by means of the coda’s modification of the context.

Francez’s semantics for coda-less ‘there’-sentences are truth-conditionally distinct from those that take the model’s domain  $D$  as the second argument of the denotation of the determiner (e.g. Barwise & Cooper, Zucchi, Keenan). Francez (2010) argues against such approaches by observing that coda-less ‘there’-sentences are frequently understood with respect to some contextually determined proper subset of  $D$ . For example, occurrences of ‘There is no coffee’ are normally not understood as asserting that the model’s domain includes no such thing as coffee. However, as Francez notes, it is possible for those who assign a semantics to coda-less ‘there’-sentences whereby the quantifier’s second argument is  $D$  to propose that ordinary contextual domain restriction (see §(3.1)) occurs with respect to the quantifier’s first argument. The two sets of semantics would then be truth-conditionally equivalent with respect to DPs headed by intersective determiners, since (where  $R$  is a contextually supplied set)  $\llbracket \text{Det} \rrbracket_D(\llbracket \text{N} \rrbracket_c \cap R)(D) = \llbracket \text{Det} \rrbracket_D(\llbracket \text{N} \rrbracket_c)(R)$  in such circumstances. However, with respect to non-intersective determiners, the two sets of semantics issue different predictions. Francez therefore attempts to identify the natural readings of coda-less ‘there’-sentences with non-intersective determiners, concluding that they accord with the predictions of his semantics. Still, the complications surrounding the analysis of post-verbal DPs headed by non-intersective determiners makes it plausible to argue that sentences where the two semantic accounts issue divergent truth conditions are unsuitable for deciding between the two sets of semantics. Furthermore, it is a central claim of this thesis that the way in which an occurrence of a sentence is understood need not reveal its semantic meaning (see the weak verification principle in §(2.2.4)).

With respect to ‘there’-sentences with codas, Francez’s semantics are truth-conditionally equivalent to Keenan’s, since Francez takes the coda to supply the second argument via con-

textual modification. In order to provide evidence in favour of his own semantics, Francez exploits the fact that Keenan predicts the semantic equivalence of a 'there'-sentence and its canonical variant. Given that Francez treats an XP as a sentential modifier when it occurs as a coda and as an ordinary predicate when it occurs in a canonical sentence, he is able to attribute putative differences in interpretation to these differing roles. For instance, Francez (2009) (p.39) claims that free relatives are understood differently in 'there'-sentences and their canonical variants: 'There is a zoo where I come from' is naturally understood as stating that my place of origin features a zoo, while 'A zoo is where I come from' states that my place of origin is a zoo. Whilst Francez provides good evidence that 'there'-sentences and their canonical variants may be understood differently, it is possible to deny that such differences are semantic in source. Furthermore, Francez's explanations for the interpretive differences between XPs that occur as ordinary predicates and as sentential modifiers are often highly tentative and speculative.

Regarding the identification of the class of existentially acceptable occurrences of DPs, and an explanation of existential acceptability, Francez (2009) (p.26) argues that such matters are 'orthogonal to the question of the truth-conditional content and the compositional makeup of existential propositions'. He therefore refrains from providing any such identification or explanation. Unlike the other accounts discussed, it is therefore not possible to criticise Francez's proposal on the basis of his comments about existentially acceptable DPs.

It has been seen that Francez's semantics are virtually equivalent to Keenan's. That is, they are truth-conditionally equivalent with respect to 'there'-sentences with codas and for coda-less 'there'-sentences with post-verbal DPs headed by intersective determiners. I claimed that the success of Francez's arguments for accepting his own semantics over Keenan's remains an open question. Both accounts therefore appear to attribute *prima facie* plausible syntax and semantics to 'there'-sentences, in addition to preserving the analysis of DPs as generalized quantifiers.

## Summary of §(1.2)

In this section, I considered the major accounts of 'there'-sentences. These included: approaches that argue for an incompatibility between the semantics of existential 'there'-sentences and some property of existentially unacceptable occurrences of DPs (Milsark (1974), Barwise and Cooper (1981), Zucchi (1995) and Keenan (2003)), approaches that assign a semantic analysis to 'there'-sentences but treat some pragmatic factor as integral to a full identification of the class of existentially acceptable occurrences of DPs (Abbott (1992) and McNally (1997)), an approach that refrains from assigning a semantic analysis to 'there'-sentences but postulates an incompatibility between a non-construction specific property of 'there'-sentences and a property of existentially acceptable occurrences of DPs (Beaver et al. (2005)), and an approach that gives a detailed semantic analysis of 'there'-sentences but refrains from identifying the class of existentially acceptable occurrences of DPs (Francez (2009)). I argued that the most promising semantic analyses are the ones proposed by Keenan and by Francez, which predict identical truth-conditions for the majority of 'there'-sentences. While Francez refrains from identifying the class of existentially acceptable occurrences of DPs, Keenan's attempt to do so exhibits notable descriptive adequacy. However, Keenan's analysis may be argued to lack explanatory adequacy, due to his failure to consider the circumstances in which DPs that denote non-intersective quantifiers may occur in existential

'there'-sentences, and his neglect of the type of contextualisation required to render contextualised 'there'-sentences felicitous. Indeed, I also argued that there are compelling reasons to identify the class of existentially acceptable occurrences of DPs on the basis of pragmatic features rather than purely lexical properties. However, none of the pragmatic explanations of existential acceptability considered succeed in invoking a clearly-defined property that permits a sufficiently informative explanation of existential acceptability within a theory that analyses DPs as denoting quantifiers.

## Chapter Summary

The aim of this section has been to provide some background information on quantifiers and some of their properties. The problem posed by 'there'-sentences has been discussed at length, since it brings to light a number of quantifier properties that correlate to some extent with the existential acceptability of occurrences of DPs. Another reason to focus on 'there'-sentences is that they will be important in future chapters, in particular §(4).

I began this section by endorsing the functional notion of quantifiers proposed by recent theories of generalized quantifiers, before identifying an important distinction between the DPs headed by a list of 'definite' determiners and those headed by a list of 'indefinite' determiners. I described the problem posed by 'there'-sentences, where certain DPs may occur in existential 'there'-sentences (the existentially acceptable ones) whereas others may only occur in contextualised 'there'-sentences (the existentially unacceptable ones). I then explored the many attempts in the literature at providing a descriptively and explanatorily adequate analysis of 'there'-sentences. I concluded that the best analysis of 'there'-sentences should pair the semantics given by Keenan or Francez with an identification of the class of existentially acceptable occurrences of DPs that is sensitive to pragmatic factors. Developing an account of 'there'-sentences is not an aim of this thesis; however, a generalisation pertaining to a link between information storage and the circumstances in which definite post-verbal DPs are licensed will be sketched in §(4.4.2).

## Chapter 2

# Topics and File Cards

The aim of this chapter is to provide a general overview of the diverse literature on *information structure*, the way in which information is ‘packaged’ in occurrences of sentences. A central claim of this thesis is that the way in which occurrences of DPs are understood is frequently illuminated by attending to information structure. The emphasis will be on the notion of a *sentence topic*, since it is this aspect of information structure that will be of primary importance in later chapters.

In §(2.1), the aim is to clarify how to define and model the topic of an occurrence of a sentence. I will define a ‘topic’ as the indicator of the item that an occurrence of a sentence is about, and incorporate into the common ground file cards representing these aboutness items. §(2.2) aims to establish the aboutness items that the file cards associated with topical DPs should represent. I will conclude that DPs’ aboutness items are arbitrary minimal witness sets of their extensions. §(2.3) then considers the practicalities of identifying the topic of an occurrence of a sentence.

### 2.1 Defining Topics

I shall begin by giving a general overview of information structure (§(2.1.1)). I will then define a ‘topic’ as the indicator of the item that an occurrence of a sentence is about, which will be modelled by incorporating into the common ground file cards representing these aboutness items (§(2.1.2)). A pressing matter to be tackled is which types of lexical items may occur as sentence topics, and I shall conclude that irreducibly quantificational DPs are permissible topics (§(2.1.3)). I then consider the systems of file cards proposed by Heim (1982, 1983) and Erteschik-Shir (1997, 1999, 2007), before observing deficiencies in both approaches and identifying three desiderata for an adequate system of file cards (§(2.1.4)).

#### 2.1.1 Information Structure Overview

In this subsection, I will introduce the notion of information structure, along with the dichotomies of topic-comment, background-focus and theme-rheme that are commonly discussed in work on information structure.

*Information structure* (IS) is a term that originates with Halliday (1967), though similar ideas may be found in the ‘information packaging’ of Chafe (1976) and the ‘functional sen-

tence perspective' of the Prague school (e.g. Sgall et al. (1986)). The most precise characterisation of IS is employed in Chafe (1976), where it is defined as follows:

**Information Structure (IS) definition:** A system of categorising aspects of the occurrence of a sentence in order to analyse the *packaging of information* in light of the *immediate communicative needs, goals and interests of interlocutors*.

Given that IS is defined relative to interlocutors' communicative needs, a background theory of communication must be described in order to clarify this definition. I shall assume that communication may be modelled in terms of the *common ground* ('CG') developed in Stalnaker (1978), which is defined as a set of propositions (and those sets that may be constructed from propositions) associated with a conversation at a given time, consisting of the information mutually accepted by all interlocutors for the purposes of that conversation. CGs are primarily altered by *assertions*, as the proffered content of an assertion is analysed as a proposed change in the propositions contained in the CG, and an unchallenged assertion will update the CG in the proposed manner. *Presuppositions* are then analysed as requirements for the input CG, and a second means of altering the CG is via the *accommodation of presuppositions*. That is, if an occurrence of a sentence triggers a presupposition that the input CG fails to meet, the CG may be subsequently updated to reflect the requirements imposed upon the input CG, provided the requirements are suitably uncontroversial. For example, an occurrence of 'Zaid knows that every king is bald' asserts that Zaid knows that every king is bald, adding this information to the CG if unchallenged; yet it is normally thought to also presuppose that every king is bald, thereby requiring the CG to already include this information. If the CG does not include the information that every king is bald, then discourse participants will either deem the occurrence infelicitous or accommodate the presupposition by adding the required information.

In order to encode interlocutors' communicative needs, goals and interests within the CG, the notion of a question under discussion developed in Ginzburg (1995a), Ginzburg (1995b) and Roberts (1996) shall be used. It is standard to follow Hamblin (1973) in treating the ordinary meaning of a question as a set of propositions. The meaning of a question is then the *question under discussion* ('QUD') relative to a given context if the interlocutors enter it into the common ground, along with their intention to answer it. Selecting a QUD is a way of modelling interlocutors' communicative needs due to this encoding of a set of propositions in the CG where certain information is taken for granted and certain other information is marked as absent yet desired. A proposition is a *partial* answer to a QUD if it contextually entails the truth or falsity of at least one element of the set of propositions comprising the QUD, and it is a *complete* answer to the QUD if it contextually entails the truth or falsity of every element of the set of propositions. If a natural language sentence that *reflects* the QUD (that is, expresses the same set of propositions as the QUD) is explicitly stated, then there is an *explicit* QUD operative at that context, whereas otherwise the QUD is *implicit*.

Finally, IS is said to pertain to *immediate* communicative needs because there are certain other factors that might affect the way in which information is packaged that fall outside the remit of IS, such as long-term background knowledge or politeness considerations.<sup>1</sup> This completes the clarification of the definition of IS.

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<sup>1</sup>Krifka (2007), p.14.

There are three dichotomies that are frequently found in discussions on IS: *topic-comment*, *background-focus* and *theme-rheme*. The topic-comment dichotomy is emphasised by Strawson (1964), Chafe (1976), Gundel (1974), Kuno (1972) and Reinhart (1981), and centres around a distinction between the expression that indicates what a sentence is about (topic) and the parts of a sentence asserting something about this ‘aboutness item’ (comment). The background-focus dichotomy is emphasised by Rooth (1985), Krifka (2007) and Büring (2016), and is described in terms of constituents that indicate the presence of alternatives that are relevant to the interpretation of the sentence (focus) and those parts of a sentence that invoke no such alternatives (background). The theme-rheme dichotomy is emphasised by the Prague school, including Halliday (1967), Firbas (1969), Benesova et al. (1973) and Daneš (1974), and is characterised in terms of a division between the parts of a sentence that consist of old information relating to prior discourse (the theme) versus the parts that contain new information about the theme (the rheme).

For most sentences, there are multiple possible ways of carving them up according to these dichotomies, though factors such as prosody, communicative needs and syntactic structure will frequently place some restrictions on these possibilities (as shall be discussed in §(2.3.1)). In almost all cases, differences in information structure fail to affect the truth conditions of occurrences of sentences; instead, they affect the management of propositions within the CG.<sup>2</sup>

For example, we may mark the following occurrences of sentences according to reasonable choices of topic (‘T’), comment (‘C’), background (‘B’), focus (‘F’), theme (‘Th’) and rheme (‘Rh’):

[Zaid]<sub>T</sub> [burned everything in his yard]<sub>C</sub>.

[Zaid]<sub>B</sub> [burned everything in his yard]<sub>F</sub>.

[Zaid]<sub>Th</sub> [burned everything in his yard]<sub>Rh</sub>.

It should be apparent that there is considerable overlap between the properties each dichotomy purports to capture, to the extent that some have taken ‘topic’, ‘background’ and ‘theme’ to denote the same feature of sentences, a feature which they contrast with the aspect of a sentence referred to by ‘comment’, ‘focus’ and ‘rheme’. However, Ebert (2009) concurs with advice given in Molnár (1993) that we resist such a conflation, on the grounds that each of the three dichotomies capture a slightly different notion. Molnár (1993) argued that the topic-comment dichotomy relates to the factual aspect of an utterance, whereas the theme-rheme distinction depends on discourse-givenness from the hearer’s point of view, and the background-focus distinction relates to relevance from the speaker’s point of view. I will follow this recommendation to refrain from an overly hasty conflation of the categories, since the connections between the different properties of occurrences of sentences then becomes an empirical matter to be investigated rather than an a priori matter.

My concern in this thesis will predominantly centre on the idea of a *sentence topic*, since this notion turns out to illuminate a range of issues related to DPs. An initial difficulty of relying on the topic-comment dichotomy emerges from the observation in Reinhart (1981)

<sup>2</sup>A potential exception arises with respect to focus-sensitive particles such as ‘only’, since some have argued that different choices of focus have a semantic effect for such cases. See Krifka (2007) for a discussion of this phenomenon, as well as an overview of the notion of focus.

(p.56) that '[a]lthough the [linguistic] role of the relation *topic of* is widely acknowledged, there is no accepted definition for it and not even full agreement on the intuitions of what counts as topic'; Ebert (2009) (p.19) reacted to this claim by writing that '[a]s far as I can surmise, the situation is no different 25 years later'. Despite the absence of a broad consensus regarding the nature of sentence topics, I intend to endorse the traditional notion of a topic as identifying what a sentence is about, with an occurrence of a sentence's having at most one constituent as its topic. I will furthermore accept the position described by Ebert (2009), where *topic* can be seen as an entirely conceptual notion, independent of any syntactic, morphological or intonational markings. ... However, certain syntactic structures, morphologic markers and intonational means have been argued to indicate the topical status of a constituent. Hence topicality is *testable* via such means'.

The remainder of this chapter will consist of a development of this rough characterisation.

### 2.1.2 Clarifying 'Aboutness'

Within this subsection, I shall begin by considering in greater detail what it means for a sentence to be about something, and how to model a sentence's being about a particular thing. Afterwards, I will explore the issue of which lexical items may act as sentence topics, an area where there is a lack of consensus within the literature.

The notion of a sentence's being about an item has often been left undefined (as in Kuno (1972)), or has been defined in a manner that is unsuitable for the linguistic role of a sentence topic (as with the semantic formulation of aboutness found in Putman (1958), where the proposition expressed by a sentence determines what it is about).<sup>3</sup> Such construals of topicality are inadequate for current purposes, since they fail to yield an account of the relation between topic choice and communicative needs. However, Reinhart (1981) observes that two clear criteria for a sentence's being about some item emerge from Strawson's discussion of the distinction between subjects and predicates. The first criterion relates to Strawson's (1964) (p.96) 'principle of relevance', which asserts that the purpose of discourse is generally to 'give or add information about what is a matter of standing or current interest or concern'. The second criterion relates to Strawson's 'principle of verification', which holds that 'assessments of statements as true or false are commonly, though not only, topic-centered'.

Reinhart goes on to clarify Strawson's criteria within a CG-based theory of communication. She endorses the position that 'information is not just added to the CG content in form of unstructured propositions, but is rather associated with entities or sets of entities, just like information in a file card system is associated with file cards that bear a particular heading'.<sup>4</sup> The reason to accept that the information in CGs is organized in this way is that this 'would make it easier to remember and more accessible for the evaluation of coming information'.<sup>5</sup> Reinhart (1981) (p.80) therefore describes topics as 'one of the means available in the language to organize, or classify the information exchanged in linguistic communication – they are signals for how to construct the context set, or under which entries to classify the new proposition'.

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<sup>3</sup>Reinhart (1981), p.58.

<sup>4</sup>Krifka (2007), p.41.

<sup>5</sup>Reinhart (1981), p.79.

Reinhart next elaborates the connection between this file-based system and Strawson's criteria for a sentence's being about an object. Reinhart (1981) (p.81) holds that, if a sentence  $S$  occurring relative to a context  $c$  has a topic associated with a file card  $f$ , then, firstly the proposition expressed by  $S$  'will be assessed by the hearer in  $[c]$  with respect to the subset of propositions already listed in the context set under  $[f]$ ', and, secondly if the proposition is not rejected 'it will be added to the context set under the entry  $[f]$ '. These two processes correspond, respectively, to Strawson's principle of verification and principle of relevance.

In my view, a reliance on Reinhart's modified criterion of relevance alone is sufficient to capture the sense in which an occurrence of a sentence is about an object associated with its topic, in addition to explaining the effect of topic choice on the management of information within CGs. Furthermore, I think there are certain issues that arise when the assessment of an occurrence of a sentence is linked to the choice of topic, which I shall touch upon in §(2.2.4). For these reasons, I will adapt Reinhart's observations and endorse the following definition of a sentence topic:

**Topic Definition:** An expression  $\alpha$  in a sentence  $S$ , where  $S$  expresses the proposition  $p$  relative to a CG  $c$ , is the *topic* relative to  $c$  if and only if: it is signalled that  $p$  should be added to a file card in  $c$  representing an item associated with  $\alpha$  by  $c$  (if  $p$  is not rejected).<sup>6</sup>

This definition captures the idea that the topic of an occurrence of a sentence indicates the file card with respect to which the information expressed by the occurrence of the sentence should be stored. I will assume that the *aboutness item* (that is, the item the occurrence of the sentence is understood to be about) represented by a file card is from the domain of discourse  $D$ . It is natural to think of file cards as representing the items that discourse participants accept for the purposes of the conversation, whereas the items in  $D$  provide the semantic meaning for expressions that occur within the discourse.

In the remainder of the chapter, the aim will be to elaborate what it means to add a proposition to an entry in a file card system (in §(2.1.4)) and what aboutness item such file cards represent (in §(2.2)). However, I will first investigate the type of lexical items that may occur as sentence topics.

### 2.1.3 Topicable Items

I have endorsed the idea that a sentence topic indicates an aboutness item represented by a file card in the CG, under which the information conveyed about that item is stored. However, an immediate concern is that many approaches that invoke file cards or similar items (e.g. Karttunen (1969), Heim (1982)) solely associate such items with DPs that are taken to denote an individual. I shall refer to DPs that *can* be (though frequently are not) analysed as denoting an individual as *individual-denoting DPs*, a group that consists of proper names, DPs headed by 'a(n)', along with DPs headed by 'the' and 'some' when the restrictor

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<sup>6</sup>As will be discussed in §(3.4), it is not always the case that  $p$  is added to the file card associated with  $\alpha$ , since contextual factors might cause information to be added to a file card distinct from (but related to) the one associated with the sentence topic. Nevertheless, even in such cases we might maintain that the selection of  $\alpha$  as the topic serves to *signal* that  $p$  *should be* added to the file card associated with  $\alpha$ , with discourse participants possibly ignoring this signal when contextual features render a related file card available.

is grammatically singular.<sup>7</sup> In contrast, *irreducibly quantificational DPs* such as ‘every cat’ and ‘no king’ cannot be analysed as denoting individuals. We might therefore wonder whether irreducibly quantificational DPs may occur as topics (that is, whether they are ‘*topicable*’).

In this subsection, I will begin by clarifying the reasons for the popularity of the traditional view that only individual-denoting DPs are topicable. I shall then describe the permissive view that some have adopted whereby a broad range of non-individual-denoting expressions may be topics, including NPs and VPs. The aim is to demonstrate support within the literature for views that challenge the traditional position that only individual-denoting DPs are topicable. I will conclude that the current framework is compatible with treating irreducibly quantificational DPs as topicable.

The traditional notion that only individual-denoting DPs are topicable appears to be based on the idea that it only makes sense to have file cards that represent individuals. On this view, individual-denoting DPs are uniquely topicable due to the potential to link them to file cards that represent the individual associated with their denotations. Such a view of file cards is presumably taken due to a recognition of the difficulty of establishing what item the file card for an irreducibly quantificational DP should represent. Clearly, it must represent a set rather than an individual; however, there are several options regarding the set that should be represented, and it is debatable which option best captures what a sentence with a topical DP is intuitively about.

In order to challenge this line of thought, I shall go on to argue that sets are reasonable items to represent by means of the file card system, and that careful selection of the set allows us to capture the intuitive item that a given sentence is about. However, I shall begin by motivating the position that it is not untenable to claim that expressions other than individual-denoting DPs may be topics.

One author who endorses the idea that NPs may occur as sentence topics is Krifka. Krifka (2007) (p.42) points out that Reinhart’s definition of ‘topic’ allows the information expressed by occurrences of sentences of the form ‘Det N  $\beta$ ’ to be stored as comments about the extent to which the property expressed by ‘ $\beta$ ’ holds for the elements of the set denoted by ‘N’. Of course, from the fact that the definition of ‘topic’ does not exclude NPs, it does not follow that speakers ever construe NPs as topical. Yet Krifka gestures towards an argument for allowing NPs to occur as sentence topics by observing that this is one way to explain the fact that all natural language quantifier expressions denote conservative quantifiers; though he does not elaborate on his reasoning in this regard.

A more compelling argument in favour of permitting NPs to act as sentence topics is developed in Portner and Yabushita (2001). They discuss data from Japanese, where the particle ‘wa’ marks expressions that determine what the sentence is about.<sup>8</sup> In Japanese, there are settings where ‘wa’ felicitously attaches to the NP, and where infelicity results when it is used to mark the entire DP.<sup>9</sup> The authors make the plausible assumptions that this particle acts as an explicit topic marker in Japanese, and that the constraints on information structure within sentences of one language can provide insights about the constraints on information structure within other languages. If these assumptions are accepted, then it

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<sup>7</sup>More technically, individual-denoting DPs have minimal witness sets (see §(2.2.1)) containing one singleton set. Hence approaches that diverge from theories of generalized quantifiers often take treat the individual in the singleton set as the DP’s denotation.

<sup>8</sup>Portner and Yabushita (2001), p.273.

<sup>9</sup>*Ibid.*, p.276.

follows that NPs may occur as topics within other languages, including English.

An even more permissive position is endorsed by Büring, who holds that sentence topics may be any set-denoting lexical item. Although Büring does not argue for such a position, he gives an example where a determiner is the sentence topic in Büring (1999), and one where an adjective is the sentence topic in Büring (2007). Similarly, Reinhart (1981) states that expressions other than DPs, with the possible inclusion of ‘predicates’, may occur as sentence topics. One argument in favour of this permissive position consists of arguing for the topicability of some irreducibly set-denoting items, before pointing out the arbitrariness of precluding the topicability of any other set-denoting items, when there appears to be no relevant lexical or denotational difference between them.

For the purpose of this thesis, there is no need for me to take a position on the exact class of topicable expressions. However, I will claim that irreducibly quantificational DPs are theoretically topicable. In order to support this claim, in §(2.2) I will show that suitable file cards may be associated with irreducibly quantificational DPs. In §(2.3.3), I shall argue that the topicability of DPs goes beyond mere theoretical possibility, since it is straightforward to produce examples of irreducibly quantificational DPs that are actual sentence topics. In some later chapters (e.g. §(4.3.2)), I will allow the possibility that NPs and PPs are topicable. However, my central arguments in this thesis will only ever depend on the topicability of DPs.

#### 2.1.4 Extant Systems of File Cards

Having defended the tenability of associating file cards with items other than individual-denoting DPs, I am in a position to review some extant systems of structured common grounds. Detailed accounts of common grounds structured by file cards are given by Heim (1982, 1983) and Erteschik-Shir (1997, 1999, 2007). These two approaches shall be discussed, after considering Karttunen’s (1969) notion of discourse referents from which they took inspiration. I shall claim that an adequate account of the structure of common grounds should have several features. Firstly, it should clarify the relation between representations within a CG and the items denoted by expressions. Secondly, it should connect the IS of occurrences of sentences to the way in which interlocutors manipulate and update file cards within the CG. Thirdly, it should be compatible with theories of generalized quantifiers. I shall argue that none of the proposals considered in this subsection meet all of these desiderata.

The inclusion of representations of individuals within a CG may be traced back to Karttunen (1969), where the notion of a *discourse referent* was used to describe items that are introduced when an occurrence of a DP implies the existence of an individual that may be subsequently referred to with a pronoun or other DP. The purpose of this was to address the fact that there are instances of *discourse anaphora* – pronouns that seem to denote a particular item based on the construal of an antecedent DP, despite being outside the scope of that DP – associated with DPs that do not ‘name’ individuals in the manner traditionally thought to characterise referential terms. For example, an occurrence of ‘a tall king’ often permits subsequent discourse anaphora, but it does not appear to ‘name’ a particular king in the same way that terms such as ‘Zaid’ or ‘the tallest king’ are traditionally thought to. The use of discourse referents allows the acceptance of the position that discourse anaphors have a referential role, without commitment to the view that their DP antecedents refer in the

traditional sense.<sup>10</sup> However, Karttunen gives a purely theoretical definition of discourse referents – characterising them in terms of their uses, and the conditions of their existence – rather than taking a position on their ontological nature within a CG and relation to actual referents.

Heim (1982, 1983) developed these ideas into a system where *file cards* play the role of Karttunen’s discourse referents. Although the notion of a file card remains somewhat metaphorical, Heim clarified the connection between file cards and actual referents. In brief, she claimed that a *file* is constructed that contains a numbered *card* for each individual mentioned in a discourse. Information conveyed in the discourse about each of the individuals is progressively added as descriptive content to the appropriate file card. The logical forms of occurrences of sentences are assigned *file change potential*, a function from files into files, which governs the means by which a new file is constructed in light of an occurrence with that logical form.<sup>11</sup> Furthermore, files are assigned truth conditions, which classify a particular file as *true* if there is a sequence of items within the domain that satisfies the file; that is, each item must fit the description on the appropriate card within the file.<sup>12</sup> It is in this way that Heim secures the relation between file cards and domain members.

To illustrate Heim’s notion of file cards, consider the following discourse:

1. (a) A king is talking to a cat.
- (b) The king is bald.

Before the utterance of (1a), interlocutors have a collection of zero file cards,  $F_0$ . Upon utterance of (1a), two file cards are added to  $F_0$ , each of them numbered and including the appropriate information.  $F_1$  may be represented as follows:

1
is a king is talking to 2
2
is a cat is talked to by 1

Upon utterance of (1b), file card 1 is updated as follows, yielding  $F_2$ :

1
is a king is talking to 2 is bald
2
is a cat is talked to by 1

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<sup>10</sup>Evans (1977), p.511.

<sup>11</sup>Heim (1983), p.227.

<sup>12</sup>*Ibid.*, p.228.

This illustrates the process of constructing file cards and updating files. A sequence of individuals  $\langle a_1, a_2 \rangle$  then satisfies  $F_1$  in a context of evaluation  $w$  if and only if  $a_1$  is a king at  $w$ ,  $a_2$  is a cat at  $w$  and  $a_1$  is talking to  $a_2$  at  $w$ ; and a sequence of individuals  $\langle a_1, a_2 \rangle$  satisfies  $F_2$  at  $w$  if and only if the preceding properties hold at  $w$  in addition to its being the case that  $a_1$  is bald at  $w$ .<sup>13</sup> With respect to the file change potential of (1b) as applied to  $F_1$ , the effect is to create a file which is satisfied by those sequences of individuals that satisfy  $F_1$  and furthermore have a first member that falls within the extension of the predicate 'is bald'.<sup>14</sup> Heim also defined a '*Novelty / Familiarity Condition*' in order to capture the property of definiteness (see §(1.3.3)), which may be summarised as the requirement that a DP headed by the indefinite article causes a new file card to be introduced and updated, whereas a DP headed by the definite article causes an old file card to be updated. It is this condition that ensures an occurrence of (1a) introduces new file cards for both DPs, whereas an occurrence of (1b) updates the information on an existing file card.

The trouble with this characterisation of file cards is that it presupposes that all occurrences of sentences may be analysed in terms of logical forms where '[o]nly variables occur in the argument positions of predicates'.<sup>15</sup> That is, pronouns are analysed directly as variables, while other DPs are co-indexed with a variable to which predicates may apply. Furthermore, the definite and indefinite article are taken as lacking semantic categories, rendering them transparent to semantic interpretation; in contrast, other determiners are treated as operators. For example, an indefinite DP is treated like a proposition containing a free variable, hence 'a king' is analysed along the lines of 'king( $x$ )'.<sup>16</sup> Heim's assumptions about the semantic role played by definite and indefinite determiners, along with the extensions of the DPs formed with these determiners, are thus at odds with the treatment of DPs in theories of generalized quantifiers. Furthermore, she does not elaborate on the process by which the information structure of an occurrence of a sentence influences the introduction and update of cards.

Erteschik-Shir (1997, 1999, 2007) developed a system of file cards that not only accords with a quantificational analysis of DPs, but furthermore elaborates the effect of information structure on interlocutors' manipulation of cards. Unlike Heim and Reinhart, she states that the CG consists of a set of file cards which *represent* existing discourse referents, without themselves being discourse referents.<sup>17</sup> She claims that a subset of these cards are located 'on top of the file', with these cards' being licensed as potential topics due to their status as prominent for the interlocutors at that point in the discourse. Erteschik-Shir adopts the Strawsonian view that the topic is the 'pivot for assessment', hence sentences are truth-evaluable and interpretable only relative to a particular information structure. Since truth values may only be assigned on the basis of evaluation with respect to a file card, she takes those sentences that lack overt topics to include an implicit spatiotemporal argument as a *stage topic*.<sup>18</sup> A stage topic is associated with a card, permanently at the top of the file, which has the heading '*sTOP<sub>t</sub>*' for which the index  $t$  reflects the time and location of the discourse.

The card associated with an individual-denoting DP is assigned a heading derived from

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<sup>13</sup>Heim (1983), p.228.

<sup>14</sup>*Ibid.*, p.232.

<sup>15</sup>*Ibid.*, p.230.

<sup>16</sup>*Ibid.*, p.237.

<sup>17</sup>Erteschik-Shir (1997), p.3.

<sup>18</sup>*Ibid.*, pp.26-7.

the lexical content of the DP and an index that maps the card to an individual discourse referent. On the other hand, a card associated with an irreducibly quantificational DP is assigned a heading derived from the restrictor, along with an index that maps the card to a discourse referent consisting of a set of individuals. Furthermore, a card for certain members or subsets from that set may be ‘attached’ to the main card, each bearing an appropriate heading and index.<sup>19</sup> The truth of the sentence then depends on whether the predicate may be entered on the number of attached cards required by the lexical meaning of the determiner, whereupon it may be entered on the main card representing the set.

To illustrate the ways in which Erteschik-Shir’s account differs from Heim’s, consider (1a) once more. Even before the utterance of (1a), Erteschik-Shir postulates the existence of a collection of file cards, with some more prominent than others. An utterance of (1a) will be felicitous only if the file card associated with its topic is prominent. The various constraints on topics predict that the most natural choice for (1a) is an implicit stage topic.<sup>20</sup> A focus rule instructs the hearer to either locate an existing card (for a focused definite) or introduce a new card (for a focused indefinite), and the application of this rule in the case at hand causes the second and third cards to be introduced.<sup>21</sup> A predication rule instructs hearers to evaluate the complement of the topic with respect to the topic and, if the result of the evaluation is ‘true’, then an update rule instructs the hearer to enter the predicate on the topic card and on additional cards activated by the focus rule. After applying the predication and update rules, the following file cards result:

<i>sTOP<sub>t</sub></i>
a king is talking to a cat at e
<i>king<sub>i</sub></i>
e is talking to a cat at <i>s<sub>t</sub></i>
<i>cat<sub>j</sub></i>
a king is talking to e at <i>s<sub>t</sub></i>

Given Erteschik-Shir’s view that definite DPs are highly likely to be topical when clause-initial, an occurrence of (1b) is then felicitous only if a file card associated with the DP ‘The king’ is prominent. The relevant card is then updated as follows by the predication and update rules, if it is true that the king is bald:<sup>22</sup>

<i>king<sub>i</sub> e talking to a cat at <i>s<sub>t</sub></i></i>
e is bald

It has been seen that the system of file cards proposed by Erteschik-Shir (1997) clarifies the process by which information structure affects interlocutors’ structuring of the common ground, in a manner that Heim’s system refrained from elaborating. Furthermore,

<sup>19</sup>Erteschik-Shir (1997), pp.24-5.

<sup>20</sup>This is the case because indefinites are topicable only if they are understood specifically, and Erteschik-Shir claims that such understandings must be triggered by features such as relative clauses (e.g. ‘a king who I know’) or particular adjectives (e.g. ‘a certain king’).

<sup>21</sup>Erteschik-Shir (1997), p.18.

<sup>22</sup>Erteschik-Shir does not consider it obligatory for entries on a card to be absorbed into the heading; however, she claims that it is always possible for it to occur, and I have allowed it to happen in this case in order to illustrate this point of difference with respect to Heim’s system.

Erteschik-Shir describes a way in which file cards may be associated with DPs that are analysed as generalized quantifiers. However, the potential for her system to deliver interpretations that accord with the predictions of theories of generalized quantifiers is open to doubt. She is not altogether clear about what causes interlocutors to introduce attached file cards, at times suggesting that it is the plural morphology of the restrictor and at other times implying that it is the determiner itself.<sup>23</sup> Whatever it is that causes the attachment of cards, the role of the determiner in the evaluation of the sentence is an additional area of unclarity. One possibility is that a determiner causes an appropriate number of file cards to be attached (e.g. three in the case of '[three kings]<sub>T</sub>'), before requiring the truthful application of the predicate to all attached cards. A second possibility is that a file card is attached for each member of the set (e.g. the number of contextually relevant kings for '[three kings]<sub>T</sub>'), with the determiner's requiring the truthful application of the predicate to the appropriate number of attached cards (e.g. three cards for '[three kings]<sub>T</sub>').<sup>24</sup> Additional complications emerge from her claim that, for topical DPs headed by indefinite determiners other than bare cardinals (e.g. 'some', 'few', 'many'), interlocutors end up with a single 'unindividuated card' attached to the main card, which represents a subset of the restrictor's extension and with respect to which evaluation of the sentence proceeds. The resulting analysis of DPs not only involves significant unclarity, but furthermore exhibits a lack of uniformity with respect to the analysis of different determiners. It would therefore be preferable to have a file card system for DPs more closely linked to theories of generalized quantifiers, with their clear assignment of truth conditions and their uniform treatment of determiners as denoting relations between sets of individuals.

Another major limitation of Erteschik-Shir's approach concerns the ontological status of the items that file cards represent. Recall that Heim treated file cards as discourse referents, clarifying the connection between such discourse referents and the individuals they represented. On the other hand, Erteschik-Shir treats file cards as representing discourse referents, without elaborating on the nature of these discourse referents or their connection to individuals within the domain. It would be preferable to have file cards represent clearly defined items with an evident connection to the domain of discourse. The ideal scenario would be one where file cards simply represent set-theoretic structures derived from the domain of discourse, since this would employ machinery and an ontology that is already accepted for the purposes of Montagovian semantics.

There are additional features of Erteschik-Shir's system that will be argued to be problematic in later sections. Firstly, there is her endorsement of a strong notion of the verification criterion, whereby the truth conditions of occurrences of sentences may vary according to their topic (see §(2.2.4)); secondly, there is her view that a new file card is introduced for any indefinite DP included in the focus (see §(2.3.4)). These matters will be put aside for the moment.

In order to capture the sense in which a sentence topic indicates what the sentence is 'about', the aim is therefore to make use of a system of file cards that retains the relating of file cards to items within a domain of discourse emphasised by Heim (1983), along with the connection to the processing of information structure emphasised by Erteschik-

<sup>23</sup>See Erteschik-Shir (1997), pp.42-3. for these conflicting suggestions.

<sup>24</sup>See *Ibid.*, p.169. and p.72. for the suggestion that each of these divergent approaches applies with respect to 'every'.

Shir (1997). However, a system that reflects generalized quantifier-theoretic analyses of DPs more closely than either of these extant approaches will be pursued. These may be looked upon as three desiderata for a system of file cards.

### Summary of §(2.1)

I began by giving an overview of some key notions of information structure, which I situated within a theory of communication based on common grounds and questions under discussion. I emphasised the notion of a sentence topic as the indicator of the item that an occurrence of a sentence is about. This role of sentence topics was modelled by endorsing the proposal that a topical expression is associated with a file card in the common ground, upon which the information expressed by the sentence in which it occurs is stored. Instead of endorsing the traditional view that only individual-denoting DPs may be associated with file cards, I argued for the tenability of the view that irreducibly quantificational DPs are topicable. I then considered the systems of file cards advanced by Heim and Ertschik-Shir, concluding that neither met three important desiderata. In the following section, a system will therefore be described where file cards: represent set-theoretic structures derived from the domain of discourse, are compatible with theories of generalized quantifiers, and are manipulated on the basis of IS.

## 2.2 Relating File Cards to the Domain

The previous section motivates the position that expressions other than individual-denoting DPs may occur as sentence topics. In light of the desideratum that file cards are related to items within a domain of discourse, it is therefore important to establish that there are viable items for the file cards associated with irreducibly quantificational DPs to represent. Hence it is worth considering what sort of restrictions are reasonable regarding the selection of the item to be represented by a file card.

At one extreme, it could be claimed that only an expression's denotation may be represented on the file card with which it is associated. Indeed, Reinhart's definition of 'topic' differs slightly from the one offered at the end of §(2.1.2), insofar as she adopts the common assumption that the aboutness item must be the item *denoted* by a sentence topic; my modified definition arose from a desire to avoid premature judgements regarding this matter. An extreme view at the other end of the spectrum would be to claim that there are no restrictions governing the item represented on a DP's file card, thus we could have a solitary cat represented by the file card for 'the kings' and a set of mathematical properties represented by the file card for 'the cats'. I wish to pursue an approach that aims for a happy medium, where a file card need not represent the associated DP's denotation, but must have the item that it represents selected in a systematic way according to coherent criteria. This is similar to the position adopted by Ebert (2009) (p.13), who holds that 'a sensible representative of the entire quantifier is selected that can stand proxy for the quantifier itself'.

In order to determine what would be a 'sensible representative' for a DP, we must keep in mind the *purpose* of file cards. The purpose was earlier implied to be two-fold: firstly, to allow information to be stored within a structured CG based on the item that an occurrence of a sentence is about (Reinhart's motivation), and secondly, to allow an analysis of discourse

anaphora (Karttunen’s motivation). Two reasonable criteria for file card selection therefore derive from the purpose of file cards. Firstly, a DP’s file card should represent an item that occurrences of sentences in which the DP is topical are intuitively about. Secondly, the file card associated with a DP should serve as an appropriate aboutness item for certain occurrences of subsequent anaphora. It is clear that both the *aboutness* and the *anaphora* criteria would be violated by associating ‘the kings’ with a file card that represents a single cat: firstly, no occurrence of the sentence ‘The kings are walking’ is intuitively about a single cat and, secondly, the continuation ‘They are getting tired now’ does not plausibly convey information about a single cat.

I will set out four natural candidates for the set that a topical DP’s file card could represent: the DP’s denotation, the smallest live-on set, the unique minimal witness set or an arbitrary minimal witness set (§(2.2.1)). I will then assess these options. I will begin by focusing on the aboutness criterion (§(2.2.2)), before considering the anaphora criterion (§(2.2.3)). I will conclude that the approach based on arbitrary minimal witness sets is preferable according to both criteria. I shall then briefly explain reasons to retain a separation between semantic meaning and choice of file card (§(2.2.4)).

## 2.2.1 Different Candidates for File Cards

### *Candidate 1: DPs’ Denotations*

The idea that a DP’s denotation is the natural set to be represented by a file card is attractive for those who assume that a sentence is about the sentence topic’s denotation. This is an obvious assumption to make with respect to individual-denoting DPs, since occurrences of sentences such as ‘[Yasma]<sub>T</sub> is walking’ or ‘[The king]<sub>T</sub> is walking’ are intuitively about, respectively, Yasma and the contextually salient king; and these are the denotations assigned to these DPs in traditional semantic approaches. I will later argue that the aboutness criterion renders the denotational approach deeply implausible.

### *Candidate 2: Smallest Live-On Set*

Another option is to claim that topical DPs are assigned file cards representing their smallest live-on sets. Suppose  $Q_D$  is a type  $\langle 1 \rangle$  quantifier, possibly of the form  $Q'_D(A)$  where  $Q'_D$  is a type  $\langle 1, 1 \rangle$  quantifier and  $A$  is a set to which it has been applied. Where  $B$  is any set, and the set of all *live-on sets* for  $Q_D$  is written as  $L_{Q_D}$ :

**Live-on Set Definition:**  $B \in L_{Q_D}$  iff, for all  $C \subseteq D$ ,  $Q_D(C)$  iff  $Q_D(B \cap C)$ .<sup>25</sup>

What this property means is that, to know for any subset  $C$  of a domain  $D$  whether or not it stands in the relevant quantifier relation, you need only look at the part of  $C$  which is also a part of  $B$ . The quantifier therefore depends on the set  $B$  in an important way, since one need only check  $B$  to establish which other sets are in the quantifier relation. In the following, I will also describe natural language expressions that denote type  $\langle 1 \rangle$  quantifiers as having live-on sets, by which I will mean the live-on sets of their extensions.

Next, where  $B$  is any set, and the set of *smallest live-on sets* for  $Q_D$  is written as  $SL_{Q_D}$ :

<sup>25</sup>Peters and Westerståhl (2006), p.88.

**Smallest Live-on Set Definition:**  $B \in SL_{Q_D}$  iff  $B \in L_{Q_D}$  &  $\neg \exists C : C \in L_{Q_D}$  &  $C \subsetneq B$ .

It should be clear from the definition that  $SL_{Q_D}$  will always have either a single member or no members; for  $L_{Q_D}$  can contain no disjoint sets, hence it follows that there cannot be more than one set in  $L_{Q_D}$  that lacks a proper subset in  $L_{Q_D}$ .<sup>26</sup> Two important properties to note for smallest live-on sets are that, firstly,  $\emptyset$  is the smallest live-on set for  $Q_D$  if and only if  $Q_D$  is trivial (with triviality being a notion I briefly discussed in §(1.2.2), and shall discuss in more detail in §(4.3.1)). Secondly, where ‘Det’ is a natural language determiner, the smallest live-on set for  $(\llbracket \text{Det} \rrbracket_c)_D(A)$  is  $A$ .<sup>27</sup>

I will later argue that the smallest live-on set approach is promising with respect to the aboutness criterion, but encounters some difficulties with respect to the anaphora criterion.

### Candidate 3: Unique Minimal Witness Set

The next option is to claim that topical DPs are assigned file cards representing their unique minimal witness sets. Take some  $Q_D$  such that the smallest live-on set  $SL_{Q_D}$  has a member  $C$ ; then where  $B$  is any set, and the set of all *witness sets* for  $Q_D$  is written as  $W_{Q_D}$ :

**Witness Set Definition:**  $B \in W_{Q_D}$  iff  $B \subseteq C$  &  $B \in Q_D$ .<sup>28</sup>

In words,  $B$  is a witness set for a quantifier if and only if it is a subset of the smallest live-on set of the quantifier and furthermore stands in the quantifier relation. For example, consider the witness sets for the following three quantifiers:

$$W_{(Q_{every})_D(\llbracket N \rrbracket_c)} = \{B : B \subseteq \llbracket N \rrbracket_c \wedge \llbracket N \rrbracket_c \subseteq B\}$$

$$W_{(Q_{no})_D(\llbracket N \rrbracket_c)} = \{B : B \subseteq \llbracket N \rrbracket_c \wedge \llbracket N \rrbracket_c \cap B = \emptyset\}$$

$$W_{(Q_{at-least-four})_D(\llbracket N \rrbracket_c)} = \{B : B \subseteq \llbracket N \rrbracket_c \wedge |\llbracket N \rrbracket_c \cap B| \geq 4\}$$

We therefore see that the only witness set for the quantifier denoted by ‘Every N’ will be  $\llbracket N \rrbracket_c$ , since this is the only set that is both a subset of the set of Ns and is furthermore in the relation defined by the quantifier. The only witness set for the quantifier denoted by ‘No N’ will be  $\emptyset$ , since no other subset of  $\llbracket N \rrbracket_c$  has an empty intersection with  $\llbracket N \rrbracket_c$ , as required by the  $Q_{no}$  relation. Finally, the set of witness sets for the quantifier denoted by ‘At least four Ns’ will consist of all subsets of the set of Ns with a cardinality of four or greater, thus there will often be many such witness sets.

Given that there are cases where there are multiple witness sets with a range of cardinalities, it seems that it would be unhelpful to pursue an approach whereby file cards represent *arbitrary* witness sets. This inference derives from a quick assessment of the proposal with respect to the aboutness criterion: it would be highly counter-intuitive for a sentence such as

<sup>26</sup>It is provable that, if  $L_{Q_D}$  contains  $B$  and  $B'$ , then  $L_{Q_D}$  contains  $B \cap B'$  (see Peters and Westerståhl (2006), pp.89-90).  $SL_{Q_D}$  will be non-empty whenever  $D$  is finite, but is possibly empty when  $D$  is infinite.

<sup>27</sup>Peters and Westerståhl (2006), pp.89-105. More specifically,  $SL_{Q_D(A)} = \{A\}$  whenever the (global) quantifier  $Q$  has the properties of isomorphism closure, extension and ‘finite action’; given that every quantifier denoted by a natural language determiner has these properties, it is not necessary to define or discuss them further.

<sup>28</sup>Ebert (2009), p.281.

‘At least four kings are walking’, uttered relative to a context where the extension of ‘kings’ includes fifty members, to be about (say) twenty seven kings; yet if the DP’s file card were to represent an arbitrary witness set for the quantifier, then a set with a cardinality of 27 may well turn out to be represented. Rather, a *prima facie* promising approach would be to pick the *smallest* witness set to be represented by the file card, to prevent occurrences of sentences from being about witness sets with gratuitous members.

In order to develop this third approach, we define the set of minimal witness sets as follows. Take some  $Q_D$  such that the smallest live-on set  $SL_{Q_D}$  has a member, meaning  $W_{Q_D}$  also has members; then where  $B$  is any set, and the set of all *minimal witness sets* for  $Q_D$  is written as  $MW_{Q_D}$ :

**Minimal Witness Set Definition:**  $B \in MW_{Q_D}$  iff  $B \in W_{Q_D}$  &  $\neg \exists C : C \in W_{Q_D}$  &  $C \subsetneq B$ .<sup>29</sup>

In words,  $B$  is a minimal witness set for a quantifier if it is among the smallest witness sets. Clearly, there may be many such minimal witness sets, if there are multiple disjoint witness sets each lacking proper subsets that are witnesses. For example, the minimal witness sets for ‘At least four kings’ will consist of every set of contextually salient kings with a cardinality of four. However, whenever the cardinality of  $MW_{Q_D}$  is 1, we may say that  $Q_D$  has a *unique minimal witness set*.

In order to clarify these ideas, note the following list of DPs’ minimal witness sets:

$$\begin{aligned}
 MW_{(Q_{every})_D}(\llbracket N \rrbracket_c) &= \{\llbracket N \rrbracket_c\} \\
 MW_{(Q_{some})_D}(\llbracket N \rrbracket_c) &= \{B \subseteq \llbracket N \rrbracket_c : |B| = 1\} \\
 MW_{(Q_{four})_D}(\llbracket N \rrbracket_c) &= \{B \subseteq \llbracket N \rrbracket_c : |B| = 4\} \\
 MW_{(Q_{at-least-four})_D}(\llbracket N \rrbracket_c) &= \{B \subseteq \llbracket N \rrbracket_c : |B| = 4\} \\
 MW_{(Q_{no})_D}(\llbracket N \rrbracket_c) &= \{\emptyset\} \\
 MW_{(Q_{at-most-four})_D}(\llbracket N \rrbracket_c) &= \{\emptyset\}
 \end{aligned}$$

The third approach to constructing file cards would involve representing the unique minimal witness set of the quantifier denoted by a DP. However, a problem associated with this approach is immediately obvious: not all quantifiers have unique minimal witness sets. Indeed, in the above list, only ‘Every N’, ‘No N’ and ‘At most four N’ denote quantifiers with unique minimal witness sets. I will later argue that this presents difficulties with respect to the aboutness criterion.

#### *Candidate 4: Arbitrary Minimal Witness Set*

In light of the fact that some quantifiers lack *unique* minimal witness sets, the final approach consists of representing an *arbitrary* minimal witness set on the relevant file card. Indeed, this is the approach that Ebert (2009) (p.236) settles on, claiming that ‘a good representative

<sup>29</sup>Ebert (2009), p.281.

would be an element of the quantifier which does not contain any ‘disturbing’ elements. A *minimal set* ... is a set that meets this requirement’.

In cases where the minimal witness set is empty, this approach commits itself to the view that a file card associated with DPs headed by these determiners would represent the empty set. It is worth briefly delineating the class of quantifiers that have an empty minimal witness set, which is the class of right monotone decreasing quantifiers. *Monotonicity* properties clarify the entailment relations between quantificational claims, and a quantifier’s being *right monotone decreasing* means that when an ordered pair of sets stand in the quantifier relation, any subset of the second member of that pair will also stand in that relation:

**Right Monotone Decreasing Definition for Type  $\langle 1, 1 \rangle$  Quantifiers:** Where  $Q$  is a type  $\langle 1, 1 \rangle$  quantifier and  $D$  is a domain,  $Q_D$  is *right monotone decreasing* iff: if  $B' \subseteq B \subseteq D$ , then  $Q_D(A)(B)$  implies  $Q_D(A)(B')$ .  $Q$  is right monotone decreasing if each  $Q_D$  is.

I shall often describe a determiner as ‘right monotone decreasing’ if the quantifier it denotes has the property in question, and I will describe a DP formed from a right monotone decreasing determiner as simply ‘monotone decreasing’ (since the quantifier the DP denotes has only one argument for which monotonicity properties may vary). Right monotone decreasing determiners include: ‘not all’, ‘no’, ‘at most  $n$ ’ and ‘few’. The reason that the unique minimal witness set of all right monotone decreasing quantifiers will be empty is that the empty set will be a subset of the smallest live-on set of any such quantifier (due to its being a subset of every set), and will also be in the relevant quantifier relation (due to the monotone decreasing property), meeting the two conditions for being a minimal witness set. In the following section, I will argue that this observation presents some surmountable difficulties for the current approach with respect to the aboutness criterion. However, I will claim that the anaphora criterion provides strong evidence in favour of it.

## 2.2.2 The Aboutness Criterion

Since all four approaches treat aboutness items as sets, it might be argued that *none* of them can meet the aboutness criterion: for natural language speakers never intuitively take occurrences of sentences to be about sets. However, I will assume that when the aboutness item associated with an occurrence of a sentence is a set of individuals, a natural language speaker will take that occurrence to be about the *members* of such a set (whether or not the speaker is in an epistemic position to list the members of that set). I will therefore oscillate between describing an occurrence of a sentence as being about (say) a set of three kings and about three kings, depending on whether I am discussing the formally assigned aboutness item or the individuals that natural language speakers take an occurrence to be about.

I will now assess the four approaches in light of the plausibility of the aboutness items they associate with occurrences of the following:

2. (a) [Every king]<sub>T</sub> is in the yard.
- (b) [The king]<sub>T</sub> is in the yard.
- (c) [The three kings]<sub>T</sub> are in the yard.
- (d) [Most kings]<sub>T</sub> are in the yard.
- (e) [At least three kings]<sub>T</sub> are in the yard.

- (f) [At most three kings]<sub>T</sub> are in the yard.
- (g) [A king]<sub>T</sub> is in the yard.
- (h) [Some king]<sub>T</sub> is in the yard.
- (i) [Three kings]<sub>T</sub> are in the yard.
- (j) [Many kings]<sub>T</sub> are in the yard.
- (k) [Few kings]<sub>T</sub> are in the yard.
- (l) [No kings]<sub>T</sub> are in the yard.

I will begin by assessing the approach that holds that file cards represent a DP's denotation. Once irreducibly quantificational DPs are considered, any intuitive appeal of the denotational approach diminishes. Such an approach is committed to the counter-intuitive view that every occurrence of a sentence with a topical DP is about a set of sets that stands in the relevant relation to the restrictor set. For example, theories of generalized quantifiers take 'Three kings' to denote the set of all sets in the relevant *D* that have an intersection with the set of kings that is of cardinality 3 or greater. Imagine a context where the sets of kings, men and New York inhabitants are the only sets that yield a cardinality exceeding 3 when intersected with the set of kings; relative to such a context, (2i) is about kings, men and New York inhabitants, and a file card for 'Three kings' represents this set of sets. Yet it is clear that no English speaker would spontaneously describe a sentence such as (2i) as being about the collection of New York-dwelling male kings, or as being about all properties that more than three kings have (if the speaker is unaware of the members of the set). Perhaps one could attempt to explain away these unintuitive results. However, I think that the three other approaches hold more potential to embody what sentences with topical DPs are intuitively about.

The appeal of taking the smallest live-on set of a topical DP as the item to be represented by the associated file card is that (2a) – (2l) would all be associated with file cards representing the set of kings, capturing the fact that it seems intuitively acceptable to classify them as being about kings. However, there is a reasonable objection to this approach: if each DP in (2a) – (2l) is associated with a file card representing the set of kings in *D*, then it is unclear how we could individuate their file cards. The need to individuate file cards becomes stark when we consider utterances such as '[Three kings]<sub>T</sub> are in the yard. [Two kings]<sub>T</sub> are in the house'; for we would presumably need two distinct file cards if we are to avoid entering a pair of incompatible propositions on the same file card. If both DPs were to be associated with file cards representing the set of kings, it is hard to see how to ensure the existence of multiple file cards representing the same set, with each such card being clearly individuated. I will later argue that this problem of individuating file cards is insufficient to rule out the second approach, but is nevertheless a limitation that would need to be addressed.

The third approach involves taking the unique minimal witness set of a topical DP as the item to be represented by the associated file card. It was earlier mentioned that many quantifiers lack unique minimal witness sets; indeed, of the DPs in (2a) – (2l), only 'every king', 'few kings', 'at most three kings' and 'no kings' denote quantifiers with unique minimal witness sets. Hence the prediction emerges that there is nothing for the other sentences to be about. One might try to argue that a DP is topicable if and only if it has a unique minimal witness set. However, this claim would be deeply implausible, on the grounds that

individual-denoting DPs, such as those headed by ‘the’ and ‘a(n)’, are the paradigm cases of sentence topics. The aboutness criterion therefore seems sufficient to rule out the third approach.

A major benefit of taking an arbitrary minimal witness set of a topical DP as the item to be represented by the associated file card is that this approach initially seems to avoid the file card individuation problem noted for the smallest live-on set approach. To see this, observe that different quantifiers denoted by DPs of the form ‘Det N’ frequently have different minimal witness sets, despite generally having  $[[N]]_c$  as their smallest live-on set. Hence (2a) – (2l) will not all be stored on file cards representing the same set, allowing the cards associated with distinct DPs to be individuated on the basis of the items they represent. Another benefit over the smallest live-on set approach is that occurrences of sentences with topical individual-denoting DPs (e.g. (2b), (2g) and (2h)) will be about a single individual from the restrictor’s extension. Similarly, an occurrence of a sentence with a bare cardinal as its determiner (e.g. (2i)) will be about a set of individuals with the appropriate cardinality. While I claimed that it is not outlandish to classify such sentences as being about a set of contextually salient kings, perhaps it is more natural – or, at least, more compatible with the traditional view that an occurrence of a sentence with a topical individual-denoting DP is about an individual – to take them to be about minimal witness sets.

However, this fourth approach appears to face a significant limitation. As earlier mentioned, all monotone decreasing DPs denote quantifiers with the empty set as their minimal witness set. This is problematic because it means that any occurrence of a sentence with a topical DP that denotes a monotone decreasing quantifier would turn out to be about the empty set. This seems highly counter-intuitive.<sup>30</sup> A possible solution emerges, which would involve denying that monotone decreasing DPs are topicable. Indeed, Ebert (2009) presents compelling evidence in favour of this conclusion. However, I will assess the fourth approach in light of the anaphora condition before pursuing such a strategy.

In sum, I have argued that the aboutness criterion is sufficient to rule out two of the four approaches: that file cards represent a DP’s denotation, and that file cards represent a DP’s denotation’s unique minimal witness set. The aboutness criterion emphasises that the remaining two approaches have promising aspects along with limitations. The smallest live-on set approach provides an intuitively acceptable item for each of (2a) – (2l) to be about (i.e. the set of all kings at the context), but faces potential problems with individuating file cards. In contrast, the arbitrary minimal witness set approach assigns aboutness items to some of the sentences that are arguably more natural (e.g. a set of three kings in the case of (2i)), whilst assigning highly unnatural aboutness items to other sentences (e.g. the empty set in the case of (2k)). It therefore seems that the anaphora condition should be used to decide which of the remaining two candidates for file cards should be pursued.

### 2.2.3 The Anaphora Criterion

This second criterion is based on the widely accepted notion that occurrences of pronominal anaphors are generally topical (e.g. see Erteschik-Shir (1997)), and that they are associated with some highly salient item (e.g. see Ariel (2001)) which will normally be given by some

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<sup>30</sup>Obviously, the exact same limitation arises with respect to the third approach, since the empty set will also be the *unique* minimal witness set of every right monotone-decreasing quantifier; however, I refrained from describing this as a problem for the previous approach, since it faced its own more pressing difficulty.

recent sentence topic (e.g. see Hendriks and de Hoop (2001)). I will take these ideas to suggest that the information expressed by an occurrence of a sentence containing a discourse anaphor will frequently be stored on the file card associated with the topic of the preceding sentence. By considering situations where an occurrence of a sentence with a discourse anaphor appears to be about an item that only the preceding DP could render available, we may therefore reconstruct the aboutness items of DPs. I will argue that there are contexts where discourse anaphors preceded by sentences with any non-monotone decreasing DP are understood non-exhaustively, which is to say that the anaphors are associated with file cards representing the minimal witness set of that DP. This is strong evidence that topical DPs are associated with file cards representing one of their minimal witness sets.

There is an extensive literature on the complications associated with understanding pronominal anaphors that follow irreducibly quantificational DPs. This literature normally frames the discussion in terms of the individuals or set that a discourse anaphor is understood to refer to, or to pick out in some non-referential manner. For current purposes, it is more useful for me to frame the discussion in terms of the item that an occurrence of a sentence featuring a discourse anaphor is intuitively about. A central principle to be advanced in this thesis is that *the choice of file card affects the way in which assessors construe an occurrence of a sentence* (see §(2.2.4) for further discussion). I assume this principle applies in the case of discourse anaphora, insofar as the file card with which anaphors are associated corresponds with the item that the anaphors are understood to pick out. Hence the discussion to follow will be stated in terms of the file card with which occurrences of anaphors appear to be associated.

It has been widely observed (e.g. by Kadmon (1987), Kamp and Reyle (1993), Szabolcsi (1997), Reinhart (1997) and Ebert (2009)) that discourse anaphors may be divided into two groups, according to the determiner that heads the DP in the sentence that precedes them. The first group consists of anaphors that are understood *exhaustively*, insofar as occurrences of sentences that include them seem to be about the members of the entire intersection of the two arguments of the extension of the antecedent's determiner. The second group consists of anaphors that are understood *non-exhaustively*, whereby occurrences of sentences that include them appear to be about the members of a set with the cardinality contributed by the preceding determiner (the DP's minimal witness set, according to Szabolcsi (1997)), whatever the cardinality of the intersection of the two arguments of the determiner's extension. Exhaustive anaphors include those that follow DPs headed by 'every', 'most', 'at least *n*', 'many', and 'some' when its NP argument is grammatically plural. Non-exhaustive ones include those that follow individual-denoting DPs and DPs headed by '*n*' and 'the *n*'.

In order to grasp this distinction, consider the following continuation after an occurrence of (2a) – (2l):

3. (He is / They are) having fun.

Relative to a context where there are four kings in the yard, the literature predicts that an occurrence of (3) is naturally understood to be about those four kings when it follows (2a), (2d), (2e) and (2j), yielding the exhaustive understanding. In contrast, an occurrence of (3) is seemingly about a single king when it follows (2b), (2g) or (2h), which is reflected in the fact that (3) must include a grammatically singular pronoun as a continuation to these sentences; and when an occurrence of (3) follows (2c) or (2i), it seems to be about three kings,

again yielding a non-exhaustive understanding.<sup>31</sup>

However, the literature frequently overlooks the fact that exhaustive construals are possible even for discourse anaphors that are typically placed in the group characterised by non-exhaustive construals. For example, the following exchange is acceptable, where B's utterance cannot be coherently understood to be about three kings, instead appearing to concern all of the kings in the yard:

4. A: Three kings are in the yard.

B: Actually, they number at least five.

Similarly, the discourse anaphors typically categorised as favouring exhaustive understandings may also be understood non-exhaustively. For instance, in the following exchange, B's utterance cannot plausibly be construed to be about all of the kings in the yard, instead appearing to be about a collection of at least three kings who are asserted to lack the property of being in the yard:

5. A: At least three kings are in the yard.

B: No, they're inside.

Indeed, my judgement is that a non-exhaustive construal is unavailable only for discourse anaphors that follow occurrences of monotone decreasing DPs.<sup>32</sup>

An additional complicating factor emerges from the observation in Kamp and Reyle (1993) that it is always possible to understand occurrences of sentences with anaphors to be about the members of the extension of the DP's restrictor, whatever determiner heads the DP. A continuation to (2d) – (2l) that increases the likelihood of such an understanding would be the following occurrence, which seems to be about the members of the entire set of (contextually relevant) kings:<sup>33</sup>

6. But they will all be there for the yard party later.

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<sup>31</sup>Note that the truth of (2h), (2g) and (2i) is consistent with the presence of four kings in the yard, and the truth of (2c) is consistent with such a scenario provided contextual domain restriction occurs (e.g. where the determiner's extension's first argument is the intersection of the set of kings and the set of people interlocutors were just discussing).

<sup>32</sup>Monotone decreasing DPs are known to yield idiosyncratic construals of subsequent discourse anaphora. As observed by Evans (1977) (p.494.), it is generally unacceptable for discourse anaphora to follow 'no'-headed DPs. In the case of occurrences of sentences with anaphors that follow DPs headed by 'at most *n*' and 'few', it has been noted that the item they appear to be about is unpredictable. For instance, Moxey and Sanford (1993), Sanford et al. (1994), and Paterson et al. (1998) present experimental data showing that, although occurrences of sentences with anaphors that follow 'few'-headed DPs are sometimes understood to be about the members of the intersection of the extensions of the restrictor and nuclear scope, individuals display a robust preference for taking them to concern the members of the *relative complement* of the nuclear scope's extension with respect to the restrictor's extension.

<sup>33</sup>It is difficult to establish whether occurrences of sentences with anaphors that follow DPs headed by 'every', 'the' or 'the *n*' may be understood to be about the members of the restrictor's extension, since the truth conditions of (e.g.) (2a) – (2c) require the entire set of kings to be in the yard, rendering such a construal of the pronoun equivalent to an exhaustive one.

From these observations, it may be concluded that occurrences of sentences with discourse anaphors are understood to be about the members of a range of sets in a manner dependent on aspects of the context. Most importantly for current purposes, discourse anaphors are often construed non-exhaustively when they follow occurrences of non-monotone decreasing DPs. If the aboutness item associated with occurrences of sentences with discourse anaphors is generally (or at least sometimes) the aboutness item associated with the topic of the preceding occurrence of a sentence, it follows that one of the topicable items in occurrences of sentences containing non-monotone decreasing DPs must be associated with a file card representing the DP's minimal witness set. The best candidate for this topicable item is a constituent containing the determiner, given that minimal witness sets are defined with respect to type  $\langle 1, 1 \rangle$  quantifiers. Out of the determiner alone or the entire DP, it is most plausible to associate the latter with a file card representing a minimal witness set: for, firstly, it has not yet been established that determiners are topicable, and secondly, it would seem unnatural to hold that the aboutness item for an occurrence of a sentence in which a determiner alone is the topic (should such an occurrence exist) involves individuals contributed by the NP's interpretation. From this reasoning it follows that the file card associated with a topical DP is its minimal witness set. The fact that discourse anaphors that follow monotone decreasing DPs may not be understood non-exhaustively is then attributed to the idea that monotone decreasing DPs are non-topicable, an idea earlier linked to the minimal witness set approach.

As a side point, it would be interesting to link alternative construals of discourse anaphors to the topicality of items other than DPs. If both a DP's NP restrictor and the complement of a determiner are topicable, then it would be natural to associate each with a file card representing their respective extensions. Hence the construals available for discourse anaphors that follow any type of DP (namely the restrictor's extension construal and the exhaustive construal) would be predicted to arise in scenarios where the topic of the preceding occurrence of a sentence is understood to be one of these two items. This proposal fits with the sort of contexts evoked by the examples that were earlier shown to elicit the relevant construals: (4) suggests a context where interlocutors are talking about the group of kings in the yard and attempting to determine the size of the group, whereas (6) is suggestive of a discussion about a pre-established group of kings and their whereabouts. However, this proposal is orthogonal to the arguments of this section and will not be developed.

It may therefore be seen that the anaphora criterion favours the view that topical DPs are associated with file cards representing an arbitrary minimal witness set. In contrast, the approach that takes the file card associated with a topical DP to represent the smallest live-on set results in the absence of a file card representing a minimal witness set for the non-exhaustive construal of anaphora. Furthermore, such an approach cannot explain the divergent construals available for anaphora following monotone decreasing and non-monotone decreasing DPs, since the file card associated with a DP is predicted to represent the NP's extension whatever determiner is involved. Finally, the smallest live-on set approach cannot attribute the difference between non-exhaustive and exhaustive construals of anaphora to the topicality of, respectively, the preceding DP and the preceding DP's restrictor, since the file card associated with both items would represent the same set.

I therefore conclude that the anaphora criterion supports the proposal that topical DPs have minimal witness sets rather than smallest live-on sets as their aboutness items. My

arguments to this effect solely rely on the necessity of a file card representing a minimal witness set of the DP in order to provide the non-exhaustive understanding that sometimes arises. That is, there is no need to speculate about which items must be topical for discourse anaphors to be construed other than non-exhaustively.

#### 2.2.4 File Cards and Semantic Meaning

It is worth taking a moment to clarify my reasons for rejecting the verification condition in §(2.1.2). Recall that the verification condition – originally discussed in Strawson (1964) and developed in Reinhart (1981) – suggested that assessing an occurrence of a sentence as true or false is ‘topic-centred’. It is not altogether clear what this means, but the idea evidently involves linking the truth value assessors assign an occurrence of a sentence to the choice of topic. This rough idea may be understood in either a strong or weak sense. The strong version suggests that the semantic meaning of a sentence partially depends on the file card with respect to which information storage occurs. From this view, it follows that the truth value of an occurrence of a sentence may vary according to the choice of file card. According to the weak version, the verification condition simply suggests that an assessor’s *perspective* on an occurrence of a sentence is influenced by the file card upon which information storage occurs. This view allows the semantic meaning and truth value of an occurrence of a sentence to be fixed independently of file card choice, while holding that the meaning and truth values an assessor *attributes* to an occurrence of a sentence may vary according to file card choice.

To clarify the difference between these two versions, contrast a context where the information expressed by a sentence  $S$  is stored on a file card representing  $d$  with an (otherwise identical) context where it is stored on a file card representing  $d'$ . The strong version of the verification condition predicts that  $d$  will contribute to the semantic meaning of the first occurrence of  $S$  and  $d'$  will contribute to that of the second, possibly resulting in different truth values for each occurrence relative to the contexts of utterance. On the other hand, the weak version predicts that the semantic meaning and truth values of each occurrence of  $S$  may remain identical, but assessors are likely to perceive  $d$  to contribute to the semantic meaning of the first occurrence and  $d'$  to contribute to the semantic meaning of the second occurrence, which allows the possibility of divergent *perceived* truth values of the two occurrences relative to each context of utterance. I will present some reasons for rejecting the strong version of the verification condition and accepting the weak version.

A strong version of the verification condition is implemented by both Heim (1982) and Erteschik-Shir (1997), with the former assigning truth conditions to files and the latter assigning truth conditions to sentences that vary according to the choice of file card. There are two main reasons that I diverge from such an approach. Firstly, as discussed in §(2.1.1), the standard view within the literature is that IS does not influence sentences’ semantic meaning, except possibly in the presence of focus-sensitive expressions such as ‘only’. This position is based not only on empirical observations, but also on the principle that the semantic meanings of sentences are definable independently of pragmatic features such as IS. While empirical or theoretical considerations might turn out to be sufficient to motivate a re-evaluation of the standard view, it is commonly argued (e.g. Rooth (1992), von Stechow (1994)) that it must be treated as the null hypothesis. It is therefore preferable to develop a system of file cards that encodes no connection to sentences’ semantic meaning.

My second reason for rejecting the strong version of the verification condition emerges from my position that DPs' file cards represent minimal witness sets. In light of this position, it follows that file cards will sometimes represent sets that exclude the individuals that play a direct role in causing an assertion to be uttered or to be true. For example, there will be situations where the information expressed by an occurrence of 'At least four kings are walking' is stored on a file card representing a set of four kings  $B$ , when the speaker might have in mind a distinct set of four kings  $B'$ , and the set of kings that are walking might turn out to be a disjoint set of six kings  $B''$ . The strong verification condition would presumably take the set that the file card represents to contribute to semantic meaning, yet it is difficult to grasp how the semantic meaning of a DP could be given solely by means of an arbitrary minimal witness set. In contrast, the weak verification condition allows non-arbitrary sets to contribute to semantic meaning, rendering the arbitrariness of the minimal witness set that a file card ends up representing easier to accept.

The system of file cards that I have described is therefore best implemented alongside a rejection of the strong version of the verification condition. On the other hand, it is compatible with the weak version. Indeed, a central principle to be advanced in this thesis is that *the choice of file card affects the way in which assessors understand an occurrence of a sentence*. In more detail, I will endorse the following view:

**Weak Verification Condition:** A context where the proposition expressed by an occurrence of a sentence is stored on a file card representing  $d$  will generally coincide with assessors' accessing a proposition  $p$  to which  $d$  contributes.<sup>34</sup>

To refer to the propositions assessors naturally consider in such situations, along with the process of their considering these propositions, I shall use the term '*understanding*' (or sometimes '*construal*' for the proposition and '*construing*' for the process). This terminology is intended to allow neutrality about whether the occurrence of the sentence *semantically expresses* the understanding accessed by assessors, or whether assessors are accessing a proposition that the occurrence is being used to *pragmatically convey*, distinct from the one it literally expresses. For the weak version of the verification condition is stated in such a way that it is compatible with the view that the meaning and truth values of occurrences of sentences sometimes *genuinely do* vary according to the choice of file card, with interlocutors' perception that this is the case therefore being accurate. Hence endorsing my statement of the weak version of the verification condition does not rule out that the strong verification condition holds with respect to at least some sentences; though for the reasons given earlier, I think a system of file cards should refrain from assuming that the strong verification condition holds generally. Furthermore, note that my statement of the weak verification condition is neutral about whether the choice to store information on a file card representing  $d$  causes assessors to access a proposition to which  $d$  contributes, or whether assessors' accessing a proposition to which  $d$  contributes causes information storage to occur with respect to the file card for  $d$ ; a correlation between the two scenarios is simply noted.

Having clarified reasons to reject the strong verification condition as a general principle, I will present evidence in favour of the weak verification condition in subsequent chapters.

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<sup>34</sup>It is difficult to clarify what it means for a set of items to *contribute* to a proposition, since this partially depends on one's analysis of propositions. Nevertheless, the intuitive idea should be sufficiently clear for current purposes.

## Summary of §(2.2)

This section aimed to establish the set that a topical, irreducibly quantificational DP's file card could represent. I began by presenting four candidates: the denotation, the smallest live-on set, the unique minimal witness set and an arbitrary minimal witness set. I first assessed each candidate with respect to the aboutness criterion, which requires the file card associated with a DP to represent an item that occurrences of sentences in which the DP is topical are intuitively about. I argued that this criterion rules out approaches that associate DPs with file cards representing either their denotations or their unique minimal witness sets. I then assessed the two remaining candidates with respect to the anaphora criterion, which requires the file card associated with a DP to serve as an appropriate aboutness item for certain occurrences of subsequent anaphora. I argued that approaches that associate a topical occurrence of a DP with a file card representing an arbitrary minimal witness set best make sense of assessors' construals of discourse anaphora. I then clarified my reasons for rejecting the strong version of the verification condition, while stating the weak verification condition that will be endorsed in subsequent chapters.

The approach based on minimal witness sets advanced in this section allows the first desideratum for a system of file cards to be met: DPs' file cards have been connected to set-theoretic structures derived from a domain of discourse. The aboutness items assigned to DPs are furthermore closely tied to the analyses proposed by theories of generalized quantifiers, in accordance with the second desideratum. The final section shall pursue the third desideratum, linking file cards to IS.

## 2.3 Identifying Sentence Topics

In this third section, I pursue the final desideratum for a system of file cards, relating their manipulation to IS. An important initial step involves establishing the ways in which intonation, communicative needs and syntactic structure help to identify sentence topics. A preliminary fact to note is that there is more agreement about how to identify the focus of an occurrence of a sentence than the topic. That is, foci have particularly distinctive features that are near universally accepted as reliable hallmarks. I will therefore begin by defining 'focus' and explaining its hallmarks (§(2.3.1)). Next, I will argue that topic and focus generally stand in complementary distribution, thus the hallmarks of focus indirectly help to identify topic (§(2.3.2)). I will then describe techniques for identifying the topic of an occurrence of a sentence both indirectly (by directly identifying the focus before inferring that some other constituent is the topic) and directly, before observing that these techniques confirm that irreducibly quantificational, non-monotone decreasing DPs frequently occur as topics (§(2.3.3)). Finally, I will relate the standard notion of focus as an indicator of alternatives to the manipulation of file cards via the effect of questions under discussion on the common ground (§(2.3.4)).

### 2.3.1 Identifying Focus

As stated in §(2.1.1), it is commonly held that a constituent within an occurrence of a sentence is part of the sentence's *focus* when the understanding of the sentence partially depends on the availability of certain alternatives to that lexical item. The standard way of

formalising the role of focus as an indicator of alternatives is by means of the system of *Alternative Semantics* developed in Rooth (1985), Kratzer (1991) and Rooth (1992). Alternative Semantics defines the *focus semantic value* of an occurrence of a sentence as ‘the set of propositions obtainable from the ordinary semantic value by making a substitution in the position corresponding to the focused phrase ... At an intuitive level, we think of the focus semantic value of a sentence as a set of alternatives from which the ordinary semantic value is drawn, or a set of propositions which potentially contrast with the ordinary semantic value’.<sup>35</sup> More technically, an occurrence of an expression  $\alpha$  relative to a CG  $c$  is assigned a *focus semantic value*  $\llbracket \alpha \rrbracket_c^f$  in addition to its *ordinary semantic value*  $\llbracket \alpha \rrbracket_c^o$ . The focus semantic value is a set of items of the same type as the item denoted by  $\alpha$ , which is derived from  $\alpha$ ’s ordinary semantic value by inserting an appropriately-typed free variable in the position corresponding to the focus of  $\alpha$ . The type constraints for the free variable are imposed by specifying the domain that its value must belong to. In addition to the basic domains  $D_e$  and  $D_t$  (respectively of individuals and propositions), complex domains  $D_{\langle \sigma, \tau \rangle}$  are defined as sets of functions from  $D_\sigma$  to  $D_\tau$ , where both  $\sigma$  and  $\tau$  are well-formed semantic types.<sup>36</sup> Rooth (1985) furthermore gives a recursive definition of focus value, therefore assigning such values to sub-sentential constituents.

For example, where ‘ $\llbracket \ ]_F$ ’ indicates the constituent in focus, the focus value of (7a) will be the set of propositions expressed by sentences of the form ‘ $\mathcal{Y}X$  is bald’ (e.g. ‘Some king is bald’, ‘No cat is bald’, ‘Every tree is bald’, etc.), and the focus value of (7b) will be the set of propositions expressed by sentences of the form ‘Some king  $X$ ’ (e.g. ‘Some king is bald’, ‘Some king is outside’, ‘Some king is a cat’, etc.):

7. (a)  $\llbracket \llbracket \text{Some king} \rrbracket_F \text{ is bald} \rrbracket_c^f = \{ \llbracket \mathcal{Y}(X)(\text{is bald}) \rrbracket_c^o \mid \llbracket \mathcal{Y} \rrbracket_c^o \in D_{\langle \langle e, t \rangle, \langle \langle e, t \rangle, t \rangle \rangle} \& \llbracket X \rrbracket_c^o \in D_{\langle e, t \rangle} \}$   
 (b)  $\llbracket \llbracket \text{Some king} \rrbracket \llbracket \text{is bald} \rrbracket_F \rrbracket_c^f = \{ \llbracket \llbracket \text{Some (king)}(X) \rrbracket_c^o \mid \llbracket X \rrbracket_c^o \in D_{\langle e, t \rangle} \}$

Having sketched the standard analysis of focus as a means of indicating alternatives relevant to understanding an occurrence of a sentence, we may now turn to the matter of recognising the focus of an occurrence of a sentence. For most sentences, occurrences with distinct choices of focus are possible. However, the prosody, communicative needs and syntactic structure associated with an occurrence of a sentence will constrain the focus choice that may be attributed to that occurrence. Firstly, with respect to *prosody*, it is widely accepted that focus is identified in spoken English via *pitch accent*, which is a ‘local maximum or minimum of the fundamental frequency’, indicated by capitalisation in written form.<sup>37</sup> Büring (2016) (pp.6-7) claims that *neutral prosody* for an English sentence involves the assignment of pitch accents to the minimal number of *open class elements* (i.e. nouns, adjectives and

<sup>35</sup>Rooth (1992), p.76.

<sup>36</sup>While  $D_t$  is usually treated as a domain of truth values, it is important for the focus semantic values of occurrences of sentences to end up as a set of propositions (construed as sets of contexts of evaluation) rather than a set of truth values. While this could be implemented by recursively defining the intensions of expressions (as in Rooth (1985)), a simpler approach achieves the same effect by interpreting occurrences of sentences in a domain of propositions. The ordinary semantic value of a sentence ‘ $\alpha(\beta)$ ’ would therefore be accurately represented as  $\llbracket \lambda i. [\alpha(i)(\beta(i))] \rrbracket_c^o$ , in order to reflect its status as a function from contexts of evaluation  $i$  to the extension of each constituent at  $i$ . However, I will omit lambda abstraction over contexts of evaluation variables when writing such interpretations, for simplicity.

<sup>37</sup>Büring (2007), p.447.

main verbs) such that each syntactic phrase contains at least one pitch accent; optional rules then allow accents to be removed from or added to open class elements preceding the expression that receives the clause-final pitch accent. The effect of focus assignment on neutral prosody is generally accepted to include the following: the lexical material in a focus must carry at least one pitch accent, and the item on which the clause-final pitch accent falls is obligatorily included in the focus. However, there is debate about the correct rules governing exactly which items within a focus must receive a pitch accent. *Restricted* views of focus projection (e.g. Gussenhoven (1983), Ladd, Fuchs (1984), Baart (1987) and Gussenhoven (1999)) hold that it is possible for a clause to be in focus only if pitch accents occur on at least every argument and modifier that precedes the final accented word, whereas *extended* views (e.g. Chomsky (1971), Jackendoff (1972), Steedman (1994) and Büring (2016)) frequently allow a single accented word to ‘project’ focus to an entire complex clause. Given that everything to follow is compatible with any pairing of focus choice and prosodic structure that conforms with the generally accepted effects of focus assignment on neutral prosody, I shall not enter into this debate.<sup>38</sup>

A second crucial factor that constrains focus choice consists of *communicative needs*. More specifically, an occurrence of a sentence provides a felicitous answer to a QUD only if it is congruent with that QUD by virtue of having a suitable focus. The intuitive explanation for the congruence required between a question and an occurrence that provides an answer derives from the role of focus as an indicator of alternatives, insofar as focus serves to ‘signal other propositions which are potential answers in the context of the question’.<sup>39</sup> If we use the system of Alternative Semantics earlier described, along with Hamblin’s semantics for questions, then it is possible to give a precise statement of this congruence between QUDs and their answers:<sup>40</sup>

**Question-Answer Congruence principle:** An occurrence  $s$  of a sentence relative to a CG  $c$  is *congruent* with the meaning of a question  $q$  iff:

- a)  $\llbracket q \rrbracket_c^o \subseteq \llbracket s \rrbracket_c^f$ , and
- b) There is no alternative occurrence  $s'$  of  $s$  which has a smaller constituent in focus and meets a).

A question  $q$  may be more *specific* than some  $s$  that provides a felicitous answer, which is the case whenever its meaning is a proper subset of the focus value of  $s$ . This reflects the fact that questions sometimes include information that cannot be reconstructed from the focus value of an occurrence of a sentence congruent with the question’s meaning. For example,

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<sup>38</sup>It is worth noting that the data seems to support restricted views. Gussenhoven (1999) (p.46.) gives the following example, where (a) is an appropriate answer to the question ‘What’s happening?’ (thereby having sentence-wide focus) while (b) may only appropriately answer the question ‘What’s John tickling Mary with?’ (thereby having narrow focus on ‘a feather’)

- (a) JOHN’s tickling MARY with a FEATHer.
- (b) John’s tickling Mary with a FEATHer.

Extended views predict that (b) is an appropriate answer to ‘What’s happening?’; my judgement accords with Gussenhoven’s that this prediction is incorrect.

<sup>39</sup>Rooth (1992), p.84.

<sup>40</sup>Büring (2007), p.451.

when the 'wh'-word 'who' is used in a question, the free variable in its ordinary meaning is restricted to a domain composed of human individuals, whereas the free variable in the focus value of an answer need not include such a restriction.<sup>41</sup> The reason there cannot be an alternative occurrence of the sentence with a smaller constituent in focus is to rule out situations where *s'* counts as congruent with the meaning of *q* by virtue of having an arbitrarily large constituent in focus that contains the smaller constituent that would yield the correct focus value. For instance, an occurrence of '[Zaid uprooted everything in his yard]<sub>F</sub>' should not count as congruent with the meaning of the question 'Who uprooted everything in his yard?'

In light of this discussion, it should be clear that the link between prosody, communicative needs and focus is extremely direct. That is, intoning a sentence with particular pitch accents restricts the possible choices of focus, and intending to convey a certain choice of focus restricts the possible placement of pitch accents. Similarly, we can either infer the required focus for an occurrence of a sentence that provides a felicitous answer to a particular explicit QUD, or reconstruct the implicit QUD in light of a particular occurrence of a sentence. Indeed, in cases where the QUD is implicit, the foci of occurrences of sentences will not only allow the reconstruction of the congruent QUD, but they will *presuppose* a particular QUD.

A third factor, *syntactic structure*, has also been observed to constrain focus choice; however, its effect is arguably restricted to cases where neither prosody nor communicative needs are present to provide clues as to the choice of focus. Such cases arise for *out-of-context* sentences, where the way in which a speaker should intone the sentence is not indicated, and no background context is described that is sufficiently rich to provide crucial features of a CG such as a QUD. It is reasonable to deny that individuals ever assign interpretations to context-independent sentence types. I shall therefore endorse the idea that assessors who encounter an out-of-context sentence will assess an occurrence of it relative to an imagined *minimal context*, by which I mean a context that associates a prosodic structure with a sentence along with a QUD corresponding to the resulting focus value. Evidence for this claim derives from experimental data given by Tian and Breheny (2015), which they take to show that we infer contextual information and accommodate QUDs 'when we engage in conversation, *and* when we read speakerless out-of-context sentences ... Sentence comprehension can never be independent from context'.<sup>42</sup> Furthermore, work on implicit prosody (Fodor (1998), Bader (1998), Quinn et al. (2000), Fodor (2002)) indicates that assessors assign a prosodic contour to out-of-context sentences they encounter even under a silent reading, generally assigning 'the most natural (default) prosodic contour for the construction'.<sup>43</sup> Given the connection between prosody, QUDs and focus, it follows that individuals assign out-of-context sentences a particular focus choice. Furthermore, given the preference for attributing to out-of-context sentences the prosody most natural for the relevant grammatical construction, it follows that the syntactic structure of such sentences influences the foci assessors are likely to assign to them.

In summary, I have characterised the IS-theoretic notion of focus as an indicator of alternatives relevant to understanding, and explained how focus choice is constrained by

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<sup>41</sup>Rooth (1992), pp.85-6.

<sup>42</sup>Tian and Breheny (2015), p.28.

<sup>43</sup>Fodor (2002), p.113.

prosody, communicative needs and syntactic structure. In the following subsection, I shall explore the empirical connections between the focus and the topic of an occurrence of a sentence, raising the possibility of using the hallmarks of focus to identify topic.

### 2.3.2 Focus as a Guide to Topic

As discussed in §(2.1.1), I have resisted the common tendency to conflate the notions of topic and background on one hand, and the notions of comment and focus on the other hand. Therefore, the fact that topic and comment are defined as being in complementary distribution and that background and focus are defined as being in complementary distribution does *not* entail that topic and focus are in complementary distribution. Rather, this becomes a matter that requires empirical investigation. In this subsection, I will describe the occurrences of sentences that are frequently used to argue that a sentence topic is sometimes a focused constituent, though I will refrain from taking a position on whether such sentences successfully show this. Instead, I will treat these sentences as cases where focus should not be used as a guide to topic. Identifying these types of ‘exceptional’ sentences therefore serves to demarcate the ‘unexceptional’ sentences for which there is widespread agreement within the literature that the topic *is* a constituent outside of the focus. Given that most examples within following sections will be of the ‘unexceptional’ type, this subsection establishes that focus may be used as a guide to the identification of topic in the majority of cases with which this thesis is concerned.

The frequency with which the literature conflates topic with background and comment with focus indicates the common impression that topic and focus normally do not overlap. Indeed, it is generally accepted that, for occurrences of sentences where the focus consists of a single constituent which is a proper part of the sentence, there will be a sentence topic consisting of some part of a constituent outside of the focus. That is, for an occurrence of a sentence such as the following, the literature converges on the notion that some proper or improper part of the subject or object DP will be the sentence topic:

8. Zaid [BURNed]<sub>F</sub> everything in his yard.

The primary challenge to the hypothesis that topic and focus are *always* in complementary distribution emerges from the potential for occurrences of sentences with sentence-wide focus or with a fall-rise accent. *Sentence-wide focus*, or *all-focus*, arises when the focus includes all lexical items within the sentence, which yields an occurrence congruent with QUDs reflected by sentences of the form ‘What happened?’ or ‘What’s new?’. A constituent receives a *fall-rise accent* (originally discussed in Jackendoff (1972)) when it is marked with a rising pitch contour, and when a distinct constituent is marked with the falling pitch accent characteristic of focus. Occurrences of sentences that have sentence-wide focus or fall-rise accents are often thought to lack a non-focused element that is available as a suitable topic, from which some have inferred that a sentence’s topic and focus may overlap.

Nevertheless, the existence of such focus choices remains compatible with the thesis that a sentence’s topic and focus are always disjoint. To see this, first consider cases of sentence-wide focus, such as the following:

9. [ZAId burned everything in his YARD]<sub>F</sub>.

Lambrecht (1994) (p.137) explicitly states, and Reinhart (1981) (p.70.) implies, that occurrences of sentences with sentence-wide focus simply lack topics, rather than having a topic that is part of the focus. If this is the case, then the position that a sentence topic can only ever be a constituent outside of the focus may be upheld. While it would follow that focus cannot be used to determine sentence topic for occurrences with sentence-wide focus (since there is no topic), the potential to use focus to identify topic in other cases would remain unaffected.

Next, consider cases of sentences with fall-rise accents. Krifka (2007) (p.44) argues that such sentences include ‘an aboutness topic that contains a focus, which is doing what focus always does, namely indicating an alternative. In this case, it indicates an alternative aboutness topic’. Alternative topics will be relevant in situations where an interlocutor wishes to signal that their assertion does not pertain to the topic on which information is sought, but instead addresses a sub-topic, super-topic or independent but related topic. In contrast, Büring (1999) and Büring (2016) treat the stronger fall accent as marking the focus, whereas the weaker fall-rise accent indicates a topic with a specialised use. Büring (1999) (pp.144-7) identifies three main uses of accented topics: to move the conversation away from an entity given in the preceding discourse (*‘contrastive topic’*), to narrow down a given QUD (*‘partial topic’*) and to convey that the speaker wishes to discuss a different QUD (*‘purely implicational topic’*). He claims that the accented topic induces alternative questions, which are independent of the focus-induced alternatives.

Büring (1999) gives the following example, where ‘/’ marks a fall-rise pitch accent and ‘\’ marks a falling pitch accent. Büring wishes to assign it the topic and focus indicated in (10b), whereas Krifka thinks it should have the topic and foci indicated in (10c):

10. (a) On fifty- /NINTH street I bought the SHOES\.
- (b) [On fifty- /NINTH street]<sub>T</sub> I bought [the SHOES\]<sub>F</sub>.
- (c) [On [fifty- /NINTH]<sub>F1</sub> street]<sub>T</sub> I bought [the SHOES\]<sub>F2</sub>.

It should be clear that, were we to endorse Büring’s view, then the hypothesis that topic and focus are always in complementary distribution would stand uncontested; in contrast, should we accept Krifka’s view, then it would follow that they may overlap. Nevertheless, the possibility of their overlapping would arise only for sentences with the distinctive accent pattern.

In summary, the following generalization may be accepted: for an occurrence of a sentence without a fall-rise accent or sentence-wide focus, the sentence topic will be a constituent outside of the focus. Furthermore, even when occurrences of sentences with fall-rise accents and sentence-wide focus are taken into account, it remains possible to uphold the claim that topic and focus are always in complementary distribution. However, I will remain neutral with respect to whether a topic and focus may ever overlap. Neutrality on this matter is compatible with using focus to narrow down the candidates for sentence topic with respect to cases that involve neither a fall-rise accent nor sentence-wide focus. Fortunately, almost all of the examples to be considered in the following sections are occurrences of sentences of this ‘unexceptional’ type.

### 2.3.3 Identifying Topics

In §(2.3.1), I mentioned that factors related to prosody, communicative needs and syntactic structure cause a particular lexical item to become the likely, or obligatory, focus within an occurrence of a sentence. In this section, I will begin by describing the way in which syntactic structure is frequently claimed to influence topic choice. However, the cases for which syntactic structure renders a particular constituent the obligatory topic are rare. As argued in the previous section, the topic of an occurrence of a sentence with neither sentence-wide focus nor a fall-rise accent will be outside of that focus. Techniques to recognise focus may therefore be employed in order to aid the identification of topic. I will conclude this subsection by applying direct and indirect techniques to identify topics in order to confirm that irreducibly quantified, non-monotone decreasing DPs are topicable

Following Halliday (1967), some have argued that syntactic structure directly affects the choice of topic, due to a strong correlation between a constituent's being *clause-initial* and topical. Yet as Reinhart (p.62) observes, while there may well be a preference to construe the clause-initial item as topical, 'this preference is only a matter of tendency and we can use sentences with non-subjects as topics'. While clause-initial items in general need not be construed as topics, it has been widely claimed (e.g. Gundel (1975), Reinhart (1981)) that clause-initial items that have undergone *left dislocation* are obligatorily topics. Left dislocation occurs when a constituent that is not clause-initial in the sentence's canonical form has been fronted, whilst a co-referring anaphor remains in that constituent's canonical position. Reinhart (1981) (p.64) additionally notes that, if we can appropriately replace a sentence relative to a given CG with an equivalent sentence in which a constituent has undergone left dislocation, then that constituent is possibly the topic of the original occurrence of the sentence; however, given that certain additional factors may preclude left dislocation for particular sentences or contexts, a sentence's failing this test does not entail the impossibility of the constituent's being understood as the topic.

It can therefore be seen that syntactic structure may be used to directly identify the topic of an occurrence of a sentence. However, the cases in which syntactic structure renders a particular constituent the obligatory topic (namely, left dislocation) involve relatively unusual constructions. Furthermore, testing the potential for a particular constituent to be understood as the topic, by considering a variant that has undergone left dislocation, provides little guidance as to whether that constituent *is* the topic in the original occurrence of the sentence. Given the limited utility of these procedures for directly identifying the topic of an occurrence of a sentence, the importance of using focus to identify sentence topics becomes evident. The prosodic, communicative and syntactic hallmarks of focus outlined in §(2.3.1) may therefore be used to indirectly identify the topic of an occurrence of a sentence, provided there is neither sentence-wide focus nor a fall-rise accent. In the remainder of this thesis, I will identify sentence topics based on the application of both the direct and indirect techniques.

Now that techniques for identifying sentence topics have been established, I will show that irreducibly quantificational, non-monotone decreasing DPs are not only *theoretically* topicable (as argued in §(2.1.3)) but are furthermore frequently selected as sentence topics. In contrast, monotone decreasing DPs yield a sense of oddness when attempts are made at rendering them the obligatory topic, which accords with the current proposal's prediction that they are non-topicable:

11. (a) As for (every / the / the three / most / at least three / a / some / three / many) king(s), (they're / he's) in the yard.  
 (b) ?As for (no / few / at most three) kings, they're in the yard.

The claim that monotone decreasing DPs are non-topicable receives further support from extensive cross-linguistic data surveyed in Ebert (2009) (pp.29-56).

In sum, several techniques will be used in subsequent sections to identify obligatory or probable IS. These techniques confirm that irreducibly quantificational, non-monotone decreasing DPs are topicable.

### 2.3.4 Focus and the Common Ground

The current approach might yield the impression that no uniform model of the effects of information structure is available, since topics have been analysed as indicating the file card required for information storage, while foci have been analysed as indicating the relevance of certain alternatives along with the existence of a particular QUD. However, it is possible to incorporate the notion of focus into the system of file cards endorsed. I will begin by explaining the problem with Erteschik-Shir's attempt at such an incorporation. I will then sketch my own proposal, which takes the QUD to play a mediating role by raising to prominence a particular file card.

Erteschik-Shir (1997) models the effect of focus within her system of file cards via the focus rule: the card associated with any DP included in the focus is raised to prominence, with a new card's being created in the case of indefinite DPs. However, this approach is plainly incompatible with my claim that monotone decreasing DPs cannot be associated with file cards (argued for in §(2.2.1) – §(2.2.3)). That is, Erteschik-Shir's Focus rule predicts that an occurrence of the following sentence will cause interlocutors to introduce a file card for the DP 'few kings' (though she does not elaborate on the discourse referents that this card should be linked to), which I claim is impossible:

12. [Zaid]<sub>T</sub> [talked to few KINGs]<sub>F</sub>.

One option would be to abandon my claim that monotone decreasing DPs cannot be associated with file cards, which might be achieved by reconsidering my conclusion that the most plausible item for DPs' file cards to represent is one of their minimal witness sets. However, the aboutness criterion and anaphora criterion provided clear support for the minimal witness set approach. More radically, I could abandon the idea that file cards need to represent set-theoretic objects at all, accepting Erteschik-Shir's eschewal of a systematic linking of file cards to domain members. Yet I think the benefits of grounding the system of file cards in a well-behaved ontology are sufficient to render it an important desideratum. Fortunately, it is possible to use the current system of file cards to model the effects of focus without adopting Erteschik-Shir's approach, in a manner that will now be sketched.

The Question-Answer Congruence principle entails that part of the *constant content* in the ordinary semantic value of an occurrence of a question (that is, the material other than free variables) corresponds to the topic of occurrences of sentences congruent with the meaning of that question. It is therefore natural to equate entering a question into the common ground with storing the information expressed by that question on a file card associated

with the topic of an occurrence of a sentence that provides a felicitous answer. Providing an answer to a question then involves replacing the set of propositions stored on the file card with a single proposition that counts as a partial or complete answer to the question. For example, the meaning of the question given in (13a) is congruent with (13b); hence the status of the question as reflecting the QUD at a particular context may be modelled by means of the inclusion in the common ground of the first file card below, with the provision of the answer's being modelled by the updating of this card to reflect the second one. The title of a file card gives the set it represents, and  $f$  is a choice function that selects an arbitrary member of a set of minimal witness sets:

13. (a) What property does the king have?  
 (b) [The king]<sub>T</sub> [is BALD]<sub>F</sub>.

$f(MW_{(Q_{the})_D(\llbracket king \rrbracket_c)})$
$\{\llbracket \text{the (king) } (X) \rrbracket_c^o \mid \llbracket X \rrbracket_c^o \in D_{\langle e,t \rangle}\}$
$f(MW_{(Q_{the})_D(\llbracket king \rrbracket_c)})$
$\llbracket \text{the (king) (is bald)} \rrbracket_c^o$

When a QUD contains constant content that is interpreted as a monotone decreasing DP, information storage will always occur with respect to a file card independent of that constant content, due to the fact that the monotone decreasing DP is not a viable candidate for the topic of occurrences of sentences congruent with that QUD. For example, the information expressed by an occurrence of 'What did Zaid do to few kings?' will be stored on a file card associated with a constituent that is a potential topic of an occurrence of a sentence that provides a felicitous answer (e.g. 'Zaid', or 'kings' if restrictors are topicable).<sup>44</sup> This allows the view that monotone decreasing DPs cannot be associated with file cards to be upheld.

There are two immediate matters to be addressed. Firstly, it is not clear what file card is suitable for the storage of a QUD congruent with occurrences of sentences that contain multiple potential topics. For instance, given that the meaning of (14) is congruent with occurrences of sentences that treat either DP as topical, it is unclear whether the information should be stored on the file card associated with 'the king' or 'the cat':

14. What did the king do to the cat?

It is useful to note that the same information will be added to whichever file card storage occurs with respect to. That is, the presence of the meaning of (14) as the QUD will add the following entry to a file card, whichever DP is understood as topical in the response:<sup>45</sup>

<sup>44</sup>Indeed, in order to provide a file card for information storage with respect to QUDs where the only constant content is interpreted as a monotone decreasing DP, such as the ordinary semantic value of 'What did few kings do?', I would need to assume the topicability of NPs.

<sup>45</sup>I have assigned a semantic type to ' $X$ ' that allows it to take the object position DP as its argument, which in turn yields an appropriately typed argument for the subject position DP. This allows me to gloss over the problems presented by object position DPs (see Heim and Kratzer (1998), chapter 7 for an overview). The type of  $X$  may be replaced with whatever type fits with one's preferred analysis of object position DPs, without affecting my main point.

$\frac{f(MW_{(Q_{the})D}(\llbracket king \rrbracket_c)) / f(MW_{(Q_{the})D}(\llbracket cat \rrbracket_c))}{\{\llbracket the (king) (X (the cat)) \rrbracket_c^o \mid \llbracket X \rrbracket_c^o \in D_{\langle\langle e,t \rangle, \langle e,t \rangle}\rangle\}}$
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It is therefore plausible to think that, other than the raising to prominence of a particular file card, no crucial differences in the CG result from divergent choices of constant content for storage purposes. A reasonable working hypothesis is therefore that, when the context does not single out a particular item in the ordinary semantic value of a question as providing the topic of congruent occurrences of sentences, interlocutors may arbitrarily select a file card associated with constant content in the semantic value of the question for storage of the QUD, subsequently adding the information expressed by the response to the same file card. The matter of multiple candidates for topics may be set aside in subsequent chapters, since I will only consider QUDs that unambiguously identify the topic of congruent occurrences of sentences.

A second crucial matter to be resolved concerns which file card is suitable for the storage of a QUD congruent with an all-focus occurrence of a sentence, such as the QUD reflected by ‘What happened?’. Erteschik-Shir claims that such questions involve implicit stage topics, and are stored on the associated stage file cards. However, her usage of stage cards is frequently ad hoc, with her invoking implicit stage topics for a variety of sentences in order to maintain her approach when faced with apparent counter-examples. For instance, she claims that a broad range of occurrences of questions that contain explicit DPs may induce storage with respect to stage file cards, not just those questions that express the same meaning as ‘What happened?’. Finally, her approach entails commitment to the idea that occurrences of sentences frequently contain implicit topics, yet the notion of pervasive covert lexical material is sufficiently controversial that it would be preferable to remain neutral on this matter.

I will sketch an alternative proposal, where information storage occurs with respect to a *stage file card* when the file card is not associated with overt lexical content, and represents some improper or proper subset of  $D$ . I will assume that a file card representing the entire domain of discourse  $D$  is available relative to every discourse context. This file card, along with any additional ones that represent appropriate proper subsets of  $D$ , serve as natural analogues of Erteschik-Shir’s stage cards: for the ‘location’ associated with the actual world at the current time is captured by a file card representing all of the individuals that currently exist, and a more restricted location (e.g. the room in which the discourse is taking place) may be captured by a file card representing the proper subset of the domain of discourse consisting of individuals assumed to exist within the restricted location by participants in the discourse. This construal of ‘locational’ discourse referents as representing sets of individuals (rather than as sets of space-time points, situations, etc.) assumed to be present in the relevant location accords well with the current analysis of file cards as uniformly representing sets of individuals within the domain of discourse. Furthermore, I will hold that the information expressed by occurrences of questions and sentences is stored on a stage file card only if they are either prototypically all-focus (i.e. they have the same meaning as ‘What happened?’, or are congruent with QUDs with that meaning), or they are understood to have undergone contextual domain restriction (see §(3.4)); this helps to avoid ad hoc invocations of such file cards. I will also accept as the null hypothesis that all-focus occurrences of sentences lack topics altogether, and that the information expressed by occurrences of sentences that lack topics is always stored on stage file cards; though it would be possible to

revise this assumption to permit implicit topics in all-focus occurrences of sentences without affecting my central proposal.

The view that questions structure discourse was seen to be crucial to the definition of QUDs earlier given. Given that QUDs have now been linked to file cards, we may propose that they structure discourse by imposing a partial order on file cards. That is, an explicit QUD causes the file card on which it is stored to be raised to prominence. This construal of the role of QUDs leaves several open questions. Firstly, there is the matter of the period of time for which a file card remains prominent. Secondly, there is the question of whether multiple cards may be prominent at once (cf. the 'top of the file' in Erteschik-Shir (1997)) or whether there is a single most prominent card (cf. the 'QUD stack' in Roberts (1996)). Thirdly, there is the matter of whether features other than an explicit QUD may be used to raise a card to prominence. I shall remain neutral with respect to the first two open questions, and partially address the third: I will assume that the contextual salience of an item may raise to prominence a file card representing that item. Indeed, it is generally the contextual salience of a location or collection of individuals that renders a proper subset of *D* available as a stage file card. However, an account of the features that determine contextual salience is beyond the scope of the current project.

The view that the QUD is stored on an appropriate file card incorporates the role of focus into the system of file cards by attributing to it the effect of providing the value for a variable on the card associated with the topic. Since focus is not claimed to trigger the introduction of new file cards, as argued by Erteschik-Shir, it is unproblematic for monotone decreasing DPs to occur as part of focus. Furthermore, the definition of focus as the indicator of alternatives relevant to the understanding of an occurrence of a sentence fits naturally with this proposal: by replacing a variable with the value provided by focused expressions, interlocutors are put in mind of the alternative values that this variable might have been replaced with.<sup>46</sup>

### Summary of §(2.3)

In this section, I explained how IS affects the manipulation of the system of file cards. Prosody, communicative needs and syntactic structure help to identify sentence topics indirectly (by identifying the focus of an occurrence of a sentence, which I argued is disjoint from its topic provided the focus is not sentence-wide and there is no fall-rise accent) and directly (by means of sentences that have undergone left dislocation). The potential to identify the topic of an occurrence of a sentence therefore allows predictions to be made about the file card on which the information expressed by that occurrence will be stored. I also claimed that the role of a QUD is to render prominent a file card appropriate for the storage of information expressed by a congruent occurrence of a sentence. This clarifies the sense in which the IS of occurrences of sentences causes individuals to manipulate and update file cards, thereby meeting the third desideratum for a system of file cards.

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<sup>46</sup>This perspective on focus is only obviously applicable when there is an *explicit* QUD that has been stored on the relevant card. It is possible to argue that, when a sentence does not occur relative to an explicit QUD, an implicit QUD congruent with the occurrence is briefly accommodated on the appropriate file card before its variable is replaced with the focused item. The benefit of such a position is that the proposed explanation of why focus serves to indicate alternatives becomes applicable even in the absence of explicit QUDs. A less appealing aspect of such a position is that it postulates an unnecessarily taxing procedure for the processing of discourse. For current purposes, I am able remain neutral on this matter.

## Chapter Summary

The aim of this section has been to elaborate some key notions from work on information structure, whilst also sketching a system of file cards within a structured common ground to be put to use in subsequent chapters.

I began by giving an overview of the literature on information structure, focusing on the notion of a sentence topic, which was characterised by both Strawson and Reinhart in terms of criteria of relevance and verification. I used a modified version of the relevance criterion to characterise a sentence topic, claiming that it signals that the information expressed by the occurrence of the sentence in which it is present should be added to a file card in the common ground representing its aboutness item. I committed myself to the view that all non-monotone decreasing DPs, including irreducibly quantificational ones, may occur as sentence topics; though I refrained from taking a position on which other expressions are topicable. I then considered the extant systems of file cards proposed by Heim (1982, 1983) and Erteschik-Shir (1997, 1999, 2007), identifying three desiderata for such a system: file cards should represent set-theoretic structures derived from the domain of discourse, the system should be compatible with theories of generalized quantifiers, and an explanation should be given of the connection between IS and the manipulation and updating of file cards. I then sketched a system meeting these desiderata. I argued that the item represented by the file card for a topical DP will be an arbitrary minimal witness set for the DP's denotation, based on observations pertaining to intuitive aboutness items and the processing of anaphora. This perspective allows the first two desiderata to be met. I then clarified my reasons for rejecting a strong version of Strawson's criterion of verification, instead adopting a weak verification condition that may be summarised as follows: when information storage occurs with respect to a file card representing a particular aboutness item, assessors will generally access a proposition to which the aboutness item contributes. Practical strategies for recognising the topic of an occurrence of a sentence were then discussed. Finally, I clarified the way in which features of IS affect the common ground, which allows my account to meet the third desideratum for a system of file cards.

## Chapter 3

# Triggering Domain Restriction

This chapter considers the question of *when individuals reach domain restricted understandings of occurrences of sentences with respect to their quantifier expressions* ('the Triggering Question'). I will argue that observations pertaining to information structure allow the provision of a partial answer to this question. I will motivate my proposal by challenging Shaw's (2015) attempt at a partial answer.

In §(3.1), I will present and oppose Shaw's partial answer, which claims that the potential for an anomalous interpretation of an occurrence of a sentence is a trigger for domain restriction, and that such domain restriction cannot be modelled by a general mechanism that is also applicable to sentences that hold no potential for anomaly. My criticism of Shaw's proposal predominantly rests on occurrences of sentences that pose counter-examples to the predictions of his account. In §(3.2), I will provide some background on observations that have been made concerning the connection between information structure and domain restriction. It will be concluded that the connection between information structure and domain restriction may be exploited in order to answer the Triggering Question, but that the existing literature pursues no such strategy. In §(3.3), I propose that a focus-based domain restricted understanding of an occurrence of a sentence with respect to its DP's determiner is possible only if the focus includes a proper part of the DP-external material, something I will attribute to Gricean principles. This partial answer to the Triggering Question predicts the natural assessments generated by the sentences that Shaw uses to motivate his account, in addition to the counter-examples I gave in the process of challenging his account. Finally, in §(3.4), I will show how making use of the system of file cards described in §(2) allows a more informative partial answer to be provided, based on the view that a domain restricted understanding of an occurrence of a DP arises if and only if the information expressed by the relevant occurrence of the sentence is stored on a file card representing a proper subset of the DP's restrictor's extension.

### 3.1 Domain Restriction and the Triggering Question

I will begin by giving a brief overview of the literature on the mechanisms that bring about domain restriction, along with the neglected topic of when these mechanisms are initiated (§(3.1.1)). Next, I will describe the case that Shaw uses to motivate his account, before characterising the semantics he proposes for determiners (§(3.1.2)). Then I shall challenge the

arguments that Shaw presents, showing that the potential for anomaly does not invariably trigger domain restriction, and that nothing rules out the potential for a general mechanism of domain restriction to explain Shaw's cases (§(3.1.3)).

### 3.1.1 The Neglect of the Triggering Question

Accounts of generalized quantifiers predict an occurrence of a sentence such as 'Every bottle is empty' to be true if and only if the set of bottles in the domain of discourse is a subset of the set of empty things in the domain. However, it is widely acknowledged that there are situations where *domain restriction* occurs: a sentence is understood in such a way that the first argument of the standard extension of a determiner within that sentence is taken to be a proper subset of the extension of the restrictor. For instance, Stanley and Szabó (2000) observe that assessors frequently take occurrences of 'Every bottle is empty' to be true when the relevant relation holds with respect to some subset of the set of all bottles that exist at that context, such as all of the bottles that Yan bought that day. To refer to the propositions assessors naturally consider in such situations, along with the process of their considering these propositions, I shall use the neutral terminology 'restricted (unrestricted) *understanding*'. The matter of *when* restricted understandings arise will be the topic of this chapter, a question I shall refer to as the '*the Triggering Question*'.

The literature on domain restriction includes extensive discussion of the mechanisms that should be invoked to formally analyse domain restriction (e.g. Westerstahl (1985), Partee (1989), von Stechow (1994), Roberts (1995), Eckardt (1999), Geurts and van der Sandt (1999), Bach (2000), Herburger (2000), Stanley and Szabó (2000), Stanley (2002), Breheny (2003), Martí (2003), Kratzer (2004), Bach (2005) and Rast (2013)). However, while much has been written about *how* domain restriction occurs when it does occur, less has been written about *when* it occurs. I will begin by giving an overview of the literature on the mechanism underlying domain restriction, before arguing that the Triggering Question is sufficiently important to deserve attention.

It is standard to distinguish accounts of domain restriction according to whether they invoke syntactic, semantic or pragmatic mechanisms.<sup>1</sup> Imagine a context *c'* where an occurrence of a sentence *S* (e.g. 'Every bottle is empty') receives a restricted understanding that is naturally paraphrased by an occurrence of a distinct sentence *S'* (e.g. 'Every bottle *Yan bought today* is empty'). According to a *syntactic* approach to domain restriction, *S* contains silent morphemes that render it lexically equivalent to *S'*. A *semantic* approach holds that *S* and *S'* are lexically distinct sentences, but semantic mechanisms mean that the occurrence of *S* expresses the same proposition as an occurrence of *S'* relative to *c'*. Finally, a *pragmatic* approach claims that the occurrence of *S* expresses a proposition corresponding to the unrestricted understanding, but pragmatic mechanisms have allowed the use of *S* to convey the proposition expressed by an occurrence of *S'* relative to *c'*. I shall set aside the syntactic approach, since it has been widely criticised in the literature (e.g. Bach (1994), Stanley and Szabó (2000)) and therefore lacks any contemporary advocates. Two accounts paradigmatic of the semantic and pragmatic approaches will now be briefly discussed.

Von Stechow (1994) proposes a semantic account of domain restriction, postulating a *resource domain variable*, which is an index attached to certain quantifier expressions. The

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<sup>1</sup>See Stanley and Szabó (2000), pp.230-6.

context assigns to the resource domain variable a value of the type corresponding to the quantifier's first argument. He then gives a semantics where a quantifier's first argument is the extension of the appropriate lexical material intersected with the value of the resource domain variable. For example, where  $i$  is the covert variable and  $g$  is a variable assignment, a simplified version of von Fintel's semantics state that an occurrence of 'Every $_i$  N  $\beta$ ' is true when tokened and assessed relative to  $c$  if and only if  $\llbracket \text{Every} \rrbracket_c(\llbracket \text{N} \rrbracket_c \cap g(i))(\llbracket \beta \rrbracket_c)$  holds at  $c$ .<sup>2</sup> All cases of domain restricted understandings of sentences are then attributed to the mechanism of the resource domain variable's value's constraining a quantifier's first argument. For example, the resource domain variable in an occurrence of the sentence 'Every $_i$  bottle is empty' may receive as its value the set of things Yan bought on that day, causing the proposition expressed to be the same as the one that would be expressed by an occurrence of 'Every bottle Yan bought today is empty' relative to the same context.

In contrast, Bach proposes a *pragmatic* account of domain restriction. Bach's (2000) (p.262) view is that '[w]e generally speak loosely, omitting words that could have made what we meant more explicit and letting our audience fill in the gaps'. Domain restriction, he claims, is just a variety of this tendency to omit constituents in cases where we expect interlocutors to grasp the proposition we mean to communicate. Bach (2000) (p.268) suggests that it is the 'lack of relevant specificity' of the proposition literally expressed that causes the hearer to perceive an instance of loose talk and seek an alternative understanding. For example, he holds that an occurrence of 'Every bottle is empty' always expresses the proposition that every bottle in the domain of discourse is empty; however, it may be used to convey the proposition expressed by an occurrence of 'Every bottle Yan bought today is empty', provided the hearer perceives a lack of relevant specificity and succeeds in reconstructing the missing material.

Neither of these accounts of the mechanism of domain restriction provide clear predictions about which occurrences of sentences are likely to receive restricted understandings.<sup>3</sup> Indeed, a discussion of the Triggering Question is largely absent from the literature. One reason that the Triggering Question has been neglected is that it is often taken for granted that some degree of contextual domain restriction *always* occurs. If this were so, then there could be no interesting, non-trivial answer to the Triggering Question. However, examples such as the following demonstrate that it is not the case that every actual occurrence of a sentence receives a restricted understanding:

1. (a) Everything is part of the natural world.
- (b) Every prime number is divisible by itself and one.
- (c) Every bottle Yan bought today is empty.
- (d) It is not the case that every actual occurrence of a sentence receives a restricted understanding.

Firstly, there are rare examples like (1a), where the restrictor 'thing' seemingly denotes the entire domain of discourse (that is, including everyday objects, particles, numbers, etc.).

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<sup>2</sup>Note that von Fintel defines resource variables as functor variables that apply to contextually-determined arguments, in order to handle 'bound' readings of quantifier expressions where the resource domain appears to vary for each item in some set denoted by another expression. This complication may be overlooked for current purposes.

<sup>3</sup>Though see §(3.2.2) for a more detailed discussion of the predictions of von Fintel's account.

Williamson (2003) (p.416) observes that we should understand an ontological naturalist who issues (1a) as generalizing without any restriction whatsoever, as we would otherwise be ‘failing to appreciate the radical extent of their claim’. In seeking examples of sentences that have an unrestricted understanding, people tend to have these rare sentences in mind, with their rarity perhaps contributing to the sense that unrestricted understandings are marked. However, (1b) – (1d) are examples of sentences that have an unrestricted understanding provided the quantifier’s first argument ends up as the standard extension of the restrictor at the context. For instance, an unrestricted understanding will arise with respect to an occurrence of (1b) or (1c) if the quantifier’s first argument ends up as, respectively, the set of all primes (rather than, say, the set of primes that the speaker has ever reached by counting), or the set of all bottles that Yan bought on the relevant day (rather than, say, the set of beer bottles Yan bought that day).

Of course, the possibility of such understandings does not establish that interlocutors would ever actually use or understand sentences such as (1b) and (1c) in an unrestricted manner. However, I am fairly sure that my own use of (1d) in the previous paragraph is naturally understood as a claim about the set of *absolutely all* actual occurrences of a sentence. While some occurrences of (1a) – (1d) may indeed be understood in a restricted way, this only serves to emphasise the importance of addressing the Triggering Question.

A complete answer to the Triggering Question would involve specifying every factor that triggers and blocks domain restricted understandings. However, the complexity and breadth of the pragmatic factors that influence communication raise doubts about the possibility of describing a complete answer. Fortunately, partial answers may be illuminating, where a proper subset of the set of factors that trigger and block restricted understandings is identified. In this chapter, I will propose that observations pertaining to information structure allow the provision of a partial answer. For example, the position to be developed predicts that, relative to a context where all of the bottles Yan bought that day are empty but some of the bottles Yasma bought are full, and relative to the indicated QUD and pitch accents, (1e) will naturally be judged as false and (1f) as true:

1. (e) (I’m looking for empty containers to store stuff in. What’s empty?)  
Every BOTtle is empty.
- (f) (What happened to the bottles Yan bought today?)  
Every bottle is EMPTy.

Having considered extant accounts of domain restriction and the Triggering Question, it has become clear that the question of which mechanisms should be used to model restricted understandings is separable from the question of which factors trigger and block the initiating of these mechanisms. While the literature has focused on the former question, I have argued that addressing the latter question is crucial, on the grounds that occurrences of sentences demonstrably vary with respect to whether or not a restricted understanding is natural.

### 3.1.2 Anomaly as an Answer

Shaw provides a partial answer to the Triggering Question, which I will describe before challenging. He argues that the potential for an anomalous interpretation of an occurrence

of a sentence triggers a domain restricted understanding. Shaw (2015) (p.147) characterises *anomaly* as the quality displayed by ‘utterances of grammatical sentences with meaningful constituents that seem to resist conventional interpretation’, more commonly referred to as ‘category mistakes’. The case that Shaw uses to motivate his view is the following:

*Trees and Planks*: Bob owns a house with a large yard. In the yard there are six trees and six beautiful hand-carved Scandinavian planks, but nothing else - no bushes, brush, grass or anything of the sort: just dirt. Bob wants to build a fire to keep warm in the winter but is loathe to use those wooden planks. Consequently Bob uproots the six trees and uses them as firewood.

Shaw claims that speakers will classify (2a) as true and (2b) as false:

2. (a) Bob uprooted everything in his yard and burned it.
- (b) Bob burned everything in his yard.

These results are unexpected, on the grounds that the truth of a literal understanding of (2a) logically entails the truth of a literal understanding of (2b).<sup>4</sup> Shaw considers the explanation for this unexpected data to be that (2b) is understood with respect to the literal extension of the restrictor ‘thing in his [Bob’s] yard’, and thus includes the planks; in contrast, (2a) is understood in terms of a subset of the restrictor’s extension that excludes the planks.<sup>5</sup> Shaw’s reasoning therefore indicates that either some aspect of (2a), absent with respect to (2b), triggers domain restriction, or that some feature of (2b), absent from (2a), blocks domain restriction. He ends up attributing the different understandings to the presence of the predicate ‘uprooted’, which he considers to be a trigger for domain restriction because occurrences of sentences such as ‘Bob uprooted the plank’ will normally be classified as anomalous.

Shaw claims that anomaly-triggered domain restriction arises as a result of a particular mechanism within the semantics of determiners. His semantics make use of *domains of significance*, which give information about the objects that each predicate can be applied to in a truth-evaluable manner. A predicate’s domain of significance contains that predicate’s extension as a subset. Shaw focuses on cases where the union of the extensions of a determiner’s arguments fails to be a subset of the intersection of the domains of significance of the determiner’s arguments. He proposes that, in such cases, if the intersection of the domains of significance is furthermore non-empty, then the truth conditions for determiners require the sentence to be assessed solely with respect to the intersection of the domains of significance. His explanation for this is that, without the domain restriction, the sentence would end up being anomalous and undefined; and Shaw (2015) (p.154) assumes the existence of ‘a general interpretive strategy ... to maximize truth-evaluable (i.e. conventionally interpretable) content’. When the intersection of the domains of significance is empty, there is no way to prevent the occurrence of the sentence from being assigned the value ‘undefined’.<sup>6</sup>

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<sup>4</sup>That is, for a right monotone increasing quantifier  $Q$  like the one denoted by ‘every’,  $Q(A)(B \cap B') = 1 \rightarrow Q(A)(B') = 1$ .

<sup>5</sup>Presumably Shaw thinks that, at least relative to *Trees and Planks*, the extension of ‘thing in his [Bob’s] yard’ is the set of medium-sized, dry goods in Bob’s yard. Otherwise, the literal extension of the restrictor might include (e.g.) particles of dirt and molecules of air, and an understanding of (2b) where the quantifier’s first argument is the set of six trees and six planks would be a domain restricted understanding after all.

<sup>6</sup>For example, consider the following sentences:

Given these semantics for ‘every’, an analysis of (2a) relative to the context described in *Trees and Planks* begins with the observation that the intersection of the domains of significance of the predicates ‘thing in his yard’, ‘uprooted’ and ‘burned’ consists of the set of six trees, since planks are not included in the domain of significance of ‘uprooted’. The truth of (2a) is then predicted because the set of things in Bob’s yard that are among the six trees is coextensive with the set of items that were uprooted and burned among the six trees. The falsity of (2b) is predicted due to the fact that the intersection of the domains of significance of ‘thing in his yard’ and ‘burned’ consists of the set of six trees *and* six planks, which fails to be a subset of the set of things that Bob burned.

As mentioned in the introduction, the issue of the mechanism used to model domain restricted understandings of sentences is separate from the issue of the factors that influence the initiating of this mechanism. Thus it is conceivable that the restricted understandings of occurrences of both (2a) and ‘Every bottle is empty’ are modelled by a single *general* mechanism that underlies all cases of domain restriction, despite the fact that a range of factors might trigger the activation of this mechanism (with the potential for anomaly possibly being one such factor). In order to defend the claim that the restricted understanding of (2a) should be modelled by means of his proposed semantic mechanism, Shaw must therefore argue that no mechanism used to model other instances of domain restriction may account for the restricted understanding of (2a).

Shaw’s first argument to this effect is that occurrences of (2a) and (2b) are understood differently despite the fact that ‘the context need not alter significantly between their assessments’.<sup>7</sup> According to Shaw, the general mechanisms often invoked to capture a shift between the restricted and unrestricted understanding of a sentence with the same DP require a change in context.

Shaw’s second argument is that the assessment of occurrences of (2a) is impervious to the salience of the planks. He assumes that, were the restricted understanding of (2a) to arise as a result of general mechanisms of domain restriction, then the salience of different sets should automatically affect the restricted subset that (2a) is understood relative to. He presents a variant of the case:

*Trees and Planks 2:* Bob was cold the other day and looking for kindling to keep warm. The type of trees that grow on Bob’s property were not really any good for making fires, but the Scandinavian planks in his yard were spectacularly flammable. Bob didn’t really value those planks at all. Anyway, at the end of the day he uprooted everything in his yard and burned it.

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- (i) Every tomato is red.
  - (ii) Everything is red.
  - (iii) Every prime is red.

Let us assume that the domain of significance for ‘red’ is the set of concrete objects, for ‘prime’ is the set of numbers, and for ‘tomato’ and ‘thing’ is the entire domain. It follows that an occurrence of (i) is true if and only if the set of tomatoes that are also concrete objects (which is the set of all tomatoes) is a subset of the set of red things that are concrete objects (which is the set of all red things). An occurrence of (ii) is true if and only if the set of things that are also concrete objects (which, crucially, is a *proper subset* of the set of all things) is a subset of the set of red things that are concrete objects; hence anomaly-triggered domain restriction is predicted, and an occurrence of (ii) may be true even if the extension of ‘thing’ includes some numbers and the extension of ‘red’ includes no numbers. The fact that the intersection of the domains of significance of ‘prime’ and ‘red’ is empty means that every occurrence of (iii) is undefined.

<sup>7</sup>Shaw (2015), p.149

Shaw takes it that the understanding of the final sentence still excludes the planks, even though he believes that they have been made as salient as possible.

A final reason he offers in support of his proposed analysis is a putative abundance of cases where the potential for anomaly yields a robust domain restricted understanding. He provides the following two cases. His semantics predict that the subsequent sentences are true relative to the described scenarios, a prediction he takes to concur with natural judgements:

*José's Cocktails:* At a gastronomical competition José served two courses of tuna and veal accompanied by different rum cocktails. José added three kinds of cocktail bitters to the first cocktail, and two distinct kinds of cocktail bitters to the second. The judges enjoyed each meal. But after sipping from the cocktails, they declared that they would like to try them with more of the bitters that Jose had added. José accordingly added more of his first three bitters to his first cocktail, and more of his subsequent two bitters to the second cocktail, and presented them again for judging.

3. The judges sipped from everything José served before José added more of each cocktail bitter to it.

*Vera's Patient:* Vera has one of her patients, Marla, begin their therapy session by producing drawings and text on a single sheet of paper. Marla scrawls a dozen or so images and writes out the first ten words that come to her mind. Vera picks up the paper and, after reading the first two words in her head, reads the next eight, which seem more significant, out loud to Marla.

4. Vera read most things Marla scrawled on the page out loud.

In sum, Shaw argues for two main claims. His first claim is that the potential for anomaly always triggers a domain restricted understanding. This is due to a specific mechanism of domain restriction that he encodes in the semantics of determiners, whereby a quantifier's arguments are automatically constrained to those subsets of the extensions of the restrictor and the nuclear scope that are included in the relevant domains of significance. His second claim is that no general mechanism of domain restriction can be used to capture the type of domain restriction exhibited by his examples. A partial answer to the Triggering Question therefore emerges: when anomaly would otherwise result, domain restricted understandings will always arise. Support for this proposed answer derives from the robustness of the restricted understandings of (2a), (3) and (4) and the robustness of the unrestricted understanding of (2b). However, I will go on to challenge each of Shaw's two claims, before providing an alternative partial answer to the Triggering Question that predicts assessors' natural responses to (2a) – (4).

### 3.1.3 Against Anomaly-Triggered Domain Restriction

We may grant that the responses Shaw predicts with respect to occurrences of (2a), (3) and (4) are accurate, and that they conform to the predictions of his semantics. Yet it can nevertheless be shown that the predictions of his semantics for other sentences with the potential for anomaly are incorrect. Consider the following three sentences relative to the background scenarios, QUDs and prosody indicated:

*Xander's Maths Lesson:* During a Maths lesson, Xander is told by the teacher to complete some multiplications of his choice. On the board, the teacher has written over the course of the lesson: '22', '38', '42', ' $\tan(\theta) = 1/\cot(\theta)$ ' and 'Pythagoras'. After looking at the board for inspiration, Xander says: "22, 38 and 42 multiplied by three are 66, 114 and 126".

5. (What did Xander multiply?)

Xander multiplied everything written on the BOARD.

*Xenia's Lake:* Xenia is investigating the lake in her yard, in order to determine the source of regular splashing at the water's surface. During her investigation, she sees six fish, six frogs and six lily pads. All of the fish and the frogs she saw were splashing.

6. (What was splashing?)

Everything XENia saw in the LAKE was splashing.

*Xerxes' Desk:* Xerxes is tidying his desk, which is covered in tangled cables and piles of books and papers. He starts by untangling the cables and putting them away in a drawer. But by the time he has finished with the cables, he cannot be bothered to do anything with the piles of books and papers.

7. (What did Xerxes untangle and put away?)

Xerxes untangled and put away everything on his DESK.

Shaw's account predicts that (5) - (7) will be understood in a restricted manner, due to the anomaly that would result from interpretations involving their restrictors' literal extensions. His account therefore predicts that they will be judged *true*, since in each case, when the quantifier's arguments are restricted to only those elements in the extensions of the restrictor and nuclear scope that are members of the intersection of their domains of significance, the quantifier's first argument is a subset of the second. However, it is natural for an assessor to instead deny that the occurrences of these sentences are true.<sup>8</sup> That is, the most natural understanding is an unrestricted one.

It is worth considering how Shaw might attempt to account for these data. Firstly, it should be noted that Shaw (2015) (p.159) takes anomaly-triggered domain restriction to be 'merely a default interpretive mechanism, which may be overcome by other factors'. Shaw identifies processing costs as one such factor. However, it is clear that processing costs are not to blame for the resisted restriction in (5) - (7): the background scenarios are no less simple and natural than Shaw's examples, and the target sentences are no more syntactically complex than any of his.

Indeed, it seems to be no harder to produce cases where sentences with the potential for anomaly are understood in an unrestricted way than to produce examples where restricted understandings arise. If there are many non-abnormal counter-examples to Shaw's account, then I take it to be clear that the potential for anomaly does not invariably trigger restricted understandings. It follows that the mechanism of anomaly-triggered domain restriction

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<sup>8</sup>These claims about assessors' natural judgements, along with others in the chapter, are based on informal surveys. While data based on more formal surveys is beyond the scope of the current project, I hope to provide it in future work.

should not be encoded in the semantics for determiners. I will now claim that Shaw's arguments against the potential for a general mechanism of domain restriction to capture his cases are unsuccessful.

Shaw's first argument was that (2a) and (2b) are understood by a given assessor in, respectively, a restricted and unrestricted way, despite the fact that the assessor considers them in quick succession. Shaw infers that the assessor considers the sentences relative to a pair of contexts without any noteworthy change. However, this inference is based on the assumption that there are no syntactic or lexical features of (2a) and (2b) that significantly affect the context. In §(3.3.2), I will suggest that the differing syntactic structures of (2a) and (2b) cause assessors to consider them relative to distinct minimal contexts.

Shaw's second argument involved his using *Trees and Planks 2* in an attempt at disproving the hypothesis that general mechanisms are responsible for the restricted understanding of (2a). However, accounts that postulate a general mechanism of domain restriction need not commit themselves to the position that, in the presence of a trigger for domain restriction, the sentence is automatically understood with respect to the most salient subset of the restrictor's extension. It was earlier noted that the question of what mechanism should be used to model domain restriction is separate from the question of what factors trigger and block the initiation of this mechanism; now it may be emphasised that the additional question of which subset of the restrictor's extension ends up entering into the restricted understanding of a sentence is separate from both of these earlier questions. Hence it is possible to argue that a general mechanism of domain restriction brings about the restricted understanding of (2a) relative to *Trees and Planks*, and that pragmatic factors arise with respect to *Trees and Planks 2* that either block the restricted understanding altogether or cause a restricted understanding to obtain with respect to some subset of the restrictor's extension distinct from the salient set of planks.

### Summary of §(3.1)

In light of my arguments against Shaw's partial answer to the Triggering Question, it follows that the potential for anomaly is not a trigger for domain restriction, and that there is no reason to deny that general mechanisms may explain the domain restriction exhibited by Shaw's cases. Hence the methodological aim of avoiding proposing a greater number of specific mechanisms than we require to account for the full range of linguistic phenomena recommends that we attempt to explain his cases by means of general mechanisms. I will therefore go on to propose a partial answer to the Triggering Question that is compatible with modelling domain restriction via general mechanisms. Moreover, the answer will explain why sentences (2a) and (3) – (4) have robust propensities to yield restricted understandings while (2b) and (5) – (7) are naturally understood in an unrestricted way.

## 3.2 Domain Restriction and Information Structure

It is well-known that assessors' understandings of certain types of quantifier expression are sensitive to information structure; though determiners such as 'every' are generally not thought to be included among these quantifier expressions. The answer to the Triggering Question that I will go on to develop is based on the hypothesis that information structure

has an effect on the emergence of domain restriction with respect to determiners such as ‘every’. I will begin by explaining why it is frequently acknowledged that IS may affect a quantifier’s first argument, and give an overview of existing accounts of the mechanism by which this occurs (§(3.2.1)). I will then extend the mechanism developed in von Stechow (1994) to determiners such as ‘every’, showing that no answer to the Triggering Question automatically emerges (§(3.2.2)).

### 3.2.1 IS-Sensitive Quantifier Expressions

Well-known data shows that assessors’ understandings of certain types of quantifier expression are sensitive to IS. However, the mechanisms proposed in the literature to model the effects of IS are generally not extended to the determiner ‘every’. Furthermore, I will argue that extant accounts fail to elaborate the factors triggering and blocking their proposed mechanisms.

The clearest example of quantifier expressions that are influenced by IS consists of quantificational adverbs, such as ‘always’, ‘often’ and ‘rarely’.<sup>9</sup> The focus-sensitivity of these adverbs is illustrated by the following sentences, originally given in Rooth (1985):

8. (a) In St. Petersburg, officers always escorted [balleRInas]<sub>F</sub>.
- (b) In St. Petersburg, [OFFicers]<sub>F</sub> always escorted ballerinas.

(8a) is naturally paraphrased as ‘Always, when officers escorted someone in St. Petersburg, it was ballerinas they escorted’, while (8b) is paraphrased as ‘Always, when ballerinas were escorted by someone in St. Petersburg, it was officers they were escorted by’.

Arguments have also been advanced that the way we understand the determiners ‘few’ and ‘many’ is sensitive to focus. For example, Herburger (1997) perceives focus to have a truth-conditional effect on the following sentences, which were originally presented in Westerståhl (1985).<sup>10</sup>

9. (a) Many Scandinavians have won [the Nobel Prize in LIterature]<sub>F</sub>.
- (b) Many [ScandiNAvians]<sub>F</sub> have won the Nobel Prize in Literature.

(9a) and (9b) may be paraphrased respectively as ‘Many of the individuals of Scandinavia are winners of the Nobel Prize in Literature’ and ‘Many of the winners of the Nobel Prize in Literature are Scandinavians’.

Although the data are subtler, some have claimed that assessors’ understanding of determiners other than ‘few’ and ‘many’ is similarly affected by focus. For example Eckardt (1999) presents sentences like the following:

10. Ludwig washed most cars with [X-polish]<sub>F</sub>.

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<sup>9</sup>Note that the definition of ‘quantifier expressions’ given in §(1.1.2) might be taken to suggest that quantificational adverbs should not count as quantifier expressions, since they often occur without overt expressions that are understood to denote the set over which they quantify. I will nevertheless follow the standard approach from the literature on quantificational adverbs whereby they are analysed as denoting some kind of relation between sets.

<sup>10</sup>Note that Westerståhl (1985) did not attribute the different understandings of these sentences to IS.

The interpretation predicted by the standard truth conditions for (10) may be paraphrased as ‘Most cars were washed by Ludwig with X-polish’; however, Eckardt (1999) (p.167) claims that occurrences of (10) are instead naturally paraphrased as ‘Most cars that were washed by Ludwig were washed by Ludwig with X-polish’.

The examples above suggest that the way we understand occurrences of sentences with quantifier expressions may be affected by IS. Some hold that IS plays a *direct* role in the semantics of quantifier expressions (e.g. Rooth (1985), Partee (1991), Diesing (1992), Krifka (1992), Herburger (1997) and Herburger (2000)). Direct approaches propose that, for certain quantifier expressions, lexical material that occurs as part of the focus is mapped to the quantifier’s second argument, whereas lexical material external to the focus is mapped to the first argument. Others have proposed an *indirect* connection between IS and the understanding of quantifier expressions (e.g. Rooth (1992), Büring (1994), von Stechow (1994), Büring (1996), Roberts (1996), Partee (1999), Sharvit and Stateva (2002), Beaver and Clark (2003), Martí (2003) and Beaver and Clark (2008)), whereby the mapping from lexical material to a quantifier’s arguments is fixed by the semantics in a manner insensitive to IS. However, lexical material external to the focus may interact with the context in such a way that it affects the understanding of the quantifier’s first argument.

In order to delineate one way in which IS may affect the understanding of a quantifier expression, I define the following:

**Focus-Based Domain Restriction Definition:** An occurrence of a sentence has undergone *focus-based domain restriction* when it receives a domain restricted understanding involving a proper subset of the syntactic restrictor’s extension that has been supplied by means of focus-external lexical material in the sentence (e.g. (10)).

Direct and indirect accounts of the influence of IS on the understanding of quantifier expressions rarely use their proposed mechanisms to provide focus-based domain restricted understandings of determiners such as ‘every’. Most extant accounts are solely designed to handle quantificational adverbs, since these are the paradigm example of quantifier expressions susceptible to the influence of IS. While Herburger (2000) extends her mechanism to indefinite determiners, she claims that it is inapplicable to definite determiners. Eckardt (1999) proposes a mechanism that allows focus-based domain restricted understandings for definite determiners, but claims that it is only applicable with particular choices of focus.<sup>11</sup> Von Stechow (1994) is silent on the matter of whether his mechanism is applicable to determiners, though Büring (1996) assumes that it is.

Furthermore, extant accounts have little to say about the Triggering Question. Accounts that solely target quantificational adverbs imply that their mechanisms are triggered for the vast majority of occurrences of such expressions.<sup>12</sup> This position is not unreasonable: for, firstly, quantificational adverbs are normally taken to lack a syntactic restrictor, hence some mechanism must always apply to yield a quantifier that has a pair of arguments. Secondly,

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<sup>11</sup>That is, Eckardt (1999) (p.177) claims that it is only possible when the determiner does not c-command the constituent in focus.

<sup>12</sup>Whilst Herburger (2000) notes a couple of cases where her mechanism of Focal Mapping applies to one overt or covert quantifier expression whilst leaving another overt quantificational adverb within the same sentence unaffected, she classifies this as ‘a second, less salient kind’ of reading (Herburger (2000), p.61). She does not predict when this reading will emerge.

the literature commonly holds that it is ‘practically obligatory’ to understand an occurrence of a quantificational adverb in such a way that the first argument of its extension is fixed by IS.<sup>13</sup> An answer to the Triggering Question with respect to quantificational adverbs therefore may well be trivial. However, §(3.1) argued that interesting, non-trivial answers to the Triggering Question are available with respect to determiners. Yet those accounts that extend their mechanisms to determiners still do not provide predictions about the factors that trigger and block these mechanisms.<sup>14</sup>

It may therefore be concluded that, while mechanisms of focus-based domain restriction have been developed within the literature, a discussion of the factors that trigger and block these mechanisms is absent.

### 3.2.2 A Mechanism of Focus-Based Domain Restriction

In this subsection, I will assume a mechanism of focus-based domain restriction, extend it to determiners such as ‘every’, and show that additional work is still required if observations about IS are to be used to answer the Triggering Question.

Von Stechow argues that indirect approaches should be preferred to direct ones, due to their potential to maintain a fundamental separation between semantics and pragmatics while isolating their points of contact.<sup>15</sup> Furthermore, indirect approaches invoke mechanisms of domain restriction that are able to model both non-focus- and focus-based domain restriction, whereas direct approaches describe mechanisms where a quantifier’s first argument is affected solely via a mapping based on IS. For these reasons, I will assume an indirect approach, employing the mechanism of focus-based domain restriction developed in von Stechow (1994) and extending it to definite determiners. I will later show how my partial answer to the Triggering Question is extricable from many of the minimal assumptions I will make about the mechanism of domain restriction.

The mechanism of domain restriction advanced by von Stechow was sketched in §(3.1.1). Von Stechow (1994) (p.49) allows IS to affect the understanding of a quantifier’s first argument by permitting the resource domain variable to receive the QUD as its value. When the QUD is of a type incompatible with its contributing to the quantifier’s first argument, von Stechow allows its union to provide the value of the resource domain variable. We may treat *focus-based* domain restricted understandings as special cases where the resource domain variable receives a QUD reconstructed from the focus value of the relevant occurrence of a sentence as its value. On the other hand, when an occurrence of a sentence receives a domain restricted understanding involving a proper subset of the syntactic restrictor’s extension that has been supplied by means of an explicit QUD consisting of a *proper subset* of the

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<sup>13</sup>Rooth (1992), p.110.

<sup>14</sup>Although Herburger (2000) does give a clear answer to the Triggering Question with respect to definite determiners, claiming that the mechanism that brings about focus-based domain restriction is *never* triggered, this answer is just a denial of the hypothesis we are exploring. Eckardt’s (1999) claim that certain choices of focus are incompatible with the triggering of her mechanism for definite determiners would seem to count as a partial answer to the Triggering Question, albeit one that is unilluminating with respect to (2a) – (7). However, Eckardt provides no explanation of the reason for the incompatibility between certain choices of focus and domain restricted understandings of definite determiners.

<sup>15</sup>von Stechow (1994), p.35. That is, direct approaches commit themselves either to the view that focus affects the underlying representation that serves as the input to the semantics, or that the semantics is partially determined as a result of extra-syntactic factors.

occurrence's focus value, I shall refer to it as a case of *QUD-based domain restriction*.<sup>16</sup>

In the following, I will assume that von Fintel's mechanism for allowing IS to affect the understanding of a quantifier's first argument may be extended to the determiners 'every' and 'most'. I shall consider the predictions of the assumed mechanism of focus-based domain restriction with respect to the following variant of (2a):

11. Bob uprooted everything in his yard.

The reason for considering this variant is that it is syntactically simpler than (2a); however, Shaw's semantics predict that it should receive an anomaly-triggered domain restricted understanding in the same way as (2a). In another concession to simplicity, I will treat the NP 'thing in his yard' as a constituent that cannot be decomposed further for the purposes of focus allocation; however, I will permit 'everything (in his yard)' to be decomposed into the constituents 'every' and 'thing (in his yard)', since I assumed this in the discussion of the semantics of (2a). In light of these assumptions, and given minimal assumptions about the underlying syntax, the following reflect the nine most important focus choices:

**Focus Choices:**

12. (a) Bob [uprooted everything in his YARD]<sub>F</sub>.  
 (b) Bob [upROOTed]<sub>F</sub> everything in his yard.  
 (c) [BOB]<sub>F</sub> uprooted everything in his yard.  
 (d) [BOB]<sub>F1</sub> uprooted [everything in his YARD]<sub>F2</sub>.  
 (e) [BOB]<sub>F1</sub> [upROOTed]<sub>F2</sub> everything in his yard.  
 (f) [BOB] uprooted everything in his YARD]<sub>F</sub>.  
 (g) Bob uprooted [EVERY]<sub>F</sub> thing in his yard.  
 (h) Bob uprooted [everything in his YARD]<sub>F</sub>.  
 (i) Bob uprooted every [thing in his YARD]<sub>F</sub>.

Some operations must apply to the focus value before it may be assigned to the resource domain variable, since the focus value is a set of propositions whereas the quantifier's first argument is a set of individuals. One strategy would be to follow von Fintel by first forming the union of the focus value. A property may then be created from this proposition by 'restructuring' it to remove the contribution of the quantifier expression that occurred within the sentence (which, after all, should not contribute to the value of its own resource domain variable), before giving an intersective treatment of the remaining expressions that denote sets of individuals.<sup>17</sup>

<sup>16</sup>Note that QUD-based domain restriction would not count as a distinct 'type' of domain restriction, provided the mechanism that brings it about is the one underlying domain restriction in general. The reason that Shaw considers anomaly-triggered domain restriction to be a phenomenon distinct from contextual domain restriction is due to the separate mechanism that supposedly brings it about.

<sup>17</sup>E.g. the values that result from applying these strategies to (12c) may be represented as follows, where  $u$ ,  $x$ ,  $y$  and  $z$  are variables of type  $\langle e \rangle$ :

**Focus Value** -  $\{\llbracket \text{Every}(\lambda x. \text{Thing-in-}v\text{'s-yard}(x))(\lambda y. \text{Uprooted}(y)(z)) \rrbracket_{c,g}\}$

(= the set of propositions expressing that every item that is a thing in  $g(v)$ 's yard is an item that  $z$  uprooted.)

**Resource Domain Variable Value** -  $\{\llbracket \lambda u. \exists z[(\lambda x. \text{Thing-in-}v\text{'s-yard}(x)) \wedge (\lambda y. \text{Uprooted}(y)(z)) \wedge u = x \wedge u = y] \rrbracket_{c,g}\}$

(= the property of being identical to a thing in  $g(v)$ 's yard that some individual  $z$  uprooted.)

We may now consider the effect of permitting the proposed values to affect the quantifier’s first argument. In each case, the first argument will end up as the intersection of the resource domain variable’s value and the extension of the determiner’s NP argument (i.e. the set of things in Bob’s yard):

**Paraphrases of Focus-Based Domain Restricted Understandings:**

12. (a) – (b) Bob uprooted everything in his yard that Bob stands in some relation to.  
 (c) – (d) Bob uprooted everything in his yard that some individual uprooted.  
 (e) – (f) Bob uprooted everything in his yard.  
 (g) – (i) Bob uprooted everything in his yard that Bob uprooted.

On the basis of these paraphrases, we may divide (12a) – (12i) into three groups. Firstly, there is (12a) – (12d), where a proper part of the nuclear scope is included in the focus. After the application of the mechanism of focus-based domain restriction, it is evident that the quantifier’s first argument will end up as the set of six trees for (12c) and (12d), since *Trees and Planks* specifies that only the six trees were uprooted. In the case of (12a) and (12b), the context determines whether the quantifier’s first argument ends up as the set of six trees or the set of trees *and* planks. That is, suitable contextual restrictions on the type or timing of relations that matter might entail that Bob’s interactions with the set of six trees are the only relations that count, whereas the absence of suitable restrictions might result in Bob’s standing in some relations to the set of six planks also (for example, the ‘owning’ relation).

The second group consists of (12e) – (12f), where an improper part of the nuclear scope is included in the focus. Since there is no extra-focal material that could render the quantifier’s first argument a proper subset of the restrictor’s extension, the application of the mechanism of focus-based domain restriction will be *vacuous*, insofar as it will yield an understanding equivalent to the unrestricted one. In light of my definition of focus-based domain restriction in terms of an understanding that involves a *proper subset* of the syntactic restrictor’s extension supplied by focus-external material, it follows that a focus-based domain restricted understanding is not possible for the examples under consideration. However, if we consider contexts where there is some proper subset of the focus value available, then domain restricted understandings influenced by IS may emerge via QUD-based domain restriction. One way in which a QUD will count as a proper subset of the focus value is if it includes additional variables that provide a richer structure. For instance, if the values of the resource domain variables of (12e) and (12f) were to be respectively derived from the QUDs ‘Who did what to everything in his yard?’ and ‘Who did what to what?’, then both occurrences would be understood as ‘Bob uprooted everything in his yard *that some individual stands in some relation to*’.<sup>18</sup> Given suitable contextual restrictions on individuals and relations, it is possible for the quantifier’s first argument to be understood as the set of six trees. A second way in which the QUD will be a proper subset of the focus value is if it contains constant content that is interpreted as a proper subset of the restrictor’s extension. For instance, if the

<sup>18</sup>That is, while the focus value associated with an occurrence of sentence-wide focus is  $\{\llbracket \mathcal{X}_t \rrbracket_{c,g}\}$  (the set of all propositions, overlooking cardinality issues and potential contextual constraints), QUDs with additional structure will also be congruent with such an occurrence, e.g.  $\{\llbracket \mathcal{Y}_{\langle (e,t), \langle (e,t), t \rangle} \rangle (\lambda x. X_{(e,t)}(x)) (\lambda y. Y_{(e,t)}(y)) \rrbracket_{c,g}\}$  (the set of propositions expressing that the  $\mathcal{Y}$  relation holds between the set of items that are in  $X$  and those in  $Y$ ).

value of the resource domain variable in (12e) were to be derived from the QUD ‘What happened to the trees in his yard?’, then the occurrence would be understood as ‘Bob uprooted everything in his yard *that is a tree in his yard*’.

Finally, the third group consists of (12g) – (12i), where no part of the nuclear scope is included in the focus. For this group, a focus-based domain restricted understanding appears to yield trivial claims. Indeed, a moment’s reflection reveals that *any* understanding of an occurrence of a sentence where the quantifier denoted by ‘every’ applies to the intersection of the extensions of the restrictor and nuclear scope will express a trivial truth. The same situation arises with respect to the determiner ‘most’, at least in ordinary contexts.<sup>19</sup> Furthermore, not even a proper subset of the focus value is able to yield a non-trivial domain restricted understanding.<sup>20</sup>

In sum, the following three observations have emerged: firstly, if the focus of the sample sentence (11) includes a proper part of the nuclear scope, then a focus-based domain restricted understanding is available (sometimes with appropriate contextual restriction). Secondly, if the entire nuclear scope is included in the focus, then a focus-based domain restricted understanding is not possible; though QUD-based domain restricted understandings are possible when a proper subset of the focus value is available. Thirdly, if the entire nuclear scope is excluded from the focus, then a focus-based domain restricted understanding will involve a trivial claim; furthermore, not even the availability of a proper subset of the focus value allows a non-trivial domain restricted understanding to result from the application of von Fintel’s mechanism. These observations shall be used to develop an answer to the Triggering Question.<sup>21</sup>

### Summary of §(3.2)

I began this section by discussing the well-known effects of IS on the understanding of certain quantifier expressions. I argued that the existing literature includes no answer to

<sup>19</sup>That is, for any domain  $D$  and any subsets of the domain  $A, B$ , the truth conditions dictate that  $(Q_{every})_D(A \cap B)(B)$  holds if and only if  $(A \cap B) \subseteq (B)$ ; but this will invariably be the case. Similarly,  $(Q_{most})_D(A \cap B)(B)$  holds if and only if  $|(A \cap B) \cap B| > |(A \cap B) - B|$ ; but this will always be the case when  $(A \cap B)$  is non-empty (as it is when ‘most’ is tokened relative to an ordinary context). It turns out that it is a property of *all co-symmetric* quantifiers  $Q$  that for any  $D, A$  and  $B$ ,  $Q_D(A \cap B)(B)$  will be trivial. A quantifier is *co-symmetric* iff for any  $D, A$  and  $B$ ,  $Q_D(A)(A - B) \rightarrow Q_D(B)(B - A)$  (e.g. ‘every’, ‘not every’, ‘all but  $n$ ’). Furthermore, certain additional quantifiers are co-symmetric with respect to any  $D, A$  and  $B$  for which  $|A \cap B|$  exceeds a particular  $n$  (e.g. ‘most’ when  $n = 0$ ).

<sup>20</sup>To see this, observe that the exclusion of the nuclear scope from the focus means that any proper subset of the focus value will include material interpreted as the extension of the nuclear scope. Hence allowing a proper subset of the focus value to fix the value of the resource domain variable will cause the first argument of the determiner’s extension to be the intersection of the restrictor’s extension and a subset of the nuclear scope’s extension. Yet for any domain  $D$  and any subsets of the domain  $A, B, B'$  where  $B' \subseteq B$ ,  $(Q_{every})_D(A \cap B')(B)$  will invariably hold.

<sup>21</sup>It is worth noting that Büring (1996) also sketches a version of von Fintel’s account that applies to definite determiners, though his concern is to deliver the proportional understandings that sometimes emerge. He makes similar observations to the ones just detailed, noting that trivial understandings would result from allowing extra-focal lexical material to influence the construal of the quantifier’s first argument when this material consists of solely the restrictor or solely the nuclear scope. However, Büring (1996) includes no discussion about the impact of the triviality of a focus-based domain restricted understanding on assessors’ propensities to understand an occurrence of a sentence in a restricted or unrestricted way. Furthermore, he does not include a full discussion of the means by which assessors may reconstruct IS and QUDs for out-of-context sentences, whereas the current chapter addresses this issue in §(3.3.2).

the question of *when* focus-based domain restriction arises with respect to determiners such as ‘every’. After extending von Stechow’s (1994) indirect approach to such determiners, it was seen that further work is required in order to answer the Triggering Question. The hypothesis that focus choice is relevant to the Triggering Question has therefore not been adequately developed within the literature.

### 3.3 A Partial Answer to the Triggering Question

In this section, I propose a partial, theory-neutral answer to the Triggering Question. I will initially state my position solely by relying on the notion of focus, since this is sufficient to allow an informative partial answer and avoids invoking the more controversial IS-theoretic notion of a topic (see §(2.3)). My claim is that focus-based domain restriction is possible with respect to a DP’s determiner *only if the focus includes a proper part of the DP-external material* (§(3.3.1)). I will attribute this to the idea that, when the focus does not include a proper part of the DP-external material, the focus-based restricted understanding predicted to arise would convey a trivial proposition, which interlocutors resist due to Gricean reasoning. In order to apply the insights provided by the partial answer to Shaw’s sentences, where no choice of focus is indicated, I will argue that the sentences’ syntactic structures cause the natural choice of focus to consist of a proper part of the DP-external material, hence the possibility of focus-based domain restriction is predicted (§(3.3.2)). Finally, I will show how altering the foci of (2a), (2b) and (5) – (7) results in different assessments to when they were earlier presented, which conforms with the predictions of my partial answer to the Triggering Question (§(3.3.3)).

#### 3.3.1 The Partial Answer

In this subsection, I will develop the following partial answer to the Triggering Question based on the observations reached in §(3.2.2). Where *s* is an occurrence of a sentence, and *DP* is a DP headed by either the determiner ‘every’ or ‘most’:

**Partial Answer to the Triggering Question:** A focus-based domain restricted understanding of *s* with respect to the determiner of *DP* is possible only if: the focus of *s* includes a proper part (that is, some but not all) of the lexical material in *s* that is external to *DP*.

In order to informatively explain this descriptive generalization, I will make use of work in *conversational pragmatics*, an area most notably pursued by Grice and the neo-Griceans (e.g. Atlas and Levinson (1981), Horn (1984), Horn (1989), Levinson (2000)). The central idea of Gricean conversational pragmatics is that all cooperative discourse is governed by maxims of Quantity, Quality, Relation and Manner. For example, Grice (1989) (p.33) claimed that conveying trivially true or trivially false propositions involves a flouting of the first maxim of Quantity (‘Make your contribution as informative as is required (for the current purposes of the exchange)’), since the propositions are ‘totally noninformative’.

These ideas support the view that assessors will ordinarily resist focus-based domain restriction when a trivial understanding would result. That is, when considering an occurrence of a sentence for which the focus fails to include a proper part of the DP-external material, the principle that focus-external material may be used to access a speaker’s intended

domain restricted understanding is in conflict with the first maxim of Quantity. Given that the Gricean maxims constitute the most general and fundamental constraints on cooperative discourse, we may assume that they will be upheld at the cost of a pragmatic rule particular to a specific phenomenon such as domain restriction. Therefore, if the strategy of using focus-external material to access a domain restricted understanding entails that a speaker intended to convey a non-informative proposition, then this strategy will be rejected.

This explains why assessors resist a focus-based domain restricted understanding with respect to occurrences of sentences where all DP-external material is excluded from the focus (for example, (12g) – (12i)). In order to explain why a focus-based domain restricted understanding is resisted for occurrences of sentences where the focus includes all DP-external material (for example, (12e) – (12f)), it is sufficient to observe that there is simply no focus-based domain restricted understanding available.

This answer to the Triggering Question correctly predicts that domain restriction is resisted with respect to (5) – (7), since I indicated the intended focus, which consisted solely of the DP in each case. However, no explanation of the availability of the restricted understandings of (2a), (3) and (4), and the robustness of the unrestricted understanding of (2b), is immediately forthcoming, on the grounds that Shaw does not indicate any particular focus for the envisaged occurrences of his sentences. This matter will be considered in the following subsection.

I will end this subsection by clarifying the sense in which my answer to the Triggering Question is partial and theory-neutral. There are several reasons why it is a *partial* answer. Firstly, it states that *focus-based* domain restriction is possible only when the condition in question holds, which fails to entail that all forms of domain restriction are possible only when the condition holds. I consider it highly plausible that focus-external lexical material is the sole means by which assessors reach a domain restricted understanding when sentences are presented without a context sufficiently rich to render available a proper subset of the focus value or salient items. It follows that when a sentence is presented outside of a suitably rich context, domain restriction will be resisted whenever a focus-based domain restricted understanding would be unavailable or trivial. Hence the partial answer not only predicts that focus-based domain restricted understandings are resisted with respect to (5) – (7), but that domain restricted understandings in general are resisted for them. However, domain restricted understandings accessed on the basis of features other than focus-external lexical material, such as explicit QUDs or contextually salient items, may emerge for some sentences that occur relative to appropriate contexts despite the fact that domain restricted understandings cannot be reached on the basis of focus-external lexical material.

A second reason that the answer is partial is that it gives a necessary condition for the triggering of focus-based domain restricted understandings without providing a sufficient condition. A third sense in which it is partial is that it is only stated for sentences with a single occurrence of the determiner ‘every’ or ‘most’; though there is reason to think that it could be extended to a broader range of sentences.<sup>22</sup> Despite the partial nature of my

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<sup>22</sup>For instance, although  $Q_D(A \cap B)(B)$  is non-trivial when  $Q$  is the extension of an indefinite determiner, it is nevertheless logically equivalent to  $Q_D(A)(B)$ . Given that an understanding where the quantifier’s first argument is the intersection of the extensions of the restrictor and nuclear scope will be no more informative than an unrestricted understanding, the sort of Gricean reasoning ascribed to assessors with respect to co-symmetric quantifiers may also be employed with respect to those denoted by indefinite determiners. However, a detailed discussion of the potential for domain restriction with respect to indefinite determiners is a topic beyond the

answer to the Triggering Question, it has sufficient explanatory power to predict the likelihood of domain restriction in a range of cases, whereas Shaw's proposed partial answer had nothing to say about the likelihood of domain restricted understandings of sentences with no potential for anomaly.

Finally, the partial answer is to a large extent *theory-neutral*. For although I adopted certain minimal assumptions about the mechanism by which focus-based domain restriction occurs, in order to tackle the issue in a tangible way, the statement of the answer to the Triggering Question makes no reference to these assumptions. While Shaw's partial answer is inextricable from his postulated specific mechanism of domain restriction, my partial answer is therefore compatible with any account of the general mechanisms that bring about domain restriction. For example, semantic accounts of domain restriction may simply allow the focus value of an occurrence of a sentence to fix the value of the variables they postulate (or whatever feature of the semantics the context is permitted to affect). Pragmatic accounts may propose that the QUD plays a crucial role in discourse participants' accessing a distinct proposition from the one expressed by an occurrence of a sentence, and that the focus value of a sentence presented without an explicit QUD allows the reconstruction of an implicit QUD. Furthermore, the partial answer is compatible with any formalisation of focus, provided the theory accepts the prosodic and communicative means of identifying focus choice that I identified in §(2.3.1). For example, the Alternative Semantics of Rooth (1992) could be replaced with a construal of focus as new information (e.g. Lambrecht (1994)). A theory of focus may even diverge from my own with respect to the prosodic structures associated with particular choices of IS, provided it upholds the view that the item upon which a clause-final pitch accent falls is obligatorily included in the focus. I take the fact that my partial answer is theory-neutral to be a significant point in its favour.

### 3.3.2 Applying the Partial Answer to Out-Of-Context Sentences

In order to show how the partial answer to the Triggering Question predicts assessors' natural responses to (2a) – (4), I will need to defend some claims about the natural choice of focus for occurrences of each of Shaw's sentences based on their syntactic structures. I will argue that an individual who encounters (2a), (3) and (4) out-of-context will assess an occurrence that involves neutral prosody, which results in a focus that includes a proper part of DP-external material; in contrast, neutral prosody with respect to (2b) results in a focus that consists solely of part of the DP.

To begin with, observe that Shaw's sentences may reasonably be described as out-of-context, on the grounds that the way in which a speaker should intone the sentences is not indicated, and the scenarios he describes are insufficiently rich to include crucial features of a context such as a QUD. Recall my claim that individuals consider out-of-context sentences relative to imaginary contexts and that, in the absence of clues regarding the QUD, the default prosodic contour for the relevant construction is the primary factor determining the focus choice envisaged by the assessor (see §(2.3.1)). Presumably, the default prosodic contour for an ordinary sentence is neutral prosody. I must additionally commit myself to the view that assessors will favour the narrowest focus choice compatible with neutral prosody when considering an out-of-context sentence, unless additional clues motivate some wider

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scope of this chapter, as is the potential for domain restriction with respect to sentences that include multiple determiners.

focus choice compatible with neutral prosody. This claim is supported by the plausible assumption that individuals assess out-of-context sentences by exerting minimal effort to imagine a maximally rich context.<sup>23</sup> For out-of-context sentences, the narrower the focus that is assumed, the more specific the QUD with which the occurrence of the sentence is congruent, in the sense of consisting of fewer propositions; and a more specific QUD generates a richer imagined context. If there are additional clues that suggest to an assessor that a wider focus choice is more plausible, then she will presumably assign the narrowest focus compatible with the prosodic structure or QUD evoked by these clues.

Neutral prosody, as construed in §(2.3.1), would cause (2a) to have the prosodic structure: ‘BOB uprooted everything in his YARD and BURNed it’. According to any view of the relation between focus and prosody, the fact that the clause-final pitch accent falls on ‘burned’ results in a focus that includes this word. However, there are choices of focus compatible with neutral prosody that contain lexical items additional to ‘burned’, including a sentence-wide focus that contains an improper part of the DP-external material. Yet my claim that assessors favour the narrowest focus choice compatible with neutral prosody entails that assessors will assign narrow focus to ‘burned’ when (2a) is presented out-of-context, which yields a focus consisting of a proper part of the DP-external material. The prediction therefore emerges that, when assessors consider (2a) without any indication of the envisaged QUD or prosody, the occurrence they naturally assess will permit a focus-based domain restricted understanding. If we accept that IS is a major means by which interlocutors infer how a speaker intended her use of a determiner to be understood, then it follows that individuals will frequently understand an occurrence as having undergone focus-based domain restriction when such an understanding is available.

This argument may be extended to Shaw’s other sentences. Neutral prosody for (3) and (4) yields a final pitch accent on, respectively, ‘COCKtail bitters’ and ‘LOUD’. It follows that assessors will assign narrow focus to these constituents in the absence of a reason to do otherwise. In both cases, the occurrence that assessors naturally consider therefore includes a focus choice that consists of a proper part of the material external to the relevant DP, therefore permitting focus-based domain restricted understandings.

Neutral prosody with respect to (2b) yields ‘BOB burned everything in his YARD’, and the narrowest focus choice compatible with this prosody is ‘[thing in his YARD]<sub>F</sub>’. This would yield an imagined context where the QUD is reflected by a sentence like ‘What did Bob burn all of?’, which might strike an assessor as an implausible QUD on the grounds that it requires the imaginary interlocutors to know that Bob burned all of something without knowing the nature of that something. The second narrowest focus compatible with neutral prosody would be ‘[everything in his YARD]<sub>F</sub>’, congruent with the more plausible QUD expressed by ‘What did Bob burn?’. Whether an assessor assigns the narrowest possible focus to (2b), or the second narrowest one, it immediately follows from the fact that all DP-external material is excluded from the focus that a focus-based domain restriction is blocked. This explains the prominence of the unrestricted understanding observed by Shaw.

In the following subsection, I will show that occurrences of (2a) and (2b) for which the focus choice diverges from that associated with neutral prosody are naturally understood

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<sup>23</sup>Independent support for this assumption derives from Büring’s (2016) principle of *maximizing background* (pp.26-7, pp.65-6.): IS choices are preferred that exclude from focus the maximum number of constituents compatible with any pre-established prosodic structure or QUD, since this is a way to ‘maximize relations to the context’ (p.27.).

in the opposite way to Shaw’s occurrences. Not only does this support my claims about the role of IS in domain restricted understandings, but it furthermore illustrates the fragility of the putative phenomenon of anomaly-triggered domain restricted understandings.

### 3.3.3 Testing the Partial Answer

In the previous two subsections, we have seen how the proposed partial answer to the Triggering Question provides an intuitively plausible explanation of assessors’ responses to (2a) – (7). In this subsection, I shall provide further evidence in favour of the partial answer by showing how manipulating the IS of previously considered sentences affects the likelihood of domain restricted understandings.

First, consider the assessments that arise with respect to occurrences of (5) – (7) with different IS, to be assessed relative to the scenarios described in §(3.1.3). For (5)’ – (7)’, choices of focus are explicitly marked that include, respectively: a proper part of the DP-external material, an improper part of the DP-external material without additional items, and all of the lexical material. While the potential for focus-based domain restriction is predicted in the first case, in the latter two cases a domain restricted understanding is rendered available by means of an explicit QUD corresponding to a proper subset of the focus value. For (2b)’, the focus consists of a proper part of the DP-external material, predicting the possibility of focus-based domain restriction. For (2b)’’, the focus consists of all DP-external material, hence a proper subset of the focus value must be available to allow a domain restricted understanding:

(5)’ [XANDer]<sub>F</sub> multiplied everything written on the board.

(6)’ (What property did the creatures Xenia saw in the lake have?)  
Everything Xenia saw in the lake [was SPLASHing]<sub>F</sub>.

(7)’ (Who did what, in terms of tidying?)  
[XERXes untangled and put away everything on his DESK]<sub>F</sub>.

(2b)’ [BOB]<sub>F</sub> burned everything in his yard.

(2b)’’ (What happened to the trees in Bob’s yard?)  
[Bob]<sub>F1</sub> [BURNed]<sub>F2</sub> everything in his yard.<sup>24</sup>

My partial answer to the Triggering Question predicts that focus-based domain restriction is possible for the preceding occurrences of the sentences. Since my proposal does not rule out other pragmatic factors’ intervening to influence an assessor, it is not falsified if assessors resist domain restriction with respect to these five variants. Nevertheless, it seems to be significantly easier to assign (5)’ – (7)’, (2b)’ and (2b)’’ the value *true* than it was for the earlier versions (5) – (7) and (2b).<sup>25</sup>

<sup>24</sup>The fact that ‘Bob’ occurs in the QUD causes it to undergo *givenness deaccenting*, meaning that it lacks a pitch accent despite its presence in a focus. See Büring (2016), (p.17.).

<sup>25</sup>The following paraphrases the domain restricted understandings that result in each case:

(5)’ ‘Xander multiplied everything written on the board that someone multiplied.’

A more important test for my proposal is whether the prominence of the domain restricted understanding of Shaw's original sentence (2a) is undermined by forcing assessors to consider an occurrence where the focus is something other than a proper part of DP-external material. It is worth re-reading the *Trees and Planks* scenario before considering the following occurrence of (2a), which is presented relative to a QUD identical to its focus value in order to ensure the intended IS:

(2a)' (What did Bob uproot and what did he burn?)

Bob uprooted [everything in his YARD]<sub>F1</sub> and burned [it]<sub>F2</sub>.

Domain restriction indeed appears to be resisted for this occurrence of the sentence, as demonstrated by the fact that it is extremely difficult to assess it as true. Analogous results emerge when occurrences of (3) and (4) are considered for which the focus consists of part of the DP. Firstly, this demonstrates the fragility of the putative phenomenon of anomaly-triggered domain restriction. Secondly, it provides support for my proposed partial answer to the Triggering Question.

### 3.4 Relating the Partial Answer to File Cards

The discussion so far has avoided mentioning the notions of sentence topics or file cards. The first reason for this is that the extant literature that relates domain restriction to information structure (e.g. von Stechow (1994), Herburger (2000)) frames the discussion solely in terms of focus and QUDs, hence it would be natural for a proposal that builds upon these prior approaches to adopt the same theoretical devices. The second reason is that, as mentioned in §(2.3), focus is a less controversial aspect of information structure than sentence topic, with a greater consensus about how to recognise and analyse a sentence's focus. Furthermore, even when a notion of topicality is endorsed within the literature, the analysis often proceeds without invoking file cards; and even when a system of file cards is endorsed, it differs in crucial ways from the one I advanced in §(2). Hence the fact that an informative partial answer to the Triggering Question may be stated solely in terms of focus provides motivation to initially avoid relating the discussion to aspects of information structure that are less widely accepted.

However, I think an intuitive explanation of the nature of contextual domain restriction may be given in terms of file cards. In this subsection, I will sketch this proposal, initially describing a file card-based condition that is necessary and sufficient for domain restriction. Since this condition does not yield empirically testable predictions, I will derive from it a topic-based, updated partial answer to the Triggering Question, before showing how it slightly complicates the predictions issued by the partial answer given in §(3.3.1).

First note that, by a *file card supplied solely by the IS of s*, I mean a file card upon which the information expressed by an occurrence *s* of a sentence will be stored when there is no

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(6)' 'Every creature that has some property and that Xenia saw in the lake was splashing.'

(7)' 'Xerxes untangled and put away everything on his desk that someone stands in a tidying relation to.'

(2b)' 'Bob burned everything that was burned in his yard.'

(2b)'' 'Bob burned every tree in his yard.'

additional contextual influence; in other words, I mean a file card associated with the topic, or the file card representing *D* when there is no overt topic. Where *DP* is headed by either ‘every’ or ‘most’, my proposal may then be stated as follows:

**File Card-Based Condition:** A domain restricted understanding of *s* emerges with respect to *DP* if and only if the information expressed by *s* is stored on a file card that is not supplied solely by the IS of *s*, and which represents a proper subset of the restrictor’s extension.

It is important to specify that the file card associated with a domain restricted understanding cannot be a file card supplied solely by IS, since the IS associated with *unrestricted* understandings of occurrences of sentences where a ‘most’-headed DP is topical dictates that information storage should occur with respect to a file card representing a proper subset of the restrictor *N*’s extension (i.e. a minimal witness set of ‘most *N*’).

For example, I claim that storing the information expressed by an occurrence of (2a) on a file card representing the set of trees in Bob’s yard is sufficient for it to receive a domain restricted construal: for this file card cannot have been supplied solely by the IS of the occurrence (that is, neither sentence wide focus (without contextual influence) nor any choice of topic would identify a file card representing such a set), and this file card represents a proper subset of the restrictor’s extension. This condition is directly based on the weak verification condition advanced in §(2.2.4), which holds that a context where the proposition expressed by an occurrence of a sentence is stored on a file card representing some *d* will generally coincide with assessors’ accessing a proposition *P* that has content to which *d* contributes.

This file card-based condition is clearly non-equivalent to the partial answer to the Triggering Question advanced in §(3.3.1), which simply gave a necessary condition for a focus-based domain restricted construal: a focus choice that includes a proper part of the DP-external material. Firstly, the file card-based proposal states a necessary *and sufficient* condition for assessors to reach a domain restricted construal of an occurrence of a sentence: storage on a file card that represents a particular subset. However, in the absence of a reliable independent means of identifying when an individual stores the information expressed by an occurrence of a sentence on a file card representing a proper subset of the extension of a determiner’s restrictor, this condition issues no predictions about *when* domain restricted understandings will arise.<sup>26</sup> Hence the necessary and sufficient condition fails to address the Triggering Question.

However, the file card-based condition suggests a new partial answer to the Triggering Question once we consider the relation between file cards supplied solely by IS and file cards associated with domain restricted construals. Let *f*’ be a file card upon which the information expressed by an occurrence *s* of a sentence is stored when a domain restricted construal arises with respect to its DP. Observations based on intuitive aboutness items suggest that

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<sup>26</sup>In light of the claim in §(2.3.4) that a QUD raises a file card to prominence for the storage of the information expressed by an answer, it follows that there *is* sometimes a reliable independent means of identifying the file card on which the information expressed by an occurrence of a sentence has been stored. That is, if the only constant content included in a QUD is interpreted as a particular set, then the file card representing this set is the only candidate to be rendered prominent; hence the information expressed by any congruent *s* will inevitably be stored on this file card, even if the topic of *s* is associated with a file card representing a proper superset of the file card rendered prominent by the QUD. However, this independent means of identifying the file card is unavailable for many occurrences of sentences, including those presented out-of-context.

there must be some file card  $f$  that the IS of  $s$  dictates that its information should be stored on such that  $f'$  represents a proper subset of the set represented by  $f$ . For instance, if the IS of an occurrence of a sentence were to indicate that it is about Bob, then it is difficult to see how additional features of the context could cause it to instead be understood as being about the trees in Bob's yard, in contrast with a situation where the IS indicates that it is about the things in Bob's yard. This reasoning leads to the following as a more informative necessary (and insufficient) condition for a domain restricted understanding of  $DP$  in an occurrence  $s$  of a sentence:

**Updated Partial Answer to the Triggering Question:** A domain restricted understanding of  $s$  with respect to  $DP$  is possible only if: some file card supplied solely by IS represents a proper or improper superset of a minimal witness set of  $DP$ .

(Equivalently, only if: either (i)  $s$  lacks an overt topic, (ii) its topic consists of  $DP$ , (iii) its topic consists of  $DP$ 's restrictor, or (iv) its topic consists of some other item that is coincidentally associated with a file card representing an appropriate superset.)

Given that we may establish likely sentence topics independently of considering whether a domain restricted understanding emerges, this necessary condition *does* issue predictions about *when* domain restricted understandings are possible, thereby partially addressing the Triggering Question.

Yet the updated answer turns out to give a different partial answer to the one advanced in §(3.3.1). To see this, consider the predictions of the two partial answers with respect to the focus choices earlier given for (11), repeated here:

**Focus Choices:**

12. (a) Bob [uprooted everything in his YARD]<sub>F</sub>.
- (b) Bob [upROOTed]<sub>F</sub> everything in his yard.
- (c) [BOB]<sub>F</sub> uprooted everything in his yard.
- (d) [BOB]<sub>F1</sub> uprooted [everything in his YARD]<sub>F2</sub>.
- (e) [BOB]<sub>F1</sub> [upROOTed]<sub>F2</sub> everything in his yard.
- (f) [BOB uprooted everything in his YARD]<sub>F</sub>.
- (g) Bob uprooted [EVery]<sub>F</sub> thing in his yard.
- (h) Bob uprooted [everything in his YARD]<sub>F</sub>.
- (i) Bob uprooted every [thing in his YARD]<sub>F</sub>.

The original partial answer precludes the possibility of a focus-based domain restricted understanding solely with respect to (12e) – (12i) (where the focus fails to include a proper part of the DP-external material). On the other hand, the updated partial answer precludes the possibility of a domain restricted understanding with respect to (12a) and (12d) (where the topic is associated with a file card that fails to represent a superset of the DP's minimal witness set), in addition to allowing such an understanding for (12e) (where the DP may be construed as topical), (12f) (where there is no overt topic) and (12g) (where the restrictor may be construed as topical).

However, the two answers are easily reconciled once we grasp that individuals may use different *strategies* to identify file cards associated with domain restricted understandings,

and the original partial answer pertained solely to the strategy of using focus-external lexical material in a sentence to access a domain restricted understanding. Within a rich discourse context, I propose that the two major strategies used to identify file cards associated with domain restricted understandings are based on the constant content of explicit QUDs and the contextual salience of items.

For example, there are two sorts of context where the information expressed by an occurrence of (5)' ([XANDer]<sub>F</sub> multiplied everything written on the board') is likely to be stored on a file card associated with a domain restricted understanding: firstly, there are those contexts with an explicit QUD that includes constant content denoting the set of numbers that were written on the board; secondly, there are contexts where the numbers written on the board are of notable salience compared with the non-numbers written on the board. When these two major strategies are inapplicable, a domain restricted construal can only be accessed by using focus-external lexical content within the relevant sentence occurrence. For instance, when (5)' is presented with no envisaged QUD, assessors may use lexical material to reconstruct a QUD distinct from the focus value; such a QUD will be expressed by a sentence of the form 'Who multiplied everything written on the board that someone multiplied?', which is likely to raise to prominence a file card representing the set of things written on the board that were multiplied.

It follows that *focus-based* domain restriction singles out a particular strategy used by interlocutors to reach domain restricted construals, which is predominantly associated with sentences that are presented out-of-context or relative to fairly depleted contexts. Therefore, the original partial answer gives a necessary condition for *employing the strategy of using focus-external lexical material in an occurrence of a sentence to access a domain restricted understanding*, whereas the updated partial answer gives a necessary condition for *accessing a domain restricted understanding by any strategy*.

These observations explain why the updated partial answer predicts the potential for domain restricted understandings that the original answer predicted to be impossible. The fact that the necessary condition for accessing a domain restricted understanding by any strategy is met for such occurrences predicts that the information expressed by a sentence such as (12g) may be stored on a file card representing the set of trees in Bob's yard relative to a context with an explicit QUD expressed by a sentence of the form 'How many trees in his yard did Bob uproot?', or a context where the trees in Bob's yard are rendered salient.<sup>27</sup> However, the fact that the necessary condition for employing the strategy of using focus-external lexical material to access a domain restricted understanding is not met by (12g) predicts that, relative to a context that lacks explicit QUDs with appropriate constant content or appropriate salient items, a domain restricted understanding will be unavailable. Similarly, for (12e) and (12f), the prediction emerges that domain restricted understandings are possible if and only if the context includes an appropriate explicit QUD or salient items. In other words, it is unproblematic to claim that the potential for a domain restricted understanding reached via any strategy is a necessary condition for the potential for a domain restricted understanding reached via the use of lexical material, but that the latter strategy is

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<sup>27</sup>Note that §(3.2.2) stated that, when the focus consists solely of DP material, QUD-based domain restricted understandings will be trivial *when brought about via von Stechow's mechanism (where the entire QUD provides the value of the resource domain variable)*. This does not entail that QUD-based domain restricted understandings of such occurrences of sentences will be trivial when the notion of topics and file cards allow some parts of the QUD to have no effect on the restricted understanding reached, as suggested in the current subsection.

blocked for some occurrences of sentences that would allow domain restricted understandings to be accessed via other strategies in certain contexts.

What seems more problematic is that the updated partial answer predicts that certain domain restricted understandings permitted by the original answer are impossible, namely with respect to occurrences of sentences where DP-external material is obligatorily topical. However, given that the potential for a domain restricted understanding reached via any strategy is a necessary condition for a domain restricted understanding to be reached via the use of lexical material, it should be clear that the question of whether focus-external lexical material may be used to access a domain restricted understanding for occurrences of sentences such as (12a) and (12d) simply does not arise. This position is compatible with all statements made within previous subsections, since it was never argued that domain restricted understandings of occurrences of (12a) and (12d) are natural. §(3.2.2) simply considered which construals of (12a) – (12i) would result from the application of von Stechow's (1994) mechanism of focus-based domain restriction, whereupon it was found that these understandings would be vacuous or trivial in the case of (12e) – (12i), which motivated the initial partial answer barring the application of strategies based on focus-external lexical material in such cases. However, having re-examined the issue from a perspective that employs a system of file cards, it has become clear that some of the previously considered occurrences of sentences never even met the necessary condition for a domain restricted understanding to be reached by any strategy.

In sum, accepting a file card-based analysis of domain restriction yields an updated partial answer to the Triggering Question that is not only compatible with the original partial answer, but furthermore provides a deeper perspective on the relation between focus-based domain restriction and domain restricted understandings in general. In order to clarify the connection between the updated and original partial answers, it is helpful to separate a necessary condition for the potential for a domain restricted understanding (i.e. a partial answer to the Triggering Question) from necessary conditions for the application of strategies for identifying file cards associated with domain restricted understandings. Hence the insights that led to the partial answer given in §(3.3.1) are best captured within the file card-based approach as 'Constraints on Focus-Based Strategy', below:

**Updated Partial Answer (repeated):** A domain restricted understanding of an occurrence *s* of a sentence with respect to the determiner of an 'every'- or 'most'-headed *DP* is possible only if: some file card supplied solely by IS represents a proper or improper superset of a minimal witness set of *DP*.

(Equivalently, only if: either (i) *s* lacks an overt topic, (ii) its topic consists of *DP*, (iii) its topic consists of *DP*'s restrictor, or (iv) its topic consists of some other item that is coincidentally associated with a file card representing an appropriate superset.)

**Constraints on QUD-Based Strategy:** An explicit QUD reflected by an occurrence of a sentence *q* that lacks 'wh'-NP phrases (e.g. 'which trees', 'which of the trees', 'what trees', etc.) may be used to reach a domain restricted understanding with respect to the determiner of *DP* in an answer only if the QUD includes constant content understood as a proper subset of *DP*'s restrictor's extension.<sup>28</sup>

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<sup>28</sup>When *q* contains a 'wh'-NP phrase, matters are more complicated. In such cases, a QUD-based domain

**Constraints on Saliency-Based Strategy:** A contextually salient set of items *B* may be used to reach a domain restricted understanding of an occurrence of a sentence with respect to the determiner of *DP* only if *B* is a proper subset of *DP*'s restrictor's extension.

**Constraints on Focus-Based Strategy:** Focus-external lexical material may be used to reach a domain restricted understanding of an occurrence *s* of a sentence with respect to the determiner of *DP* only if (i) QUD- and saliency-based strategies are inapplicable, and (ii) the focus of *s* includes a proper part of the DP-external material.

Several notes are in order. Firstly, the constraints on the saliency-based strategy are compatible with the application of the condition to an occurrence of a DP in a question. For example, nothing rules out the application of the saliency-based strategy to the object DP in an occurrence of 'What did Bob do to the trees?' (say, if the set of trees in Bob's yard are contextually salient). This would result in the raising to prominence of a file card representing a proper subset of the restrictor's extension, and an occurrence of the same DP in an answer (e.g. 'Bob upROOTed the trees') would receive a domain restricted understanding by virtue of being understood with respect to the proper subset raised to prominence by the QUD. A second note concerns the fact that the explanation of why the focus-based strategy cannot be used for certain occurrences of sentences remains unchanged: a trivial understanding would result, which is resisted due to Gricean reasoning. Finally, note that the updated partial answer is, like the original one, compatible with extant accounts of the mechanism of domain restriction. That is, it is neutral with respect to whether an occurrence of a sentence receives a domain restricted understanding by virtue of its semantically expressing a domain restricted proposition, or by virtue of interlocutors' pragmatically inferring that the speaker intended to convey a domain restricted proposition distinct from the one literally expressed. Advocates of any mechanism of domain restriction may accept that the information expressed by an occurrence of a sentence that receives a domain restricted understanding is stored on a file card compatible with my file card-based condition; yet while an advocate of a semantic account of domain restriction will hold that the set represented by this file card will always contribute to the stored proposition, an advocate of a pragmatic account will hold that the set represented by the file card contributes to a proposition accessed by interlocutors which is distinct from the one expressed by the occurrence of the sentence.

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restricted understanding appears to be available only if the NP of the 'wh'-NP phrase is understood to denote a set that intersects with *DP*'s restrictor's extension to yield a proper subset of *DP*'s restrictor's extension. For example, relative to the indicated explicit QUD and a context where Bob uprooted all of the trees in his yard but none of the planks in his yard, (13) is naturally judged true:

(Which trees on his land did Bob uproot?)

13. Bob uprooted everything in his YARD.

The potential for a QUD-based domain restricted understanding of (13) initially seems to pose a counterexample to the updated partial answer to the Triggering Question; for it would be natural to assume that narrow focus must fall on the DP, since the entire DP seems to correspond to the 'wh'-phrase. Although there has been debate over the IS of occurrences of sentences that provide answers to explicit QUDs reflected by sentences with 'wh'-NP phrases, I will endorse the view that the restrictor of the corresponding DP in the answer is included in the (possibly accented) topic. Such a view is suggested by Pesetsky (1987), Comorovski (1996) and Erteschik-Shir (1997) (pp.24-6). This position means that domain restricted understandings of occurrences of sentences such as (13) are compatible with the updated partial answer.

It is evident that the file card-based proposal serves to illuminate the phenomenon of contextual domain restriction more than the insights developed in previous subsections. Firstly, it provides an intuitively compelling explanation of the sense in which a domain restricted construal of an occurrence of a sentence is naturally understood as being *about* a proper subset of the restrictor's extension, rather than about the restrictor's extension or the minimal witness set of the DP's extension. Secondly, it gives a necessary and sufficient condition for the emergence of a domain restricted understanding, albeit one that generally cannot be independently established to hold. Thirdly, it clarifies the matter of which proper subset of the restrictor's extension is likely to be involved in particular domain restricted understandings, by bringing to light several strategies that discourse participants may employ. It therefore addresses an interesting question distinct from the Triggering Question, which was the sole target of the earlier proposal. Fourthly, the updated proposal provides a partial answer to the Triggering Question that predicts the potential for domain restricted understandings to be reached via any strategy, whereas the earlier partial answer solely predicted the potential for such understandings to be reached via the strategy of using lexical material. The increased explanatory potential of the file card-based proposal therefore motivates adopting it over the earlier one. More broadly, the increased explanatory potential arguably provides some motivation to adopt the system of file cards described in §(2). However, the current subsection contains no arguments in favour of the file card-based proposal, other than its explanatory potential. Therefore, those who are skeptical about some aspects of the system I have accepted, or who wish to avoid commitment to file cards and sentence topics altogether, may make use of the earlier, focus-based partial answer.

### **Summary of §(3.4)**

In this subsection, I made use of the notion of sentence topics and the system of file cards endorsed in §(2) in order to provide a more informative, if more controversial, condition for the emergence of domain restricted understandings. I initially gave a necessary and sufficient, file card-based condition for the emergence of a domain restricted understanding of an occurrence *s* of a sentence with respect to a DP headed by 'every' or 'most': that the information expressed by *s* is stored on a file card that is not supplied solely by the IS of *s*, and which represents a proper subset of the restrictor's extension. However, with the exception of contexts that include an explicit QUD with limited constant content, this file card-based condition provides no predictions for when domain restricted understandings will emerge. I therefore gave the following necessary condition: that some file card supplied solely by IS represents a proper or improper superset of a minimal witness set of the relevant DP. The fact that this partial answer to the Triggering Question entails different empirical predictions to the one given in §(3.3.1) is resolved by the observation that the earlier partial answer gave a necessary condition for the strategy of using focus-external material to access a domain restricted understanding, whereas the updated partial answer gives a necessary condition for using *any* strategy to access a domain restricted understanding. In addition to the strategy based on focus-external material, I also identified strategies based on QUDs and salience, describing necessary conditions for the application of each of these strategies. The increased explanatory potential of the file card-based condition and the updated partial answer not only motivate their adoption, but furthermore provide some motivation to adopt the system of file cards described in §(2).

## Chapter Summary

In this chapter, my concern has been to clarify the factors that determine when domain restricted understandings arise. I began by challenging Shaw's proposed partial answer to the Triggering Question, which consists of the claims that domain restriction is obligatorily triggered when anomaly would otherwise emerge, and that the resulting domain restriction cannot be explained in terms of a general mechanism of domain restriction. In order to propose an answer to the Triggering Question, able to explain Shaw's cases in addition to a range of others, I suggested that information structure has an effect on domain restriction. Having considered existing accounts that formalise a mechanism of information structure-influenced domain restriction, it was found that an illuminating answer to the Triggering Question was not immediately forthcoming. I then proposed that, for an occurrence of a sentence that includes the determiners 'every' or 'most', a focus-based domain restricted understanding with respect to the determiner of that DP is unavailable or trivial unless the focus includes a proper part of the DP-external material. When domain restricted understandings are trivial, they are blocked due to assessors' engaging in a Gricean reasoning process. This claim, in combination with arguments about the natural choice of focus for occurrences of Shaw's sentences, predicts the robustness of the domain restricted understandings of (2a) and (3) – (4), along with the robustness of the unrestricted understandings of (2b) and (5) – (7). Finally, I showed how making use of the system of file cards sketched in §(2) allows the identification of a condition that is necessary and sufficient for the emergence of domain restricted understandings, a more informative partial answer to the Triggering Question, and three strategies individuals use to access particular domain restricted understandings; I also showed how the earlier partial answer isolates the third of these strategies, where focus-external lexical material (rather than an explicit QUD or contextually salient items) is used to access a domain restricted understanding. While employing file cards allows increased explanatory power, those who wish to avoid commitment to such a system may rely on the original partial answer to the Triggering Question, which remains appealingly theory-neutral.

## Chapter 4

# Contingently Empty Restrictors

The aim of this chapter is to determine the correct analysis of *quantifier expressions with restrictors that interlocutors perceive to contingently denote the empty set*. I will argue that the system sketched in §(2) – where topical DPs are associated with file cards representing an arbitrary minimal witness set within a structured common ground – sheds light on a problem that has lacked a satisfactory solution since its initial discussion in the 1980s.

In §(4.1), I shall describe the literature on the problem of contingently empty restrictors, concluding that no extant account meets three important desiderata for a successful solution. I will argue that a topic-sensitive account that associates a pragmatic existence presupposition with DPs is required. In §(4.2), I will consider various forms that such an account might take, distinguished according to the source they postulate for the existence presupposition. In §(4.3), I will develop the sort of topic-sensitive, pragmatic presuppositional account that has been argued for, based on the previously endorsed system of file cards. In §(4.4), I will show how the developed account meets the three desiderata for a solution to the problem of contingently empty restrictors.

### 4.1 The Problem of Contingently Empty Restrictors

In §(4.1.1), I shall explain the problem posed by contingently empty restrictors, in addition to proposing three desiderata for its successful treatment: descriptive adequacy, explanatory adequacy, and a reliance on independently-motivated machinery. I will then discuss four accounts prevalent in the literature: semantic accounts (in §(4.1.2)), processing accounts (in §(4.1.3)), implicature accounts (in §(4.1.4)) and pragmatic presuppositional accounts (in §(4.1.5)). I shall conclude that pragmatic presuppositional accounts are most promising with respect to the three desiderata.

#### 4.1.1 The Problem

There is an extensive literature pertaining to NPs that interlocutors perceive to contingently denote the empty set. A paradigm instance of a *contingently non-denoting* NP is ‘American king’: for the intersection of the set of Americans and the set of kings is empty relative to the current time and actual world, although the intersection is non-empty relative to some

close counterfactual scenarios. When a non-denoting NP occurs as the restrictor for a DP, I shall refer to it as an '*empty restrictor*'.

The problem posed by *perceived* contingently empty restrictors (that is, restrictors that interlocutors take to be contingently empty) begins with the observation that the standard truth conditions for generalized quantifiers indicate that empty restrictors should pose no obstacle to the assigning of the predicted truth values. For example, the truth conditions for 'every' predict that occurrences of sentences where the restrictor is contingently empty will be unproblematically true, since the empty set is a subset of any set. The truth conditions for 'some' predict that occurrences of sentences where the restrictor is contingently empty will be unproblematically false, since the empty set has an empty intersection with any set.

However, it has been shown in the literature that sentences with perceived contingently empty restrictors exhibit an unexpected pattern of acceptability. Not only do occurrences of such sentences frequently elicit an oddness response instead of judgements that accord with the values predicted by the standard truth conditions, but the eliciting of a judgement of oddness or valuedness seems to correlate with certain properties of the sentence in a predictable way. To explain these claims, it is important to begin by clarifying what it means for an occurrence of a sentence to elicit a sense of *oddness* in an assessor. The following definition demarcates the phenomenon the literature has been concerned with, whilst avoiding prematurely judging the source or nature of the oddness response:

**Oddness Response definition:** An occurrence of a sentence elicits an *oddness response* if and only if: (i) an assessor has a sense that the occurrence is defective or infelicitous, and (ii) the assessor encounters difficulty in assigning it a truth value relative to the relevant context.

The second part of the definition is intended to prevent a sense that a certain sentence constitutes a bizarre thing to utter relative to some or all CGs from counting as an oddness response, if it is simultaneously straightforward to assign it a particular truth value relative to a given CG. For example, an occurrence of the sentence 'There are no kings and there are no kings' would be strange relative to any ordinary CG, since there is normally a pragmatic expectation that the second conjunct of a conjunction will contribute new information. However, the conditions under which this pragmatically bizarre sentence would be true – that is, if and only if there are no kings within the relevant domain – are nevertheless discernible, allowing an assessor to assign it a value. Also note no oddness response is elicited if an assessor struggles to assign a truth value to an occurrence of a sentence that she nevertheless considers an appropriate contribution to the discourse, due to factors such as epistemic limitations.

Having clarified what I mean by an 'oddness response', we are in a position to set out the data pertaining to sentences with perceived contingently empty restrictors that naturally elicit judgements of oddness and judgements of valuedness. Consider the natural responses to occurrences of the following three sentences, relative to a CG where 'American king(s)' is (correctly) perceived to be a contingently empty restrictor:

1. (a) ? Every American king lives in New York.  
(b) (?) No American kings live in New York.  
(c) There are no American kings living in New York.

The first type of data is illustrated by the contrast between (1a) and (1b). Lappin and Reinhart (1988) claim that a consideration of the former invariably triggers the oddness response, whereas the latter may sound odd or acceptable depending on the context and assessor. They propose (p.1023) that '[t]he relevant distinction here is between [DPs] with weak determiners and those with strong determiners' (see §(1.2.2) for a definition of 'strength'); though their support for this diagnosis of the contrast is solely based on their consideration of a pair of sentences where the determiners 'no' and 'two' combine with empty restrictors. Nevertheless, the view that the contrast between (1a) and (1b) centres upon the contrast between (in the terminology advanced in §(1.1.3)) definite and indefinite determiners has been widely endorsed in the literature. For instance, Reinhart (2004) (p.52.) reports that, 'about half the participants' she has surveyed in various classes assign a value to each of a series of sentences where an indefinite determiner applies to a contingently empty restrictor, whereas the rest of the participants react with an oddness response to each of the sentences.<sup>1</sup> I shall therefore refer to the phenomenon illustrated by these data as '*Definite Variance*'.

The second type of data is illustrated by (1c), and consists of the observation that the value predicted by standard truth conditions can be easily assigned in the case of 'there'-sentences with perceived contingently empty restrictors.<sup>2</sup> I shall refer to this phenomenon as '*There' Acceptability*'. '*There' Acceptability* is unexpected in light of the problems associated with assigning the standard values to non-'there'-sentences with contingently empty restrictors.

The *problem of contingently empty restrictors* involves accounting for these data by explaining why judgements of oddness arise in cases where standard accounts predict truth values, in addition to explaining why definite and indefinite determiners vary in their propensity to elicit a sense of oddness when combined with empty restrictors. Furthermore, the fact that 'there be' constructions allow assessors to assign the predicted value requires explanation.

The following subsections will consist of a survey of the available accounts of sentences with contingently empty restrictors that are prevalent in the literature. I shall discuss four types of account: *semantic*, *processing*, *implicature* and *pragmatic presuppositional*. These categories are not intended to be totally precise, since certain accounts seem to straddle their boundaries: for example, the account of Reinhart (2004) could be classified as a processing or a pragmatic presuppositional account. Nevertheless, the categories are sufficiently sharp to structure the discussion of the existing positions. It should also be noted that the literature has mainly focused on the task of explaining *Definite Variance*, thus the discussion in the following subsections will only pertain to this aspect of the problem of perceived contingently empty restrictors; developing an account that can explain '*There' Acceptability* will be tackled later, after progress has been made in finding an account that is able to explain *Definite Variance*.

I will assess the proposed solutions to the problem of contingently empty restrictors according to *descriptive adequacy* (the accuracy of the judgements they predict with respect to empty-restrictor sentences with definite determiners, indefinite determiners and 'there be' phrases), *explanatory adequacy* (the plausibility of their explanation of *Definite Variance*

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<sup>1</sup>Reinhart's (2004) report suggests that some assessors consistently judge occurrences of sentences where an indefinite determiner applies to a contingently empty restrictor to be valued, and other assessors consistently judge them to be odd. *Definite Variance* would receive equal support from a scenario where each assessor varies in her response to an occurrence of such a sentence, potentially due to contextual features.

<sup>2</sup>Geurts (2007), p.253.

and ‘There’ Acceptability) and *generality* (the extent to which they rely upon independently motivated mechanisms with general applicability). Such desiderata are frequently invoked implicitly or explicitly in the assessment of accounts of any linguistic phenomenon.

I will conclude that pragmatic presuppositional accounts are most promising, though modifications are required to allow such accounts to meet all three desiderata. Such modifications will be implemented in a later section.

#### 4.1.2 Semantic Accounts

A semantic account addresses the problem of contingently empty restrictors solely by altering the truth conditions given by standard theories of generalized quantifiers. If a semantic account succeeds in altering the truth conditions in such a way that they no longer conflict with the responses elicited by empty-restrictor sentences, then progress is made in resolving the problem of perceived contingently empty restrictors.

The semantic view originates in de Jong and Verkuyl (1984), where it is claimed that the trivial truth predicted by accounts of generalized quantifiers and classical logic for sentences where ‘every’ applies to an empty restrictor is based on marked, ‘lawlike’ uses of such sentences. De Jong and Verkuyl argue that the ordinary truth conditions for definite determiners involve a requirement that the extension of the restrictor phrase is non-empty, causing occurrences of sentences to be assigned the value ‘undefined’ when this requirement is not met. This undefinedness is the source of the resulting sense of oddness: for given that occurrences of sentences with perceived empty restrictors lack truth values, it is unsurprising that assessors struggle to assign them values. For example, de Jong and Verkuyl’s truth conditions for ‘every’ are as follows:<sup>3</sup>

$$\llbracket \text{Every } N \beta \rrbracket_c \begin{cases} = 1 \text{ if } \llbracket N \rrbracket_c \subseteq \llbracket \beta \rrbracket_c \text{ and } \llbracket N \rrbracket_c \neq \emptyset \\ = 0 \text{ if } \llbracket N \rrbracket_c \not\subseteq \llbracket \beta \rrbracket_c \text{ and } \llbracket N \rrbracket_c \neq \emptyset \\ = \text{undefined if } \llbracket N \rrbracket_c = \emptyset \end{cases}$$

De Jong and Verkuyl uphold the standard truth conditions for indefinite quantifier expressions, treating sentences featuring such expressions as defined even with the presence of an empty restrictor.<sup>4</sup>

A significant difficulty thus arises for the account of de Jong and Verkuyl with respect to accommodating all of the data that composes the problem of contingently empty restrictors. Definite Variance was originally noted in Lappin and Reinhart (1988), hence the earlier paper by de Jong and Verkuyl did not perceive any pressure to reconsider the truth conditions of indefinite determiners. Yet this results in their account’s predicting that sentences where an indefinite determiner combines with an empty restrictor will always prompt judgements of valuedness, which is contradicted by the data.

More generally, in order to predict the Definite Variance data, there are three options available for a semantic account. It must either: modify the truth conditions for indefinite determiners so that the application to an empty restrictor yields undefinedness, claim that indefinite determiners are semantically ambiguous between a version with the standard semantics and a version with modified semantics, or propose an extra-semantic explanation

<sup>3</sup>De Jong and Verkuyl (1984), p.36.

<sup>4</sup>De Jong and Verkuyl (1984), p.28.

of the oddness response that sometimes arises with respect to indefinite DPs. I will now show that all of these options are problematic.

Let us begin by considering the first response, where the semantics for indefinite determiners are altered to incorporate a non-emptiness requirement. The first argument against this approach is that it erodes the distinction between definite and indefinite determiners by undermining the distinct properties that are commonly attributed to each class.<sup>5</sup> For example, as stated in §(1.2.3), Keenan (2003) shows indefinite DPs to be intersective. However, modifying the truth conditions for indefinite determiners means that such determiners need not denote intersective quantifiers.<sup>6</sup> A second argument against incorporating a non-emptiness requirement into the semantics for indefinite determiners is that such a move *still* fails to yield the correct predictions for the Definite Variance data. For Definite Variance includes the observation that sentences with indefinite DPs and empty restrictors *vary* in their propensity to generate the oddness response. Modified truth conditions for indefinite determiners would predict that sentences with indefinite DPs and empty restrictors *invariably* trigger the oddness response, as is supposed to be the case for such sentences with definite DPs.

Turning now to the second option, Geurts (2007) (p.261) suggests that the best way for de Jong and Verkuyl to salvage their account is to claim that indefinite determiners are semantically ambiguous between presuppositional and non-presuppositional readings, with the context sometimes making one reading more salient. That is, each occurrence of an indefinite determiner denotes either the quantifier proposed by theories of generalized quantifiers or a second quantifier which is identical apart from being undefined when its first argument is empty. According to this approach, we can continue to distinguish a class of quantifiers with properties such as intersectivity, but we must deny that determiners such as ‘no’ invariably denote quantifiers from this class; for they will sometimes denote the presuppositional copies that lack these properties. I will consider, and reject, this type of approach in §(4.2.2).

The third option presumably involves endorsing one of the other responses to the problem of contingently empty restrictors with respect to indefinite DPs. That is, while the oddness consistently elicited by occurrences of definite DPs is attributed to their truth conditions, the oddness sometimes elicited by occurrences of indefinite DPs is attributed to processing effects, implicatures or pragmatic presuppositions. One objection to such a proposal is that it would be preferable on grounds of methodological simplicity to advance a uniform explanation of the oddness response elicited by occurrences of definite and indefinite DPs with perceived empty restrictors. A second objection is that many of the criticisms of processing and implicature accounts, to be set out in subsequent subsections, will straightforwardly apply to an account that endorses the relevant response solely with respect to indefinite DPs. Finally, if this third approach were to associate pragmatic presuppositions with indefinite DPs, then it would plausibly count as the type of position to be considered, and rejected, in §(4.2.4).

In summary, de Jong and Verkuyl’s semantic account in particular has been seen to fail to predict the differing judgements associated with the Definite Variance data, thereby lacking descriptive adequacy. I then argued that semantic accounts in general are unable to develop

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<sup>5</sup>Lappin and Reinhart (1988), p.1027.

<sup>6</sup>To see this, note that the modified truth conditions for (e.g.) the determiner ‘no’ are compatible with situations where  $Q_{no}(A)(B)$  holds but  $Q_{no}(A \cap B)(B)$  fails to hold (i.e. if  $A \neq \emptyset$  but  $A \cap B = \emptyset$ ); thus  $Q_{no}$  fails to be intersective.

de Jong and Verkuyl's approach into an approach that predicts the Definite Variance data, since all three options for such a development face insurmountable difficulties. We may therefore conclude that semantic accounts inevitably lack descriptive adequacy.

### 4.1.3 Processing Accounts

Processing accounts accept the standard truth conditions for generalized quantifiers, but hold that the semantics place restrictions on the assessment procedures for sentences with different types of determiners. The oddness response is therefore attributed to an inability to process certain sentences with empty restrictors in the required manner.

The processing account given by Lappin and Reinhart (1988) takes as its point of departure Strawson's (1964) principle of verification (discussed in §(2.1.2)), which they interpret to mean that a sentence is assessed by retrieving the stored entry associated with the subject DP and determining whether it possesses the property denoted by the nuclear scope. When no entry can be retrieved for the DP, the assessment procedure stalls.<sup>7</sup> However, Lappin and Reinhart deny that this stalling is invariably linked to subject position of the DP, instead claiming that it is the processing of the empty set as an initial step in the assessment procedure. They begin by explaining why definite, but not indefinite DPs, with empty restrictors require the processing of the empty set, before discussing why this processing must occur as the first step of assessment.

To start, the authors note that the truth value of a sentence with an indefinite determiner may be established purely on the basis of the cardinality of the intersection of the quantifier's first and second argument, due to the property of intersectivity (defined in §(1.2.3)). On the other hand, they claim that assessors establish the truth value of a sentence with a definite determiner by considering the cardinality of the quantifier's first argument relative to the cardinality of the intersection of the first and second arguments.<sup>8</sup> Thus the cardinality of the set denoted by the restrictor must be determined for a sentence with a definite determiner to be assessed. Lappin and Reinhart then argue that the establishment of the cardinality of the set denoted by the restrictor occurs as the initial step of assessment for sentences with definite determiners, due to computational efficiency.<sup>9</sup> To understand this argument, consider a sentence of the form 'Every N  $\beta$ '. The authors suggest that there are three options for empirically assessing this sentence:

*Processing Definite DPs -*

- (i) - Scan  $\llbracket N \rrbracket_c$  to determine  $|\llbracket N \rrbracket_c|$  and  $|\llbracket N \rrbracket_c \cap \llbracket \beta \rrbracket_c|$ , then compare  $|\llbracket N \rrbracket_c|$  to  $|\llbracket N \rrbracket_c \cap \llbracket \beta \rrbracket_c|$ .
- (ii) - Scan  $\llbracket \beta \rrbracket_c$  to determine  $|\llbracket N \rrbracket_c \cap \llbracket \beta \rrbracket_c|$ , scan  $\llbracket N \rrbracket_c$  to determine  $|\llbracket N \rrbracket_c|$ , then compare  $|\llbracket N \rrbracket_c|$  to  $|\llbracket N \rrbracket_c \cap \llbracket \beta \rrbracket_c|$ .
- (iii) - Scan the complement of  $\llbracket \beta \rrbracket_c$  to determine  $|\llbracket N \rrbracket_c - \llbracket \beta \rrbracket_c|$ .

According to the authors, option (i) is the most efficient strategy, since it involves a single process, and the sets that are scanned are likely to have tractable cardinalities. In contrast,

<sup>7</sup>Lappin and Reinhart (1988), p.1030

<sup>8</sup>*Ibid.*, p.1029.

<sup>9</sup>*Ibid.*, p.1032.

option (ii) is claimed to involve multiple processes, and option (iii) requires the scanning of the complement of  $\llbracket \beta \rrbracket_c$  which will generally possess a cardinality that exceeds the cardinalities of both  $\llbracket N \rrbracket_c$  and  $\llbracket \beta \rrbracket_c$ .

If this argument from computational efficiency succeeds, then it follows that the set denoted by the restrictor is the first item that is processed for definite determiners. Thus the assessment procedure stalls at the initial step when the cardinality of the set denoted by the restrictor is found to be zero. In contrast, for sentences with indefinite DPs, it is equally computationally efficient to begin by scanning the set denoted by the restrictor phrase or the set denoted by the nuclear scope:

*Processing Indefinite DPs -*

- (i) - Scan  $\llbracket N \rrbracket_c$  to determine  $|\llbracket N \rrbracket_c \cap \llbracket \beta \rrbracket_c|$ .
- (ii) - Scan  $\llbracket \beta \rrbracket_c$  to determine  $|\llbracket N \rrbracket_c \cap \llbracket \beta \rrbracket_c|$ .

Individuals that choose the first strategy will judge the sentence to be odd due to the assessment procedure's stalling upon encountering the empty set, and individuals that choose the second strategy will judge the sentence to have the value predicted by standard theories.<sup>10</sup> This yields the mixed judgements characteristic of sentences where indefinite determiners combine with empty restrictors.

It is clear that the account proposed by Lappin and Reinhart (1988) is therefore able to predict the Definite Variance data. However, doubts may be raised regarding the coherence of their explanation of Definite Variance, on the grounds that their arguments regarding computational efficiency pertain to a notion of 'scanning' that is not entirely explicit. They seem to think that assessors scan a quantifier's arguments in order to establish the relevant cardinalities; yet there is no explanation of the apparent inability to scan the relative complement or the intersection of the arguments. If assessors could scan such sets, then the following options would presumably become available:

*Processing Definite DPs -*

- (iv) - Scan  $\llbracket N \rrbracket_c - \llbracket \beta \rrbracket_c$  to determine  $|\llbracket N \rrbracket_c - \llbracket \beta \rrbracket_c|$ .

*Processing Indefinite DPs -*

- (iii) - Scan  $\llbracket N \rrbracket_c \cap \llbracket \beta \rrbracket_c$  to determine  $|\llbracket N \rrbracket_c \cap \llbracket \beta \rrbracket_c|$ .

However, if such options are available, then the observations about computational efficiency fail. Firstly, option (iv) would result in an assessment procedure for definite determiners that would be identical to option (i) in terms of number of processes and tractability. Yet it could not be proposed that processing would stall when  $\llbracket N \rrbracket_c - \llbracket \beta \rrbracket_c$  is empty, since it will be empty both in cases where  $\llbracket N \rrbracket_c = \emptyset$  and in certain cases where  $\llbracket N \rrbracket_c \subseteq \llbracket \beta \rrbracket_c$ . Regarding indefinites, option (iii) would allow them to be uniformly assessed in a manner that involves an equal number of processes as options (i) and (ii). Yet, again, the empty set would be encountered

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<sup>10</sup>Lappin and Reinhart (1988), p.1033.

both in cases in which the restrictor is empty and in certain cases in which the quantified claim holds, hence stalling could not be postulated as the effect of encountering the empty set as the first step of the procedure.

Reinhart (2004) (p.57) suggests a solution to this issue, claiming that we should follow the notion of verification described in Strawson (1964) by requiring the assessment procedure to consider ‘only sets which are directly expressed in the sentence, or have been “antecedently introduced”’. This provides a principled means of precluding the scanning of intersections and relative complements. However, Lappin and Reinhart (1988) are unable to uphold this principle when faced with sentences where indefinite determiners apply to empty restrictors *and* empty nuclear scopes (e.g. ‘No American kings are Swiss kings’). They claim that these sentences seem to sometimes trigger judgements of valuedness, despite the fact that both processing strategies proposed for indefinite determiners result in the empty set’s being encountered as an initial step. They conclude that it is possible for such sentences to be processed by speakers’ choosing to scan the intersection of the two arguments, causing them to deem the sentence valued if they find it to be empty.<sup>11</sup> This claim confuses matters for two reasons. Firstly, it seems that we *may* assess sentences by scanning the intersection of the quantifier’s arguments, even when such a set has not been introduced by material in the discourse. As earlier noted, their claims pertaining to the most effective strategies crucially rest on the avoidance of scanning sets other than the quantifier’s arguments. Secondly, it turns out that scanning the empty set as an initial step in assessment does not always result in stalling, and no explanation for this is offered. It would seem implausible to claim that it is only the emptiness of one of a quantifier’s arguments that triggers stalling, and that the emptiness of an intersection of its arguments is acceptable. In short, the account starts to look somewhat unclear and ad hoc.

The idea that one scans each of the quantifier’s arguments independently, and that scanning the empty set as an initial step results in stalling, can thus be seen to be simultaneously crucial to the account of Lappin and Reinhart and lacking in support. The key issue underlying these objections is summarised concisely by Geurts (2007) (p.256), and holds implications for any processing account: ‘Although Lappin and Reinhart’s main idea, that truth-value judgments are correlated with the pragmatics of verification, is intuitively plausible, it seems that the classical generalised quantifier semantics does not sufficiently constrain the range of potential verification strategies’. The fact that an extremely broad range of processing strategies is consistent with standard accounts of generalized quantifiers means that no difference between the verification procedures of sentences with indefinite and definite determiners naturally emerges from the semantics. Thus any processing account of Definite Variance that aims to derive processing differences purely from the *semantics* of determiners will inevitably involve an ad hoc air.

This observation does not rule out accounts that allow the *pragmatics* of determiners to contribute to restrictions on the assessment procedure. Reinhart (2004) offers such an account, building upon the processing account advanced in Lappin and Reinhart (1988). She begins by reiterating the claim made in Lappin and Reinhart (1988) that the semantics of definite determiners render the checking of the restrictor set a requirement for assessment, a process that stalls if the set is found to be empty, whereas the intersectivity of indefinite determiners means that they may be assessed without checking the restrictor set. The main

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<sup>11</sup>Lappin and Reinhart (1988), p.1034.

departure from the account advanced in the earlier paper is that, while Lappin and Reinhart (1988) indicated that the assessment procedure for occurrences of sentences with indefinite DPs is selected arbitrarily, Reinhart (2004) develops the idea that *topicality* affects the assessment procedure for such DPs. She holds that, in settings where indefinite DPs are topicable, the topic selection is arbitrary; the assessment procedure then begins with checking the set included in the denotation of the topic, with the procedure's stalling if this set is empty. Broader pragmatic factors are therefore claimed to affect the assessment of sentences with indefinite DPs, allowing a more natural explanation of Definite Variance.

This sensitivity to pragmatic features in general, and topicality in particular, closely aligns the view of Reinhart (2004) with the pragmatic presuppositional approaches to the problem of contingently empty restrictors. Indeed, Reinhart herself states (p.57) that her modified version of the processing account attributes non-emptiness *presuppositions* to DPs whenever the assessment procedure requires the restrictor set to be checked. A full assessment of her account will therefore be reserved for later sections.

In summary, processing accounts have the potential for the descriptive adequacy absent in semantic accounts, but cannot derive a coherent explanation of Definite Variance by proposing that restrictions are imposed on the assessment procedure purely by the semantics of determiners; hence they lack explanatory adequacy. Those accounts that claim pragmatic properties impose constraints on the assessment procedure are arguably best categorised under one of the other two accounts to be discussed, depending on whether they invoke conversational implicatures or pragmatic presuppositions.

#### 4.1.4 Implicature Accounts

Implicature accounts uphold the standard truth conditions for generalized quantifiers, but propose that it is difficult for us to access the truth values of sentences with empty restrictors due to their pragmatic infelicity. This infelicity arises due to an implausible conversational implicature that interferes with normal communication practices. Different implicature accounts might predict that an assessor will react by always accommodating the implausible implicature, always refusing to accommodate the implausible implicature (thereby inferring that the speaker has violated a conversational maxim), or considering both strategies. The oddness response will then be attributed to an assessor's reluctant acceptance of an implausible implicature, her inference that a maxim has been violated, or her confusion about how to proceed with making sense of the assertion.

It is important to begin by clarifying the notion of a conversational implicature. Grice and the neo-Griceans (e.g. Atlas and Levinson (1981), Horn (1984), Horn (1989), Levinson (2000)) propose that all cooperative discourse is governed by maxims of Quantity, Quality, Relation and Manner, and that participants in a conversation assume 'that talkers will in general (*ceteris paribus* and in the absence of indications to the contrary) proceed in the manner that these principles prescribe'.<sup>12</sup> In cases where a speaker appears to violate a maxim, conversation participants are frequently induced to make certain inferences about the information that the speaker intended to convey. A proposition *p*, distinct from the proposition literally expressed by an occurrence of a sentence *S*, is a *conversational implicature* of *S* if the occurrence of *S* involves the violation of a maxim and hearers are therefore likely

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<sup>12</sup>Grice (1989), p.28.

to infer that the speaker intended to convey that p.

The most detailed version of an implicature account is given by Abusch and Rooth (2004), who begin by noting that both (1a) and (1b) are entailed by occurrences of (2):

2. There are no American kings.

The reason for this is that, assuming Keenan-style semantics for coda-less ‘there’-sentences (see §(1.2.3)), an occurrence of (2) is true relative to a context  $c$  and domain of discourse  $D$  just in case  $\llbracket \text{American king} \rrbracket_c \cap D = \emptyset$ . Hence in every context where an occurrence of (2) is true, occurrences of (1a) and (1b) will feature empty restrictors and will therefore be true according to standard accounts of generalized quantifiers. However, neither (1a) nor (1b) entails (2). This means that (2) *asymmetrically entails* (1a) and (1b).

It is commonly held that a speaker’s using a sentence S when a distinct sentence S’ that the speaker was in a position to assert asymmetrically entails S violates Grice’s first maxim of Quantity (‘Make your contribution as informative as is required (for the current purposes of the exchange)’). Abusch and Rooth therefore endorse a principle that may be stated as follows: If S’ asymmetrically entails S and S’ is an assertional alternative to S, then an individual’s uttering of S relative to a CG  $c$  implicates that he does not believe the proposition that would be expressed by an occurrence of S’ relative to  $c$ .<sup>13</sup> The fact that a speaker utters (1a) instead of (2) therefore results in the conversational implicature that she does not believe (2) to hold, hence she must believe (1a) to be true without believing that its restrictor is empty. This results in utterances of (1a) eliciting a sense of oddness for an assessor relative to contexts where she was under the impression that the CG entailed (2), since she is required to accommodate another interlocutor’s apparent belief that (2) fails to hold.

It should be clear that the same implicature is predicted to arise when (1b) is uttered. If the oddness response were to be invariably triggered by the presence of the implicature, then the prediction would emerge that all occurrences of sentences with definite *and indefinite* DPs with empty restrictors that are predicted to be true by theories of generalized quantifiers trigger the oddness response. Implicature accounts must therefore complicate the picture described so far in order to capture the Definite Variance data. Abusch and Rooth tackle this issue by claiming that a sense of oddness may be avoided with indefinite DPs because hearers are able to infer that the speaker fails to believe (2) relative to some restricted set of beliefs pertaining to a relevant situation (the hearer need not establish what beliefs this restricted set involves), rather than that he fails to believe (2) tout court. Since there is no implicature that the speaker fails to believe (2) relative to the entire belief state encapsulated in the CG, the attempted reconciliation between the information the hearer took the CG to include and the information she infers the speaker took it to include is unnecessary, hence the oddness response is avoided. Presumably, those individuals who judge sentences with indefinite DPs to be odd are being less charitable to the speaker and refraining from considering the speaker’s salient beliefs alone. Abusch and Rooth attribute hearers’ consistent failure to apply this interpretation strategy to occurrences of sentences with definite DPs to a property that only the quantifiers denoted by indefinite DPs possess.<sup>14</sup>

<sup>13</sup>Abusch and Rooth (2004), p.11. Note that it is not explained what makes something an ‘assertional alternative’.

<sup>14</sup>In more detail, Abusch and Rooth point out that the following property is possessed by the quantifiers denoted by indefinite, but not definite, determiners: For any sets  $A, B, B'$ , if  $B \subseteq B'$ , then  $Q(A)(B)$  iff  $Q(A \cap$

My primary objection to Abusch and Rooth's account is that it is psycholinguistically implausible to suppose that interlocutors routinely assume that speakers possess restricted belief states that potentially cohere poorly with their overall belief states. That is, it does not seem that a natural response to an utterance of (1b) would be the assumption that the speaker possesses some relevant set of beliefs compatible with the possibility that there are some American kings, but that the speaker's belief state as a whole entails that there are no American kings.

An alternative implicature-based account of definite determiners is sketched in Peters and Westerståhl (2006) (pp.125-6.), who propose that it is uninformative to assert sentences where an 'every'-headed DP applies to a known empty restrictor because the trivial truth of the sentence is already guaranteed by the restrictor's emptiness. This proposal differs from that of Abusch and Rooth insofar as it attributes the oddness response elicited by (1a) to an assessor's assumption that the speaker is violating the first Gricean maxim of Quantity, by accepting the stronger claim (2) at the same time as issuing a claim that is uninformative in light of the prior acceptance of (2). In other words, while Abusch and Rooth attribute the oddness response to an assessor's struggle to accommodate an implausible conversational implicature, Peters and Westerståhl attribute it to an assessor's refusal to accommodate the implicature and subsequent inference that a speaker has violated a conversational maxim. However, Peters and Westerståhl include no discussion of the behaviour of indefinite determiners with respect to empty restrictors, meaning that their proposal is insufficiently developed to display even descriptive adequacy.

Geurts (2007) (p.257) offers a powerful objection to any implicature account, based on the observation that conversational implicatures of this form can normally be *cancelled* by explicitly stating the stronger claim that is typically the assertional alternative. For example, it is commonly held that occurrences of sentences of the form 'Many N  $\beta$ ' conversationally implicate the proposition that not all N  $\beta$ , since 'All N  $\beta$ ' asymmetrically entails 'Many N  $\beta$ '; yet this implicature may be cancelled as follows:

3. Many orphans are sick - in fact, all orphans are sick.

An utterance of (3) seems felicitous, and the implicature that would otherwise arise is cancelled. Yet compare (3) with the following:

4. ? Every American king lives in New York - in fact, there are no American kings.

If Abusch and Rooth (2004) are correct that (2) is the stronger assertional alternative to every trivially true occurrence of a sentence with 'American kings' as its restrictor, and that the oddness response arises only due to the presence of the implicature that the speaker

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$B')(B)$ . For example, from the fact that the set of kings is a subset of the set of males, we can infer that 'No inhabitant of New York is a king' is true iff 'No male inhabitant of New York is a king'; on the other hand, 'Every male inhabitant of New York is a king' may be true when 'Every inhabitant of New York is a king' is false, in cases where there are some female inhabitants of New York. Thus when a hearer assumes there to be a restricted belief state concerning a salient situation that the speaker is basing his utterance on, the hearer can assess the uttered sentence at the same time as supposing that the speaker had in mind an alternative sentence where some aspect of the salient situation further restricted the explicit restrictor. Crucially, in the case of indefinite DPs, whatever additional restriction the speaker has in mind will yield a sentence with the same truth value as the one he uttered.

fails to believe (2), then the implicature should be cancelled for occurrences of (4) and no sense of oddness should arise. This prediction just seems to be straightforwardly false: as Geurts (p.257) notes, 'it is fairly obvious that this inference doesn't behave as an ordinary implicature', since it seems clear that (4) is infelicitous. The sense of oddness with respect to the first part of the sentence persists, although we might find ourselves concurring with the additional claim that there are no American kings. Without an explanation of the difficulties in cancelling the purported implicature, all implicature accounts of sentences with empty restrictors become implausible. Indeed, they must propose a special type of non-cancellable conversational implicature, which would involve the abandonment of a key characteristic of conversational implicatures.

A second objection that targets all implicature accounts concerns the difficulty of applying them to Definite Variance data that emerges with respect to occurrences of sentences that theories of generalized quantifiers predict to be false. That is, sentences that state the emptiness of a restrictor 'N' fail to entail those of the form 'Det N  $\beta$ ' when 'Det' is replaced with a determiner that is predicted to combine with an empty restrictor to yield falsity (e.g. 'some', 'three', etc.). Implicature accounts would therefore need to provide an alternative explanation of the source of the oddness response that sometimes arises in such cases in order to attain descriptive adequacy. Yet the reduced parsimony of such an account would render it less appealing than an account that provided a uniform explanation of Definite Variance data with respect to all determiners, thereby undermining its explanatory adequacy.

In summary, the implicature account proposed by Abusch and Rooth lacks explanatory adequacy with respect to Definite Variance. It was also seen that all implicature accounts must commit themselves to non-cancellable conversational implicatures, which further undermines their plausibility. Moreover, the fact that Definite Variance data arises with respect to occurrences of sentences that are predicted to be false when the restrictor is empty threatens both the descriptive and explanatory adequacy of implicature accounts.

#### 4.1.5 Pragmatic Presuppositional Accounts

The accounts to be discussed in this subsection again uphold the standard truth conditions for sentences with perceived contingently empty restrictors, claiming that certain occurrences of sentences presuppose the existence of items related to the restrictor's denotation, with the failure of this presupposition's yielding the oddness response. In the literature on presupposition, there is a division between views that encode presuppositions as requirements in the semantics that yield undefinedness upon failing, and views that treat presuppositions as constraints on the CG that yield pragmatic infelicity but fail to affect truth values. Clearly, the semantic accounts of perceived contingently empty restrictors considered in §(4.1.2) count as 'presuppositional' in the former sense, though I avoided describing them as such for simplicity. Unlike the semantic presuppositions postulated by such accounts, pragmatic presuppositions may be attributed to both definite and indefinite DPs without eroding the distinction between the two classes: for such presuppositions are independent of the semantics of quantified sentences, meaning that indefinite determiners continue to denote intersective quantifiers. The current subsection is concerned solely with accounts that are 'presuppositional' in this latter, pragmatic sense. Furthermore, the particular item, related to the restrictor's extension, which is presupposed to exist may vary according to the account. In the current subsection, I will therefore leave open what exactly is presupposed to

exist and fails to exist with respect to occurrences of sentences with perceived contingently empty restrictors.

Evidence for the idea that occurrences of sentences with definite determiners trigger an existence presupposition derives from the observation that definite DPs exhibit the behaviour characteristic of embedded presupposition-triggering expressions. For example, the sentence (5a) appears to inherit the putative presupposition that some set of American kings exists, whereas this presupposition projection is blocked in (5b):

5. (a) If it is after midnight, then every American king is asleep.
- (b) If there are American kings, then every American king is asleep.

Geurts (2007) (p.260) claims that this projection behaviour presents a challenge to anyone who wishes to deny that such sentences are associated with existence presuppositions. I concur that this evidence for presuppositional accounts is highly compelling, and it indicates the potential to deliver the correct predictions for the judgements elicited by definite determiners in a range of complex sentences.

Of course, data concerning projection lends equal support to semantic and pragmatic presuppositional accounts of contingently empty restrictors. Thus advocates of the latter type of account must give additional reasons to endorse their preferred analysis. Geurts criticises the account given by de Jong & Verkuyl (1984) on the grounds that their encoding of a non-emptiness presupposition in the semantics for quantifiers results in the prediction that every context in which this presupposition fails will generate the oddness response in assessors. However, Geurts (p.263) follows Strawson (1964) in claiming that infelicity-generating existence presuppositions are present only when the relevant DP is the sentence topic. His argument rests on pairs of sentences where DPs with perceived contingently empty restrictors vary in their clause position. Given his assumption that clause-initial status is linked to topicality, it follows that the two (a) sentences below are more conducive to the assignment of a value than the corresponding (b) sentences; though in the case of (7a) and (7b), where the DPs are indefinite, 'the contrast is admittedly subtle':<sup>15</sup>

6. (a) The Exhibition was visited yesterday by all Swiss matadors.
- (b) All Swiss matadors visited the Exhibition yesterday.
7. (a) Today a sightseeing bus was hijacked by five Swiss matadors.
- (b) Five Swiss matadors hijacked a sightseeing bus today.

As stated in §(2.3.3), it is my view that alterations in sentence structure are insufficient to establish topicality. Stronger evidence for the topic-sensitivity of assessors' responses would be supplied by manipulating IS through either left dislocation, indications of intended pitch accents or the provision of QUDs. Nevertheless, I agree with Geurts that solutions to the problem of contingently empty restrictors should be topic-sensitive. I will provide stronger evidence in favour of this perspective in due course.

Geurts infers from the apparent topic-sensitivity of assessors' responses to DPs with empty restrictors that no semantic presuppositional approach can be descriptively adequate.

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<sup>15</sup>Geurts (2007), p.266.

He therefore concludes that pragmatic presuppositional accounts of empty restrictors are preferable to semantic ones. However, I will show in §(4.2) that a semantic presuppositional account might, with pragmatic supplementation, be rendered sensitive to topicality effects. Hence Geurts' claims about the influence of topic on the construal of the data is insufficient to support pragmatic presuppositional accounts over semantic presuppositional ones.

Geurts then attempts to use the notion of topic-sensitive presupposition failure to explain Definite Variance. He begins by proposing that 'a strong quantifier always triggers the presupposition that its domain is nonempty, whereas a weak quantifier is ambivalent in this regard: sometimes it comes with a presupposition, and sometimes it doesn't'.<sup>16</sup> He holds that the choice between a presuppositional and non-presuppositional reading of an instance of an indefinite determiner 'is usually determined by contextual factors', though he does not elaborate on what sort of contextual factors might affect the reading.<sup>17</sup> He further suggests that a definite DP is inherently likely to be interpreted as the sentence topic, especially when it is clause-initial; in contrast, an indefinite DP is inherently less likely to be interpreted as the sentence topic, though it is more likely to occur as the sentence topic when in subject position than when in non-subject position.<sup>18</sup> The reason that indefinite DPs are less commonly topics than definite DPs is 'because they aren't presuppositional'.<sup>19</sup> It is not entirely clear why Geurts thinks that the non-presuppositional status of indefinite DPs affects their propensity to be topical. It is additionally unclear whether or not he thinks that an indefinite DP must be interpreted as presuppositional if it is to be interpreted as topical.

This distinction in the default likelihood for a DP to be the sentence topic is taken to explain Definite Variance: since a definite DP is almost always interpreted as the sentence topic, the failure of the existence presupposition near invariably results in the oddness response, whereas the fact that indefinite DPs will be interpreted as the sentence topic less frequently means that the restrictor's emptiness can sometimes be ignored and the ordinary truth value may be assigned.

Geurts' explanation of Definite Variance strikes me as underdeveloped. I pointed out that there is no account of the contextual factors that contribute to presuppositional and non-presuppositional readings of indefinite DPs. I also noted that there is a lack of clarity pertaining to the relationship between indefinite DPs' propensity for non-presuppositional readings and their inherent unlikelihood of being interpreted as topical, in addition to a lack of clarity regarding the proximity of the connection between topical and presuppositional interpretations of occurrences of indefinite determiners. However, such details are integral to the coherence of Geurts' explanation of Definite Variance. Therefore, although pragmatic presuppositional solutions to the problem of perceived contingently empty restrictors are a highly compelling prospect, the account adduced in Geurts (2007) gives an explanation of Definite Variance that is insufficiently plausible to pass the second desideratum for a successful solution.

It was earlier seen that Reinhart (2004) develops the processing account of Lappin and Reinhart (1988) into an approach that connects the triggering of the oddness response in the case of indefinite DPs with empty restrictors to the DPs' topicality. Not only is her account

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<sup>16</sup>Geurts (2007), p.258.

<sup>17</sup>*Ibid.*, p.261.

<sup>18</sup>*Ibid.*, p.266.

<sup>19</sup>*Ibid.*, p.267.

topic-sensitive, but she furthermore explicitly categorised it as presuppositional. However, there are some crucial differences between her approach and that of Geurts (2007). Most significantly, Reinhart (2004) predicts that (6a) and (6b) will both trigger the oddness response, since she denies a connection between topicality and the oddness response in the case of definite DPs, which she takes to yield a sense of oddness due to unavoidable problems in the assessment procedure. Although she claims that an indefinite DP with an empty restrictor only triggers the oddness response if it is the sentence topic, she nevertheless predicts that both (7a) and (7b) will possibly elicit the oddness response and possibly elicit a value judgement, with no difference in their propensity to do so. This is the case because their indefinite DPs are technically topicable in both clause positions, hence it is her view that the sentence topic will be selected arbitrarily. A more detailed comparison and assessment of the two approaches is reserved for the following section.

I have concurred with Geurts that presuppositional accounts provide a promising solution to the problem of perceived contingently empty restrictors, and that topicality appears to affect the assessment of such sentences. However, a more plausible presuppositional account than the one offered by Geurts, which is deficient in explanatory adequacy, should be sought. This is the task of the following section.

### **Summary of §(4.1)**

I have argued that a topic-sensitive, presuppositional account is the most promising solution to the problem of contingently empty restrictors. This argument was based, firstly, on the significant limitations of semantic, processing and implicature approaches to the problem. Secondly, support for a topic-sensitive, presuppositional account in particular derived from Geurts' observations that the oddness response is triggered and blocked in settings that correspond to the predictions of accounts of presupposition projection, and that topicality has an additional effect. Subsequent sections will involve developing a topic-sensitive, presuppositional account that meets the three desiderata for a successful solution to the problem of contingently empty restrictors.

## **4.2 Varieties of Topic-Sensitive, Preuppositional Accounts**

There are several forms that a topic-sensitive, presuppositional account might take. In §(4.2.1), I will sketch four positions available to such accounts regarding the source of the existence presupposition triggered by definite and indefinite DPs in certain settings. These positions vary according to whether the presupposition is treated as inherent, inherent but inactive, inherited from topic position, or deriving from divergent sources in the case of definite and indefinite DPs. An assessment of these positions will then occur. In §(4.2.2), §(4.2.3) and §(4.2.4), I will argue against, respectively, the 'Inherent' position, the 'Inherent But Inactive' position and the 'Mixed' position. This leads me to conclude that we should trace the existence presupposition associated with certain occurrences of definite and indefinite DPs to topic position, as proposed by the 'Inherited' position.

### 4.2.1 Sources of Presuppositions

A topic-sensitive, presuppositional account must address the following question: What is the source of the existence presupposition triggered by definite and indefinite DPs in certain settings? I take the following answers to be available:

**Inherent:** DPs are inherently presuppositional on at least some disambiguations.

**Inherent But Inactive:** DPs are inherently presuppositional on at least some disambiguations, but being topical is a requirement for the presupposition to be 'active' in some sense.

**Inherited:** Being topical causes DPs to be presuppositional.

**Mixed:** One of the preceding three positions holds of definite DPs, and a different one holds of indefinite DPs.

I consider an occurrence of a DP to be 'inherently presuppositional' if and only if it is associated with an *inherent presupposition*, by which I mean a presupposition that is either lexically encoded in, or conventionally associated with, the determiner heading that DP. An inherent presupposition may be either *semantic* (i.e. a requirement for definedness) or *pragmatic* (i.e. a requirement for felicity). For this reason, some of the arguments against semantic accounts that I alluded to in §(4.1.2) will be clarified by discussion in the following subsections.

Advocates of some of these positions may be found in the literature on the problem of contingently empty restrictors. For example, if we take the view of Reinhart (2004) to involve the postulation of existence presuppositions, then she seems to endorse Mixed. For she accepts Inherent with respect to definite DPs, since they must always be assessed by checking the restrictor set, and the assessment procedure stalls when the set is empty; yet she accepts Inherent But Inactive with respect to indefinite DPs, insofar as their topicality is a necessary condition for the emptiness of the restrictor to cause the processing procedure to stall.

Debates that concern problems other than that of contingently empty restrictors have also touched upon the issue of the existence presuppositions of DPs, and some of the above positions have been argued for within such debates. For example, Karttunen (1969), in his discussion of the means by which DPs establish discourse referents, seems to accept Inherent, at least with respect to the limited class of DPs upon which his discussion centres. He claims that DPs formed with the definite determiner carry an existence presupposition, whereas those formed with the indefinite determiner are ambiguous between a presuppositional, specific reading and a non-presuppositional, non-specific reading.<sup>20</sup> The multiple readings correspond to distinct positions of the 'quantifier binding variable' associated with an indefinite DP in the logical form of the occurrence of the sentence.<sup>21</sup> Diesing (1992) appears to also endorse Inherent, arguing that definite determiners always presuppose the non-emptiness of the restrictor set. Yet she takes indefinite determiners to be ambiguous between a weak reading and a strong-like, presuppositional reading, with each disambiguation corresponding to a distinct syntactic position.

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<sup>20</sup>Karttunen (1969), pp.2-3.

<sup>21</sup>*Ibid.*, p.26.

Having demarcated the available positions, the lack of clarity exhibited by the view formulated in Geurts (2007) become even starker, insofar as it is difficult to categorise his account. At some points, Geurts seems to endorse the view that definite and indefinite DPs differ in their possession of inherent presuppositions, which explains their differing propensity to be topical. At other points, he seems to accept a view where definite and indefinite DPs differ in their propensity to be topical, which explains their differing propensity to trigger presuppositions. The former view is suggestive of an Inherent or Inherent But Inactive position, whereas the latter view indicates an Inherent But Inactive or Inherited position. Yet it is clearly gratuitous to endorse *both* of the positions that Geurts equivocates between, since either one of them may be developed into a *prima facie* plausible explanation of Definite Variance.

It is notable that an articulation of the merits and limitations of each position is absent from the literature. Rather, once an author has concluded that DPs trigger existence presuppositions in some settings, they seem to select and defend one of the positions without explanation. In the following subsections, I shall therefore consider the sort of reasons that influence the choice of position. I shall begin by arguing against Inherent, before claiming that Inherited is preferable to Inherent But Inactive. Finally, I will raise doubts about Mixed. The conclusion is therefore that Inherited yields the most promising topic-sensitive, presuppositional account.

#### 4.2.2 Against Inherent

In its above formulation, it looks as if Inherent accounts would be topic-insensitive and incompatible with Definite Variance data. That is, it seems as if Inherent would incorrectly predict that all DPs have a presuppositional reading in all contexts. However, it is possible for Inherent accounts to attain *prima facie* plausibility by endorsing the following topic-sensitive explanation of Definite Variance: definite DPs are always presuppositional, whereas indefinite DPs are ambiguous between an inherently presuppositional and a non-presuppositional reading; an indefinite DP's being topical favours the presuppositional disambiguation, and its being non-topical favours the non-presuppositional disambiguation. A version of Inherent that proposed this view would correctly predict that occurrences of definite DPs are more likely to trigger the oddness response than occurrences of indefinite ones, in addition to reflecting the fact that information structure has an effect on assessors' responses. However, in this subsection I will argue that Inherent accounts still face a dilemma: either they incorrectly predict that all occurrences of definite DPs are presuppositional, or they introduce further modifications that result in the conflation of their position with Inherent But Inactive accounts.

Inherent accounts predict that definite DPs trigger existence presuppositions even when non-topical. To challenge this prediction, we may consider occurrences of sentences with non-topical definite DPs that have perceived contingently empty restrictors:

8. (Who governs New York?)<sup>22</sup>

(a) [Every American KING]<sub>F</sub> governs New York.

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<sup>22</sup>The reason I have chosen the predicate 'governs' rather than 'lives in' is that it is difficult to give a complete answer to the QUD expressed by 'Who lives in New York?'

- (b) [The American KING]<sub>F</sub> governs New York.
- (c) [The three American KINGS]<sub>F</sub> govern New York.

It is natural to respond to all three sentences with value assignments, rather than with an oddness response.<sup>23</sup> Strawson (1964), Geurts (2007) and Schoubye (2009) concur with the judgement that sentences with non-topical definite DPs naturally allow the assignment of values, though Reinhart (2004) maintains that the oddness response arises. However, Reinhart's testing of such judgements occurs purely with respect to sentences where the definite DPs are clause-final. Yet §2.3.1 and §2.3.3 argued that the provision of a QUD and intended prosody are the only reliable means of fixing topicality for occurrences of sentences in canonical form. If this idea is accepted, and (8a) – (8c) are felt to yield value judgements, then we might attribute Reinhart's diverging opinion to her consideration of occurrences of sentences for which the non-topicality of the definite DPs is not guaranteed. On the basis of the natural responses to (8a) – (8c), it therefore seems that non-topical occurrences of definite DPs do not trigger existence presuppositions, in contrast with the predictions of Inherent.

In order to attain descriptive adequacy, an Inherent account could propose that definite DPs are semantically ambiguous between presuppositional and non-presuppositional readings, just like indefinite DPs. However, such a move would be problematic for three reasons. Firstly, it seems reasonable to endorse the following principle: syntactic or semantic ambiguity should only be postulated if evidence supporting its existence is found which is unrelated to the phenomenon of concern. It follows that evidence for the ambiguity of definite DPs is required which is independent of sentences with empty restrictors. However, while some independent motivation arguably exists for the proposal that *indefinite* DPs are ambiguous between presuppositional and non-presuppositional versions, no such independent motivation appears to be available for *definites*.<sup>24</sup>

Secondly, by attempting to capture the topic-sensitivity of definite DPs, topicality appears to play such a significant role in the emergence of the existence presuppositions of

<sup>23</sup>Regarding the matter of *which* values it is natural to assign to the sentences, it is clear that (8b) and (8c) are judged false, in accordance with the predictions of my semantics for the definite article (see §(4.3.3)). Matters are slightly more complicated with respect to (8a), which the semantics for 'every' predicts to be trivially true. Abusch and Rooth (2004) state that the natural response to an occurrence of such a sentence is indeed: 'True, but just because there are no American kings'. On the other hand, von Stechow (2004) claims that his 'cursory field research' indicates that responses to sentences such as (8a) are split fairly evenly between judgements of truth and of falsity. I concur that there may be a temptation to respond to an occurrence of (8a) with 'That's false, there are no American kings'. One potential explanation attributes this response to assessors' rejecting the addition of the information expressed by an occurrence of (8a) to the file card associated with 'New York' or 'governs New York'; for although the information is technically true, it is true only because the property in question holds of *any* set, rendering it an unilluminating answer to the QUD and an unhelpful addition to the active file card.

<sup>24</sup>For example, the literature contains several proposals for categorising indefinite DPs into two groups, including: weak versus strong-like (Milsark (1977), Diesing (1992)), specific versus non-specific (Karttunen (1969), Ioup (1977), Enç (1991), Farkas (1994)), and referential versus quantificational (Fodor and Sag (1982)). Arguments for each of these proposed distinctions derive from grounds independent of data concerning contingently empty restrictors. However, each distinction may plausibly be claimed to result in an understanding of an indefinite DP with some sort of existence presupposition and one without. On the other hand, there is a relative absence of similar proposals with respect to definite DPs. Note that my arguments in favour of Inherent suggests that the distinct understandings that have been identified for different occurrences of indefinite DPs should be attributed to topic-sensitive pragmatic factors, though I will not develop this idea in the current project.

both types of DP that it surely counts as ‘activating’ the putatively inherent presuppositions. For this reason, an Inherent account that responds to the data raised by (8a) – (8c) in the way I have suggested seems to become an Inherent But Inactive account.

Thirdly, the proposal that definite and indefinite DPs alike are ambiguous undercuts the most plausible explanation of Definite Variance that Inherent accounts are able to provide. That is, it was suggested that Inherent accounts should attribute the putative robustness of the oddness response elicited by occurrences of definite DPs to the idea that such DPs are unambiguously presuppositional. The varying responses to occurrences of indefinite DPs should then be attributed to the idea that they are ambiguous between a presuppositional and non-presuppositional reading, with information structure’s serving a disambiguating effect. However, if it is claimed that both types of DP are ambiguous, and that information structure serves to disambiguate in both cases, then Definite Variance is best accounted for by the proposal that definite and indefinite DPs differ in their propensity to be understood as topical. Yet, as shown in the following subsection, this is the explanation of Definite Variance proposed by advocates of an Inherent But Inactive approach. Hence the Inherent account again appears to collapse into an Inherent But Inactive account.

The considerations in this subsection therefore seem sufficient to discount the Inherent position. Finally, note that the second option available to advocates of semantic approaches to the problem of contingently empty restrictors (the proposal that definite DPs have semantically encoded existence presuppositions whereas indefinite DPs are ambiguous between presuppositional and non-presuppositional readings; see §(4.1.2)) plausibly counts as a version of Inherent, and may therefore be rejected on the basis of the reasoning in this subsection.

### 4.2.3 Against Inherent but Inactive

In this subsection, I shall argue that Inherited accounts are preferable to Inherent But Inactive ones. Both types of account propose the same explanation of Definite Variance: the likely topicality of definite DPs and indefinite DPs differs. The initial difficulty with comparing the two accounts is that they yield identical predictions, holding that definite and indefinite DPs trigger existence presuppositions if and only if they are topical, *ceteris paribus*.<sup>25</sup> An empirical examination is therefore difficult. However, I will argue that two considerations favour Inherited over Inherent But Inactive: simplicity considerations, and the putative possibility of topical non-DPs that trigger existence presuppositions.

The argument from simplicity considerations runs as follows: Inherent But Inactive must encode an inherent existence presupposition in either the semantic meaning or pragmatic processing of DPs. Yet Inherent But Inactive must furthermore specify either a procedure by which topicality interacts with the inherent presupposition to ‘activate’ it, or a procedure by which non-topicality interacts with the inherent presupposition to ‘deactivate’ it. It then must be explained whether the inactive presupposition of a non-topical DP is rendered absent, or whether it remains present but is ‘neutralised’ in such a way that its failure has no effect on the understanding of an occurrence of a sentence. In contrast, Inherited need

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<sup>25</sup>Such views must add ‘*ceteris paribus*’ because, firstly, other potential sources of existence presuppositions might affect non-topical DPs, such as the presence of the adjective ‘existing’ (e.g. ‘the existing king’); secondly, it is possible that certain settings or constructions will ‘cancel’ the existence presupposition of a topical DP.

only provide an account of the way in which topic position triggers an existence presupposition. Inherited is therefore a more simple account than Inherent But Inactive according to two axes: firstly, Inherent But Inactive must complicate the semantics or pragmatics of DPs, and, secondly, Inherent But Inactive must invoke a greater number of processes in giving an account of DPs' presuppositions. Arguably, if there is a choice between two accounts that make the same predictions, the simpler account is preferable.

The second argument in support of Inherited over Inherent But Inactive derives from the observation that the literature contains advocates of the view that certain non-DPs are topicable. Recall that in §(2.1.3), I described arguments given by Krifka (2007) and Portner and Yabushita (2001) in support of the existence of topical NPs, along with a suggestion in Büring (1999) and Büring (2007) that a broad range of types of expression are topicable. Furthermore, Portner and Yabushita (2001) (p.276) claim that occurrences of topical NPs are understood as 'denoting some preestablished set'. If non-DPs may be topical, and if they turn out to trigger existence presuppositions in such contexts, then it is surely preferable to attribute the existence presuppositions to topicality rather than to complicate the semantics or pragmatics of non-DPs so that they include inherent but inactive existence presuppositions. For there would then be a proliferation of the type and number of expressions that are analysed as inherently presuppositional. Yet if topic position is the source of existence presuppositions in the case of non-DPs, then it would be unnecessary to claim that DPs carry inherent existence presuppositions that are activated by topic position. I take it that the topicability of non-DPs ought not to be ruled out *prima facie*, and it is clear that the compatibility of such a view with Inherent But Inactive is questionable.

From this pair of arguments, it follows that we should endorse Inherited over Inherent But Inactive, despite the fact that they yield identical predictions regarding topical and non-topical DPs.

#### 4.2.4 Against Mixed

In this subsection, I shall claim that the only *prima facie* plausible versions of Mixed generate incorrect predictions regarding non-topical definite DPs. There are two *prima facie* plausible types of Mixed account: firstly, there are those that endorse Inherent for definite DPs along with Inherent But Inactive for indefinite DPs; secondly, there are those that endorse Inherent for definite DPs along with Inherited for indefinite DPs. The reason for this is that only Mixed views of these types may explain Definite Variance. In order to explain why definite DPs are more likely to trigger an existence presupposition than indefinite DPs, Mixed must attribute a more inherent form of presupposition to definite DPs. That is, Definite Variance would not be predicted and explained if Inherent were to be endorsed for indefinite DPs and, say, Inherited for definite DPs. It follows that Mixed must either endorse Inherent for definite DPs along with one of the other views for indefinite DPs, or endorse Inherent But Inactive for definite DPs and Inherited for indefinite DPs. However, the previous subsection noted that Inherent But Inactive and Inherited generate the same predictions regarding the emergence of existence presuppositions in DPs. Thus Mixed cannot explain Definite Variance by advocating Inherent But Inactive for definite DPs and Inherited for indefinite DPs. Therefore, there are two *prima facie* plausible versions of Mixed, which both accept Inherent for definite DPs and diverge with respect to whether they endorse Inherent But Inactive or Inherited for indefinite DPs.

Since any version of Mixed will advocate Inherent for definite DPs, the problem posed by (8a) – (8c) will apply to Mixed accounts. That is, the fact that (8a) – (8c) naturally elicit value judgements, rather than the oddness response, indicates that not all occurrences of definite DPs carry existence presuppositions. In §(4.2.2), it was argued that this motivates advocates of Inherent to endorse the idea that definite DPs are ambiguous between presuppositional and non-presuppositional versions, with information structure’s serving an ‘activating’ role; however, this results in the abandonment of the Inherent account for an Inherent But Inactive one. It follows that an advocate of a Mixed account cannot plausibly uphold Inherent with respect to definite DPs. Given that the two prima facie plausible versions of Mixed accept Inherent for definite DPs, a Mixed account cannot be maintained once Inherent is rejected for such DPs.

Finally, note that the presuppositional version of the third option available to advocates of semantic approaches to the problem of contingently empty restrictors (the view that definite DPs have semantically encoded existence presuppositions whereas indefinite DPs are associated with topic-dependent, pragmatic existence presuppositions; see §(4.1.2)) plausibly counts as a version of Mixed, and may therefore be rejected on the basis of the reasoning in this subsection.

### **Summary of §(4.2.1)**

In §(4.2.2), I claimed that Inherent accounts cannot plausibly maintain the view that all occurrences of definite DPs carry existence presuppositions. While such accounts might respond to this observation by claiming that definite DPs are, like indefinite DPs, semantically ambiguous between presuppositional and non-presuppositional versions, Definite Variance may then only be explained by means of the proposal that information structure serves a disambiguating role and that the different types of DP vary in their propensity to be understood as topics. Yet this position then collapses into an Inherent But Inactive account. Inherent should therefore be rejected.

In §(4.2.3), I compared Inherent But Inactive to Inherited. Despite the fact that they yield identical predictions with respect to topical and non-topical DPs, I argued that Inherited provides a simpler account than Inherent But Inactive does. All else being equal, simplicity considerations seem to be a reasonable means of deciding between a pair of accounts. Furthermore, some have argued that there are topical non-DPs that potentially trigger existence presuppositions. Inherited provides an automatic explanation for such existence presuppositions, whereas Inherent But Inactive would need to modify the semantics or pragmatics of certain non-DPs. This is a second reason to prefer Inherited to Inherent But Inactive. Of the three non-Mixed views, my arguments therefore recommend the acceptance of Inherited.

In §(4.2.4), I considered the two prima facie plausible versions of Mixed, which both accept Inherent for definite DPs and diverge in whether they accept Inherent But Inactive or Inherited for indefinite DPs. In light of the argument against accounts that endorse Inherent for definite DPs, discussed in §(4.2.2), it follows that Mixed accounts cannot be maintained.

The conclusion of this section is therefore that Inherited provides the best account of the problem of contingently empty restrictors.

### 4.3 An Inherited, Topic-Sensitive, Presuppositional Account

Inherited claims that topical constituents trigger existence presuppositions, explaining Definite Variance by proposing that definite DPs and indefinite DPs differ in their propensity to be topical. Those who endorse Inherited without further explaining these ideas might take themselves to attain descriptive adequacy with respect to the problem of perceived contingently empty restrictors. However, the resulting account will lack a deeper explanation of *why* things are this way, and will therefore display some deficiency in its explanatory adequacy. Furthermore, its silence over the means by which topicality triggers presuppositions would undermine the extent to which it could be said to rely on general mechanisms. §(4.3.1) will therefore involve an attempt at giving an informative account of the item that is presupposed to exist when an occurrence of a DP is topical. Next, in §(4.3.2), I will tackle a problem concerning monotone decreasing DPs that must be resolved for the resulting account to attain even descriptive adequacy. Finally, in §(4.3.3), I will address an issue concerning the apparent need to postulate inherent existence presuppositions at least in the case of DPs that involve the determiner ‘the’.

#### 4.3.1 Topicality-Triggered Existence Presuppositions

I will begin by clarifying what items are presupposed to exist when a DP occurs as a sentence topic, before explaining why this presupposition inevitably fails when the restrictor is perceived to be empty.

My perspective on the nature of topical DPs’ existence presuppositions is based on the material discussed in §(2), where it was argued that topical DPs are associated with file cards representing the aboutness items of the sentences in which they occur. I claimed that the aboutness item associated with a topical DP is an arbitrary minimal witness set of the quantifier it denotes. In the earlier section, little was said about the manner in which topical DPs are *associated* with file cards; however, in light of the endorsement of Inherited, it can be concluded that topical DPs *presuppose the inclusion of a file card representing a minimal witness set of their denotation in the common ground*. In other words, a DP’s occurring as a sentence topic signals that interlocutors are assuming for the purposes of the conversation that there is a file card for the DP, which in turn means that they are assuming for the purposes of the conversation that the DP denotes a quantifier for which an appropriate file card may be constructed. This is the sense in which a topical expression may be said to trigger an *existence presupposition*.

Such a position has been argued for on the grounds that it best addresses the problem of perceived contingently empty restrictors. However, the claim that topical DPs carry existence presuppositions is bolstered when we return to the fact, mentioned in §(2.1.1), that it is common to conflate the notions of topic and theme, and therefore define ‘sentence topic’ in such a way that a topic must embody old information within the discourse. Although I defined ‘sentence topic’ in a manner that resists such an a priori conflation, it is important to consider why it has frequently been taken for granted that the constituent that indicates what a sentence is about ordinarily pertains to old information. The current position functions as a tidy explanation of this common conflation: although ‘topic’ ought not to be defined in terms of old information, the use of a DP as a topic triggers a presupposition that its aboutness item is already represented within the CG, and that the existence of the about-

ness item therefore constitutes ‘old information’ with respect to that discourse. The claim that topical DPs trigger existence presuppositions also makes intuitive sense in light of their role as indicating what the sentence is about: for it would be perverse for speakers to issue sentences about some particular thing if they doubted or denied the existence of that thing.

I will now show how the construal of the aboutness item as a minimal witness set naturally explains how cases of perceived contingently empty restrictors involve the failure of existence presuppositions. It is my contention that no DP formed from a perceived empty restrictor may have a file card. This claim follows from the arbitrary minimal witness set approach to file cards in light of several facts mentioned in §(2.2): a quantifier has the empty set as its smallest live-on set if and only if it is trivial, a quantifier’s witness set is defined as a subset of its smallest live-on set, and the empty set is not a plausible aboutness item. When these three facts are supplemented with the claim that DPs formed from perceived empty restrictors are always understood to denote trivial quantifiers, it immediately follows that such DPs cannot be associated with file cards.

To establish this conclusion, *trivial quantifiers* must first be defined. There are two trivial quantifiers for each quantifier type: a universal one which relates *all* sets and an empty one which relates *no* sets. In the case of type  $\langle 1 \rangle$  quantifiers, the two trivial quantifiers are as follows:<sup>26</sup>

**Definition of Trivial Type  $\langle 1 \rangle$  Quantifiers:** A type  $\langle 1 \rangle$  quantifier  $Q_D$  is *trivial* iff  $Q_D = \mathbf{1}_{\langle 1 \rangle, D}$  or  $Q_D = \mathbf{0}_{\langle 1 \rangle, D}$ , where:  $\mathbf{1}_{\langle 1 \rangle, D} = \{B \subseteq D\}$ , and  $\mathbf{0}_{\langle 1 \rangle, D} = \emptyset$ .

It is clear that every DP with an empty restrictor denotes a trivial type  $\langle 1 \rangle$  quantifier. To see this, first consider several examples of type  $\langle 1, 1 \rangle$  quantifiers’ applying to the empty set, which is what will occur when a determiner applies to an NP such as ‘American king’:

$$(Q_{every})_D(\emptyset) = \{B \subseteq D : \emptyset \subseteq B\} = \{B \subseteq D\} = \mathbf{1}_{\langle 1 \rangle, D}$$

$$(Q_{some})_D(\emptyset) = \{B \subseteq D : \emptyset \cap B \neq \emptyset\} = \emptyset = \mathbf{0}_{\langle 1 \rangle, D}$$

$$(Q_{four})_D(\emptyset) = \{B \subseteq D : |\emptyset \cap B| \geq 4\} = \emptyset = \mathbf{0}_{\langle 1 \rangle, D}$$

$$(Q_{no})_D(\emptyset) = \{B \subseteq D : \emptyset \cap B = \emptyset\} = \{B \subseteq D\} = \mathbf{1}_{\langle 1 \rangle, D}$$

$$(Q_{at-most-four})_D(\emptyset) = \{B \subseteq D : |\emptyset \cap B| \leq 4\} = \{B \subseteq D\} = \mathbf{1}_{\langle 1 \rangle, D}$$

Secondly, consider some simple reasoning that shows that *every* type  $\langle 1, 1 \rangle$  quantifier denoted by a natural language quantifier expression will yield a trivial type  $\langle 1 \rangle$  quantifier when applied to the empty set. For any type  $\langle 1, 1 \rangle$  quantifier  $Q_D$  and set  $B$ , whether or not it holds that  $B \in Q_D(\emptyset)$  can vary according to the selected  $B$  only if the quantifier includes a requirement on the cardinality of  $B$ . Otherwise,  $B$ ’s membership of  $Q_D(\emptyset)$  cannot vary depending on the selected  $B$ , since the empty set relates to every other set in the same way. Yet a type  $\langle 1, 1 \rangle$  quantifier that includes a requirement on the cardinality of its second argument will lack the property of conservativity (see §(1.2.3) for a definition of ‘conservativity’). To see this, consider an example  $(Q_?)_D$  of such a quantifier, defined such that  $(Q_?)_D(A) = \{B \subseteq D : A \subseteq B \wedge |B| \leq 4\}$ . That  $(Q_?)_D$  lacks conservativity is demonstrated by the situation where  $A \subseteq B$ ,  $|A| = 1$  and  $|B| = 4$ ; for then,  $B \in (Q_?)_D(A)$  but

<sup>26</sup>Peters and Westerståhl (2006), p.80.

$(A \cap B) \notin (Q?)_D(A)$ , since the specified cardinality is then exceeded. Given that conservativity is generally thought to hold of the denotations of all natural language determiners,<sup>27</sup> it follows that no natural language determiner may denote a type  $\langle 1, 1 \rangle$  quantifier that includes a requirement on the cardinality of its second argument; indeed, the natural language expression that would denote  $(Q?)_D$  is the convoluted phrase ‘Every  $_$  is among the four or fewer  $_$ ’. Hence, since no natural language quantifier expression can denote a quantifier  $Q_D$  for which  $Q_D(\emptyset)$  will vary according to the  $B$  to which it is applied, it follows that every quantifier  $Q_D(\emptyset)$  denoted by a natural language quantifier expression will be trivial.

Given the fact that a quantifier has the empty set as its smallest live-on set if and only if it is trivial, every DP with a perceived empty restrictor will therefore be construed as denoting a quantifier that has the empty set as its smallest live-on set. From the definition of witness sets as subsets of the smallest live-on set, it follows that DPs with perceived empty restrictors cannot have non-empty minimal witness sets. Finally, from the claim that the empty set is not a plausible aboutness item, it follows that DPs with perceived empty restrictors cannot be associated with file cards. Hence the existence presupposition triggered by their topicality will always fail. Furthermore, the existence presupposition cannot be accommodated, since it is not possible to construct an appropriate file card.

One concern that may arise regarding this approach is that DPs with a restrictor that denotes the empty set *unbeknownst to interlocutors* cannot have file cards. This might seem incompatible with the fact that interlocutors often take themselves to be talking about something in such scenarios, without any experience of oddness; indeed, this is why the problem is described as one that concerns *perceived* empty restrictors. However, this is unproblematic if we claim that interlocutors can construct a file card for DPs with empty restrictors that represents a non-empty minimal witness set derived from the non-empty smallest live-on set of the quantifiers that they mistakenly take such DPs to denote. The interlocutors then treat this file card as if it were the file card for the relevant DP. Hence this concern is easily addressed.

An interesting consequence of this position is that the ‘existence’ presupposition of a topical DP becomes fairly nuanced. That is, the occurrence of the topical DP requires the CG to include a file card representing a non-empty minimal witness set. This requires the CG to entail that the DP denotes a quantifier with some non-empty minimal witness set, which in turn requires the CG to entail that the DP denotes a quantifier with a non-empty smallest live-on set. Hence a topical DP may be described as carrying an existence presupposition insofar as it *directly* presupposes the inclusion of an appropriate file card in the CG, in addition to *indirectly* presupposing the non-emptiness of the relevant witness sets and smallest live-on set.

### 4.3.2 The Problem of Monotone Decreasing DPs

In this subsection, I will discuss certain complications posed by DPs denoting monotone decreasing quantifiers. These complications arise due to tension between the account described in the previous subsection and the Definite Variance data as it is typically presented. I will refer to this tension as *the problem of monotone decreasing DPs*, and argue that a solution is available.

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<sup>27</sup>With the possible exception of ‘just’ and ‘only’, which some have denied are determiners; see §(1.2.3).

The issue is that, as argued in §(2.2), DPs headed by determiners such as ‘no’, ‘few’ and ‘at most three’ are non-topicable, since their extensions lack non-empty minimal witness sets. Definite Variance is typically taken to include the datum that the indefinite DPs headed by ‘no’, ‘few’ and ‘at most three’ sometimes trigger the oddness response and sometimes elicit value judgements, depending on the context and assessor. However, the topic-sensitive, presuppositional account predicts that occurrences of sentences with non-topicable DPs should yield value judgements, even if the restrictor is empty.

There are several ways in which the problem of monotone decreasing DPs might be resolved. Firstly, one could argue that the typical presentation of the Definite Variance data is incorrect, and that monotone decreasing DPs with empty restrictors never elicit the oddness response, due to the fact that they are never construed as topical. Secondly, one could propose that monotone decreasing DPs with empty restrictors do sometimes elicit the oddness response, and that this is based on the failure of an existence presupposition that arises when an assessor attempts to construe them as topical but is unable to identify an appropriate file card. Thirdly, one could argue that monotone decreasing DPs with empty restrictors do sometimes elicit the oddness response, but this should be attributed to a source other than the failure of an existence presupposition associated with the topicality of the DP. I will refer to the three positions as, respectively: ‘*No Oddness*’, ‘*Topicality-Dependent Oddness*’ and ‘*Topicality-Independent Oddness*’. I shall assess each option in turn, concluding that a version of the third one is most promising.

According to the No Oddness position, the Definite Variance data has been misconstrued, and non-topicable DPs with perceived empty restrictors always elicit value judgements.<sup>28</sup> One version of this position claims that the typical presentation of the Definite Variance data is correct with respect to all DPs other than monotone decreasing ones. According to this version, occurrences of definite non-monotone decreasing DPs with empty restrictors are likely to elicit oddness responses, occurrences of indefinite non-monotone decreasing DPs with empty restrictors vary in the responses they elicit, and occurrences of monotone decreasing DPs always prompt value judgements. This version of the No Oddness position would therefore need to provide an independent explanation for Definite Variance, presumably attributing a divergent propensity to be topical to definite and indefinite non-monotone decreasing DPs.

A second version of the No Oddness view proposes that the data has been fundamentally misconstrued, insofar as assessors’ likely responses do not differ on the basis of the definiteness of the DP in question. Rather, occurrences of non-monotone decreasing DPs with empty restrictors have an equal likelihood of eliciting the oddness response whether they are definite or indefinite, and occurrences of monotone decreasing DPs always prompt value judgements. This view argues that the literature has drawn mistaken conclusions from contrasting one list of sentences with definite non-monotone decreasing DPs and a second list of sentences with indefinite non-monotone decreasing and indefinite monotone decreasing DPs. In other words, the supposed ‘variance’ in judgements elicited by occurrences of indefinite DPs consists of the fact that the non-monotone decreasing DPs will pattern with the definite DPs that are typically considered, while the monotone decreasing DPs will diverge from this pattern by consistently prompting truth value assignments. This second

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<sup>28</sup>Of course, this position predicts that sentences with monotone decreasing DPs might sometimes trigger the oddness response due to pragmatic issues independent of the DP.

version of the No Oddness view is rendered appealing on the grounds that no independent explanation of Definite Variance would be required.

Both versions of the No Oddness approach may be tested by considering occurrences of *definite* monotone decreasing DPs with empty restrictors; for such DPs are not typically considered in the literature on the problem of contingently empty restrictors, allowing responses to be judged in an unbiased manner:

9. (a) ? At most half of the American kings live in New York.
- (b) ? Neither Yan's nor Yasma's favourite American king lives in New York.

To my ears, the oddness response naturally arises with respect to (9a) and (9b). This counts as conclusive evidence against any version of the proposal that monotone decreasing DPs with contingently empty restrictors are consistently assigned values. In light of this observation, the No Oddness view may be ruled out.

The second approach to resolving the problem of monotone decreasing DPs accepts that sentences where such DPs have empty restrictors sometimes prompt the oddness response, but holds that this arises due to the assessor's attempt at construing a non-topicable item as topical. According to this Topicality-Dependent Oddness position, the fact that monotone decreasing DPs cannot be associated with viable file cards does not cause assessors to systematically avoid construing them as topics, in the way that has been assumed up to this point. Rather, an assessor may attempt to construe them as topical upon encountering them in an out-of-context sentence, before finding herself unable to find or construct an appropriate file card, resulting in the failure of the existence presupposition associated with topical items. One aspect of this approach that is potentially unappealing is its suggestion that competent speakers have no implicit awareness of which linguistic items are topicable. Another potential limitation is that the oddness that arises for some occurrences of sentences with empty restrictors would ultimately be independent of the problem of empty restrictors. That is, an assessor who judges (1b) to be odd would be likely to experience the same oddness response if she were to consider a minimal variant of (1b) with a non-empty restrictor immediately afterwards, assuming she would again be inclined to attempt to treat the DP as topical.

This latter observation suggests a means of testing the Topicality-Dependent Oddness approach. We should consider out-of-context sentences where right monotone decreasing determiners apply to *non-empty* restrictors alongside those where they apply to *empty* restrictors, in order to compare their likelihood of provoking the oddness response:

10. (a) No kings live in New York.
- (b) Few kings live in New York.
11. (a) (?) No American kings live in New York.
- (b) (?) Few American kings live in New York.

The Topicality-Dependent Oddness approach to the problem of monotone decreasing DPs predicts that (10a) and (10b) should be roughly as likely to elicit the oddness response as (11a) and (11b). Alternative approaches predict that no sense of oddness should arise in the case of (10a) and (10b), since assessors will select a topicable item to construe as the

topic, and no such item denotes the empty set in the case at hand. I take it that this test provides clear evidence against the Topicality-Dependent Oddness position, since there is no discernible sense of oddness surrounding (10a) and (10b), whereas the oddness response may arise with respect to (11a) and (11b). Therefore, the sense of oddness that sometimes arises with respect to monotone decreasing DPs with empty restrictors has something to do with the empty restrictors. Furthermore, challenging the Topicality-Dependent Oddness position means that we may continue to assume that assessors have sufficient tacit awareness of the non-topicality of monotone decreasing DPs to avoid construing them as topics upon encountering out-of-context sentences, in addition to experiencing a sense of pragmatic infelicity if an attempt is made at forcing such DPs to be topical.

The third approach to the problem of monotone decreasing DPs accepts that sentences where such DPs have empty restrictors sometimes prompt the oddness response, whilst attributing this response to a source distinct from the failure of an existence presupposition associated with a topical DP. The major limitation of such an approach is that the oddness response that may be elicited by occurrences of empty restrictors would have to be attributed to distinct sources in the case of non-monotone decreasing and monotone decreasing DPs. This would be less parsimonious than an explanation of the oddness response that applied to all types of DP. Nevertheless, I take it that two factors would motivate deviation from the more parsimonious proposal: if there were to be significant evidence in favour of a version of the Topicality-Independent Oddness position with respect to monotone decreasing DPs, and if it could be shown that the explanation proposed for the oddness response in such cases could not be used to explain the oddness response that arises with respect to non-monotone decreasing DPs. I will now consider two versions of the view, and argue that there is adequate motivation to accept the Topicality-Independent Oddness position, despite the diminished parsimony it fosters.

I envisage two *prima facie* plausible versions of the Topicality-Independent Oddness position. The first version attributes the emergence of the oddness response to the failure of an existence presupposition associated with a topical restrictor; for even though monotone decreasing DPs are non-topical, it might be proposed that NPs are always topical and presuppose a file card representing their extension when topical. The second version traces the oddness response that sometimes arises with respect to monotone decreasing DPs with empty restrictors to an implicature that the speaker does not believe that the restrictor is empty, since a sentence asserting the emptiness of an NP will always asymmetrically entail the truth of a sentence where a right monotone decreasing determiner applies to that NP.

The first version of the Topicality-Independent Oddness position may be tested by comparing occurrences of sentences with a monotone decreasing DP for which an empty restrictor is forced to be topical with variants for which an item other than an empty NP is forced to be topical. If a sense of oddness arises in the former case, but truth values may be naturally assigned in the latter case, then the proposal that the source of the oddness is a failed existence presupposition associated with the topicality of the restrictor becomes compelling:

12. (As for American kings, what property do they have?)
  - (a) ? NO American kings live in New YORK.
  - (b) ? FEW American kings live in New YORK.
  - (c) ? At most HALF of the American kings live in New YORK.

13. (As for kings, what property do they have?)
- (a) NO AMERican kings live in New YORK.
  - (b) FEW AMERican kings live in New YORK.
  - (c) At most HALF of the AMERican kings live in New YORK.

It indeed seems to be easier to assign values to each of (13a) – (13c) than to the corresponding sentence in (12a) – (12c). Hence there is some evidence in favour of the view that construing the empty restrictor of a monotone decreasing DP as topical may yield a sense of oddness.

However, endorsing this view implies that the topicality of the restrictors of *non*-monotone decreasing DPs might be the source of the oddness response for some occurrences of such DPs with empty restrictors. Concerns about methodological parsimony might then be taken to motivate the proposal that the oddness response elicited by occurrences of DPs with empty restrictors is *always* attributable to the topicality of the restrictor. Hence a reason must be given to accept this view for monotone decreasing DPs whilst upholding the account proposed in §(4.3.1) for non-monotone decreasing DPs. It is reasonable to concede that a non-monotone decreasing DP's restrictor might sometimes be topical, and that the emptiness of the restrictor in such cases would result in the oddness response. However, it would be implausible to adopt a solution to the problem of contingently empty restrictors that required the oddness response to always coincide with the topicality of the restrictor. For, as stated in §(2.1.3), DPs have been considered paradigm sentence topics in the literature. Hence an account that attributed the oddness response to the systematic topicality of restrictors would need to explain why assessors consistently refrain from construing a DP with an empty restrictor as topical. In sum, while evidence suggests that the topicality of an occurrence of a monotone decreasing DP's restrictor may be the source of the oddness response, and the same source may sometimes emerge with respect to non-monotone decreasing DPs, it is reasonable to maintain that most cases of oddness-eliciting occurrences of non-monotone decreasing DPs with empty restrictors involve the topicality of the entire DP.

The second version of the Topicality-Independent Oddness position may be tested by considering cases where an occurrence of a sentence containing a monotone decreasing DP with an empty restrictor is immediately followed by the denial of the putatively implicated proposition. If no sense of oddness arises, then the proposal that an implicature has been generated and cancelled becomes compelling:

14. (a) No American kings live in New York - in fact, there are no American kings.  
 (b) Few American kings live in New York - in fact, there are no American kings.  
 (c) At most three American kings live in New York - in fact, there are no American kings.

It seems natural to assign (14a) the value predicted by theories of generalized quantifiers. While there is something bizarre about (14b) and (14c), it appears to be easier to assign the predicted values to them than it is to versions that omit the continuation. Furthermore, the ease of assigning the predicted values is improved by expanding the continuation to state: 'in fact, no American kings live in New York, because there are no American kings'. Clearly, occurrences of monotone decreasing DPs other than those headed by 'no' implicate

that the speaker does not take herself to be in a position to assert the minimal variant with the determiner 'no', since sentences of the form 'No N  $\beta$ ' asymmetrically entail those of the form 'Det N  $\beta$ ' where a right monotone decreasing indefinite determiner replaces 'Det'. Cancelling this implicature first, before cancelling the implicature of 'Det N  $\beta$ ', seems to produce a more natural result.

Some evidence supporting the second version of the Topicality-Independent Oddness approach to monotone decreasing DPs has therefore emerged. Crucially, it does not follow that implicatures may explain the oddness response that arises with respect to non-monotone decreasing DPs with empty restrictors: for, firstly, sentences stating the emptiness of an NP asymmetrically entail sentences where a determiner applies to that NP only in the case of monotone decreasing indefinite determiners and 'every'. For example, 'There are no American kings' clearly does not entail 'Some American kings live in New York'. However, attempts at cancelling the putative implicature in the case of 'every' fails to dispel the sense of oddness, as evidenced by (4).<sup>29</sup> Hence conversational implicatures could only be used to explain oddness responses that arise for monotone decreasing indefinite DPs with empty restrictors. Of course, this position could not explain an oddness response elicited by occurrences of monotone decreasing *definite* DPs (e.g. 'At most half of the American kings'), since sentences stating the emptiness of an NP need not asymmetrically entail those that include such DPs, due to the fact that definite determiners impose a requirement on the cardinality of the extension of their first argument.

Given the previously mentioned difficulties in maintaining the No Oddness and Topicality-Dependent Oddness approaches to the problem of monotone decreasing DPs, the fact that the evidence provides prima facie support for both versions of the Topicality-Independent Oddness position renders it the best account to pursue. I argued that the first version of this view, which attributes the oddness to the topicality of the restrictor's triggering an existence presupposition, may be applicable to some occurrences of non-monotone decreasing DPs with empty restrictors; however, the fact that DPs are paradigm sentence topics justifies upholding the account of §(4.3.1) for non-monotone decreasing DPs in the general case. I then argued that the second version of this view, which attributes the oddness to a conversational implicature that the speaker does not believe that the restrictor is empty, is inapplicable to occurrences of non-monotone decreasing DPs; this means that there is no motivation to reconsider conversational implicature responses to the problem of contingently empty restrictors. Hence there is some motivation to accept the proposal that the source of the oddness response sometimes elicited by occurrences of monotone decreasing DPs generally differs from that of non-monotone decreasing DPs, despite the diminished parsimony this approach engenders.

The question then emerges of which version of the Topicality-Independent Oddness view to endorse. A plausible option would be to accept that each version of the view might explain some cases where monotone decreasing DPs elicit the oddness response. On the other hand, if it is considered methodologically desirable to endorse one version exclusively, then the first version should be used to explain all oddness responses elicited by occurrences of monotone decreasing DPs; for the second, implicature-based version is inapplicable to monotone decreasing definite DPs. I will remain neutral about whether one

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<sup>29</sup>Note that expanding the continuation to state 'in fact, no American kings live in New York, because there are no American kings' makes it no easier to assign values in the case of (4).

version of the Topicality-Independent Oddness view should be endorsed to the exclusion of the other. For I have shown that plausible solutions to the problem of monotone decreasing DPs exist, which is sufficient for current purposes.

### 4.3.3 Against Inherent Presuppositions for ‘The’

Despite the arguments in §(4.2) against all accounts that attribute inherent existence presuppositions to DPs, the following objection may be raised: we should attribute inherent presuppositions at least in the case of ‘the’-headed DPs, in order to account for the uniqueness and familiarity conditions often attributed to such DPs (as discussed in §(1.1.3)). From this it would follow that, firstly, it is too strong to conclude that no DPs have inherent existence presuppositions. Secondly, the oddness response sometimes elicited by occurrences of ‘the’-headed DPs with empty restrictors would then be over-determined if one were to continue to invoke the failure of existence presuppositions inherited from topic position. For these reasons, it might be argued that we should reconsider the rejection of inherent existence presuppositions for DPs in general.

However, I must resist this argument. For, firstly, if I were to attribute to ‘the’-headed DPs a lexically-encoded presupposition that entails the non-emptiness of the restrictor, then this would constitute the abandonment of a uniformly Inherited approach to the existence presuppositions of definite DPs. Secondly, it would be difficult to reconcile with the view that occurrences of sentences that include non-topical ‘the’-headed DPs with perceived empty restrictors are understood as valued. In this subsection, I will therefore show that we may capture the sense in which ‘the’ imposes a cardinality constraint on a set even when it occurs outside of the topic without resorting to inherent presuppositions.

As noted in §(1.1.3), it has frequently been claimed that ‘the’-headed DPs impose a uniqueness or familiarity condition in a manner that distinguishes their meanings from DPs headed by ‘every’ and ‘a(n)’. For instance, generalized quantifier theoretic approaches that adapt Russell’s (1905) analysis treat ‘the’-headed and ‘a(n)’-headed DPs alike by means of the quantifier that relates pairs of sets with non-empty intersections, adding a uniqueness or familiarity condition in the case of ‘the’.<sup>30</sup> On the other hand, most contemporary linguistic approaches analyse ‘the’-headed and ‘every’-headed DPs alike by means of the quantifier that relates pairs of sets where the first is a subset of the second, adding a cardinality condition in the case of ‘the’.<sup>31</sup> These strategies are supported by the observation that, unlike (15b) and (15c), there is a clear sense in which (15a) cannot be truthfully asserted relative to a context where interlocutors are assuming the existence of multiple salient kings or no kings:

15. (a) As for Yasma, she’s talking to the king.
- (b) As for Yasma, she’s talking to every king.
- (c) As for Yasma, she’s talking to a king.

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<sup>30</sup>For example, this sort of approach is pursued by Szabó (2000), though he treats the uniqueness condition as a pragmatic inference separate from the truth conditions.

<sup>31</sup>Presumably, contemporary approaches disprefer an analysis that equates ‘the’ with ‘a(n)’ on the grounds that the two determiners exhibit distributional dissimilarities (e.g. acceptability in existential ‘there’-sentences) that are normally captured by treating them as denoting quantifiers with divergent logical properties (e.g. intersectivity, etc.).

However, the condition that distinguishes DPs headed by ‘the’ from those headed by ‘every’ and ‘a(n)’ cannot be reduced to an existence presupposition associated with topicality, since the definite DP in (15a) is obligatorily non-topical, due to the left dislocation undergone by ‘Yasma’. It might therefore be argued that ‘the’ encodes an inherent existence presupposition. As previously stated, this conclusion would prove problematic for my proposal.

I will follow contemporary theories of generalized quantifiers (e.g. Peters and Westerstahl (2006)) in treating ‘the’ by means of the quantifier that relates pairs of sets where the first is a subset of the second, additionally encoding a cardinality condition as part of the asserted content. The cardinality constraint on the restrictor’s extension will act as a condition for truth rather than a condition for definedness. For simplicity, I will assume that ‘the’ is lexically ambiguous between a singular version ‘the<sub>sg</sub>’ and a plural version ‘the<sub>pl</sub>’; though, as observed by Westerstahl (1985), postulating ambiguity may ultimately lack motivation, suggesting the cardinality constraint should instead vary as a function of the determiner’s NP argument. Where  $A$  and  $B$  are subsets of the domain  $D$  determined by  $c$ :

$$\llbracket \text{The}_{sg} \rrbracket_c = \{ \langle A, B \rangle : A \subseteq B \ \& \ |A| = 1 \}.$$

$$\llbracket \text{The}_{pl} \rrbracket_c = \{ \langle A, B \rangle : A \subseteq B \ \& \ |A| > 1 \}.$$

From these semantics, it follows that ‘the king(s)’ will, like ‘every king’, denote the set of all subsets of  $D$  of which the extension of ‘king(s)’ is a subset, and have as its minimal witness set the extension of ‘king(s)’. Furthermore, the minimal witness set associated with ‘the king’ will, like that associated with ‘a king’, be a subset of the extension of ‘king’ with cardinality 1; though ‘the<sub>sg</sub>’ differs from ‘a(n)’ insofar as there is a *unique* minimal witness set consisting of the extension of ‘king’ whenever there is a minimal witness set at all. The difference in the natural understanding of (15a) – (15c) is attributed to the fact that a true assertion of (15a) is understood to attribute a particular cardinality to the set of (contextually relevant) kings in a manner achieved by neither (15b) nor (15c).<sup>32</sup>

<sup>32</sup>A related type of structure that is frequently held to carry inherent existence presuppositions is overt partitives. For example, truthful assertions of (16b) require an appropriate number of contextually salient kings, in contrast with (16a). Again, this cannot be reduced to an existence presupposition inherited from topic position, since the partitives in (16b) are obligatorily non-topical:

16. (a) As for Yasma, she’s talking to (three / few / many / most / all / some) kings.  
 (b) As for Yasma, she’s talking to (three / few / many / most / all / some) of the (four / few / many) kings.

Westerstahl (1985) shows that analyses of the definite article may be generalized to partitives, a strategy I shall adopt. If we represent the most general form for a partitive as ‘Det<sub>1</sub> of the Det<sub>2</sub> N’ (where Det<sub>2</sub> is possibly the null determiner), we may alter his analysis to accord with my truth conditions for the definite article as follows:

$$\llbracket \text{Det}_1 \text{ of the Det}_2 \rrbracket_c = \{ \langle A, B \rangle : \llbracket \text{Det}_1 \rrbracket_c(A)(B) \ \& \ \llbracket \text{The}_{pl} \rrbracket_c(A)(D) \ \& \ \llbracket \text{Det}_2 \rrbracket_c(A)(D) \}.$$

It follows that both ‘Det<sub>1</sub> of the Det<sub>2</sub> kings’ and ‘Det<sub>1</sub> kings’ denote the set of all subsets of  $D$  for which the extension of ‘kings’ stands in the relation specified by ‘Det<sub>1</sub>’, with the minimal witness set in both cases being the one specified by ‘Det<sub>1</sub>’. The difference between the natural understanding of occurrences of (16a) and minimal variants of the form of (16b) derives from the fact that the truth of the latter require the cardinality of the extension of ‘kings’ to exceed 1, and the relation specified by ‘Det<sub>2</sub>’ to hold between the extension of ‘kings’ and the domain of discourse. For example, an occurrence of ‘One of the four kings is in the yard’ is true if and only if the set of kings in the yard is of cardinality 1 or greater, the set of kings is of cardinality exceeding 1 and the set of kings is of cardinality 4 or greater. On the other hand, the truth conditions of ‘One king is in the yard’ only require the first of these conditions to hold.

It has been widely observed that the cardinality condition associated with ‘the’-headed DPs often pertains to some proper subset of its restrictor’s extension. For example, Westerstahl (1985) argues that ‘the’ is invariably interpreted relative to a *context set*, represented by a variable that intersects with the extension of the NP’s extension within the semantics. The variable representing this context set is very similar to the covert variables invoked by semantic accounts of domain restriction (see §(3.1.1)), hence my insertion of such a variable into the semantics for ‘the’ would be tantamount to endorsing a semantic mechanism of domain restriction for at least some occurrences of DPs. In order to maintain my neutrality regarding the mechanism by which domain restriction should be modelled, I will therefore refrain from representing the possible influence of context sets within the semantics for ‘the’. Instead, I will assume that ‘the’-headed DPs frequently receive domain restricted understandings, which are brought about by whatever mechanism brings about domain restricted understandings in general, and which coincide with a means of information storage that accords with my file card-based analysis of domain restriction (see §(3.4)). When domain restriction occurs with respect to ‘the’, individuals understand the cardinality condition to apply to the proper subset of the restrictor’s extension involved in the domain restricted understanding. Hence I will maintain the above semantics for ‘the’, though an advocate of a semantic account of domain restriction should modify them by inserting an appropriate covert variable.

One of the major criticisms of analyses of ‘the’ that treat the uniqueness or familiarity condition as a requirement for truth is that they predict that assessors will invariably judge occurrences of sentences for which the condition fails as false. This prediction is in conflict with the observation that oddness responses often emerge in such circumstances. However, this criticism is inapplicable to my proposal, since I preserve the Strawsonian insight that ‘the’-headed DPs may additionally carry information structure-dependent existence presuppositions. Therefore, the non-emptiness of the restrictor is presupposed if and only if the restrictor is part of the topic, with the perceived emptiness of the restrictor’s yielding the oddness response. When non-topical, a known empty restrictor will simply yield a judgement of falsity rather than oddness, due to the failure of the cardinality condition. I therefore take it that the ‘uniqueness condition’ often attributed to ‘the’-headed DPs is part of a lexically-encoded condition for truth, whereas the ‘familiarity condition’ emerges due to a topicality-inherited presupposition that an appropriate file card is present in the common ground.

The historical interest in ‘the’-headed DPs with empty restrictors has yielded a richer discussion of the nuances of assessors’ judgements than is contained in the literature on contingently empty restrictors in general, and it is worth briefly measuring my proposal against the nuanced data that has been raised. Firstly, my proposal accords with the recent experimental results presented in Abrusán and Szendrői (2013), where participants judged sentences that included ‘the’-headed DPs with empty restrictors to be false a sufficiently significant proportion of the time to pose problems for any proposal that takes such sentences to be semantically undefined. The authors conclude that their results support an analysis where occurrences of sentences with ‘the’-headed DPs assert a cardinality condition, in addition to carrying a pragmatic presupposition that is sensitive to factors that include topicality.

It is also worth noting that my proposal is able to explain various recent observations

about occurrences of sentences that include ‘the’-headed DPs with empty restrictors which are held to prompt judgements of valuedness. For instance, Lasersohn (1993) holds that occurrences of sentences may be assigned the value false in cases where, even if we suspend our belief that the restrictor is empty, other beliefs suffice to falsify the information expressed (e.g. (16a), asserted while demonstrating an empty chair). Von Stechow (2004) offers a development of this proposal, observing that occurrences of sentences are naturally judged to be false when there is a contextually salient entity whose properties are in principle enough to falsify the sentence (e.g. (16b), where Australia serves as the contextually salient entity). Schoubye (2009) claims that sentences are naturally judged false when they are understood as proffered (though unsuccessful) answers to a QUD with some true answers, which he takes to explain assessors’ natural inclination to assign values to occurrences of sentences where focus occurs on the DP (e.g. (16c), where the question of who is bald is the obligatory QUD). Schoubye also takes his proposal to explain the fact that occurrences of sentences for which a possible congruent QUD is of practical relevance to the assessor are naturally judged as valued, even when they cannot be empirically falsified (e.g. (16d), where a non-factive mental state is attributed (meaning there is no independent means of falsifying the sentence) but the question of who hates the addressee’s mother is of sufficient practical relevance to render it the likely QUD):

16. (a) The king of France is sitting in that chair.
- (b) The king of France is on a state visit to Australia this week
- (c) [The king of FRANCE]<sub>F</sub> is bald.
- (d) The king of France hates your mother.

My proposal attributes the fact that (16a) – (16d) are naturally judged false to the idea that ‘The king of France’ is naturally understood as non-topical in each case. I concur with Ebert and Ebert (2013) that, when (16a) is presented without an indication of the intended prosody or QUD, but it is specified that it should be assessed relative to a context where a chair is salient and empty, then an assessor is likely to imagine an occurrence where the topic is ‘that chair’. In other words, it is plausible to argue that, when we consider out-of-context sentences for which the envisaged context has been indicated to include the salience of a particular item, this overrides the default preference for the narrowest focus compatible with neutral prosody (see §(3.3.2)). Similarly, it is plausible to claim that individuals who consider (16b) or (16d) out-of-context are likely to assume that state visits, Australia, this week or the addressee’s mother are more likely things for imaginary interlocutors to be discussing than the king of France, perhaps because they are assumed to be salient or of practical relevance. Finally, my proposal predicts ‘The king of France’ to be obligatorily non-topical in (16c), which means that no existence presupposition emerges and fails. My proposal is therefore compatible with the fact that assessors naturally assign the value false to (16a) – (16d), on the grounds that these sentences are indeed semantically false and no existence presupposition emerges to trigger an oddness response.

In sum, I have argued that it is not necessary to attribute inherent existence presuppositions to DPs headed by ‘the’. I sketched truth conditions that include a cardinality constraint on the quantifier’s first argument. An existence presupposition is therefore predicted to arise for ‘the’-headed DPs if and only if they are construed as topical, with the failure of the

lexically-encoded cardinality constraint otherwise resulting in straightforward falsity. This analysis, though preliminary, serve to show that the proposal that the existence presuppositions associated with some occurrences of DPs are inherited from their being construed as topical cannot be challenged based on intuitions surrounding ‘the’-headed DPs.

### **Summary of §(4.3)**

In §(4.3.1), I developed an account whereby the oddness response elicited by some occurrences of DPs with perceived empty restrictors is attributed to an existence presupposition triggered by the DP’s topicality. I argued that a DP’s occurring as a sentence topic signals that interlocutors are assuming for the purposes of the conversation that there is a file card for the DP. Given my view that the file card associated with a DP represents an arbitrary non-empty minimal witness set, it follows that a topical DP directly presupposes the non-emptiness of the DP’s minimal witness sets, which means that it indirectly presupposes the non-emptiness of the DP’s restrictor.

In §(4.3.2), I discussed the fact that occurrences of monotone decreasing DPs with empty restrictors are apparently able to elicit the oddness response, which conflicts with the predictions of the account developed. I showed that it is plausible to attribute the oddness response in such cases to sources other than the topicality of the DP, before arguing that this does not undermine the account of non-monotone decreasing DPs given in §(4.3.1). In §(4.3.3), I argued that we need not attribute inherent presuppositions to DPs that involve the definite article. Rather, the data that is sometimes taken to motivate such an attribution may be handled by semantically encoding a cardinality requirement as a condition for truth, at the same time as allowing pragmatic existence presuppositions to be inherited from topic position.

## **4.4 The Account and the Three Desiderata**

In §(4.4.1), I will clarify the explanation that my presuppositional account advances for Definite Variance and ‘There’ Acceptability. I will conclude that the account meets all three desiderata for a solution to the problem of contingently empty restrictors. In §(4.4.2), I shall show how my explanation of ‘There’ Acceptability brings to light an interesting connection between IS and the existential acceptability of occurrences of DPs.

### **4.4.1 Explaining Definite Variance and ‘There’ Acceptability**

It has already been noted that Inherited predicts Definite Variance by proposing that definite and indefinite DPs differ in their propensity to be topical. However, given that the data used to support Definite Variance within the literature uniformly consists of out-of-context sentences where the target DP is clause-initial, the following, slightly weaker, proposal is sufficient to predict Definite Variance: for sentences in canonical form presented out-of-context, clause-initial definite DPs are highly likely to be construed as topics, whereas clause-initial indefinite DPs display a less robust likelihood to be construed as such. I will remain neutral about whether assessors of out-of-context sentences with clause-initial indefinite DPs are slightly more likely to understand the DP as topical than as non-topical, or are no more likely to understand the DP as topical than they are to consider any other topicable item

in the sentence as such. The prediction then emerges that, when an individual assesses a sentence such as (1a), she will be highly likely to imagine a CG that is required to contain an appropriate file card for the clause-initial DP, which results in presupposition failure and an oddness response if she furthermore envisages that the imaginary interlocutors share her belief that the restrictor is empty. On the other hand, when an individual assesses a sentence such as (1b), she is not significantly more likely to construe the clause-initial DP as topical than to construe it as non-topical, with presupposition failure and a sense of oddness arising only if she does construe the DP as topical.

This perspective on the link between a DP's being clause-initial, definite and a likely topic receives substantial support from the literature. For instance, Comrie (1979) (p.19) claims that 'subjects tend to be definite, animate, and topic'. Similarly, Aissen (2003) (p.2) holds that '[t]he prototypical or unmarked situation is for the transitive subject [...] to be definite, [and] to be topical'. Geurts (2007) (p.266) claims that definite DPs 'are more likely to be interpreted as topical, especially when they occur in subject position'.<sup>33</sup> Dalrymple and Nikolaeva (2011) (pp.50-3) argue that 'most topics are definite', and that 'specific indefinites may be interpreted as topics, although not as easily as definite noun phrases'. The simplest way of implementing the proposed link between likely topicality and clause-initial, definite DPs is by endorsing the view that definite DPs differ from indefinite ones insofar as the former include a lexically-encoded preference for topicality. While this preference may be overridden by means of prosody, the QUD or sentence structure, it will mean that assessors display a significant tendency to treat a clause-initial definite DP as topical when no such factors serve to indicate that some other DP should be construed as topical. This completes my explanation of Definite Variance.

Since I have not yet mentioned the attempted explanation of 'There' Acceptability given by approaches to the problem of contingently empty restrictors in general, and Inherited accounts in particular, my discussion of this matter requires more detail than the explanation of Definite Variance did. I will argue that assessors of out-of-context existential 'there'-sentences are highly likely to understand the post-verbal DP and its restrictor as non-topical. This provides an explanation of 'There' Acceptability: given that the oddness response is attributed to the failure of an existence presupposition, and given that an existence presupposition is predicted to arise and fail only when some part of a DP is topical, it follows that DPs with empty restrictors will be highly unlikely to elicit the oddness response when they occur in the post-verbal position of existential 'there'-sentences. My argument will begin by considering evidence supporting the view that occurrences of post-verbal DPs and their restrictors are non-topical in the unmarked or default case. I will observe that it does not follow that such items can never be construed as topical, and I will argue that an occurrence of a coda-less 'there'-sentence may contain a topical post-verbal DP only if it is issued as an answer to a question that has one of two forms. I will then suggest that prominent counter-examples that have been advanced against the hypothesis that post-verbal DPs are non-topical may be explained as cases where an implicit QUD reflected by a question with an appropriate form is accommodated. I will conclude that an assessor of an out-of-context existential 'there'-sentence is unlikely to consider the sort of occurrence that corresponds with the topicability of the post-verbal DP or its restrictor.

Many in the literature endorse the strong position that the post-verbal DP of existen-

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<sup>33</sup>Though as discussed in §(4.1.5), Geurts' explanation of this claim is not altogether convincing.

tial ‘there’-sentences can *never* be topical. Evidence for this strong view emerges from a consideration of occurrences of ‘there’-sentences where attempts are made at rendering the post-verbal DP the obligatory topic. For instance, ‘there’-sentences for which the DP has undergone left dislocation, such as (17), seem unacceptable. Furthermore, it often sounds more natural to respond to a QUD that renders a particular DP the likely topic of an answer with a canonical variant such as (18b), rather than a ‘there’-sentence like (18a):

17. ? As for (some / three / at least three / many) kings, there (are such individuals / is such a group) in the yard.
18. (What property do (some / three / at least three / many) kings have?)
- (a) ? There are (some / three / at least three / many) kings [in the YARD]<sub>F</sub>.
- (b) (Some / Three / At least three / Many) kings are [in the YARD]<sub>F</sub>.

This evidence against the topicability of post-verbal DPs in existential ‘there’-sentences may be compared to the behaviour of material consisting of combinations of parts of post-verbal NPs and codas. The apparent acceptability of (19a) – (20d) might be taken to suggest that the NPs and codas of existential ‘there’-sentences are topicable, though this matter will be returned to later:

19. (a) As for kings, there are (some / three / at least three / many / few) of them in the yard.
- (b) As for the yard, there are (some / three / at least three / many / few) kings in it.
- (c) In the yard, there are (some / three / at least three / many / few) kings (there).
- (d) As for kings in the yard, there are (some / three / at least three / many / few) of them.
20. (a) (What property do kings have?)  
There are [(SOME / THREE / at least THREE / MAny / FEW)]<sub>F1</sub> kings [in the YARD]<sub>F2</sub>
- (b) (What property does the yard have?)  
There are [(some / three / at least three / many / few) KINGs]<sub>F1</sub> [in]<sub>F2</sub> the yard.
- (c) (What is in the yard?)  
There are [(some / three / at least three / many / few) KINGs]<sub>F</sub> in the yard.
- (d) (How many kings are in the yard?)  
There are [(SOME / THREE / at least THREE / MAny / FEW)]<sub>F</sub> kings in the yard.

Due to this sort of data, Reinhart (2004) (p.60) claims that ‘all studies agree’ that the post-verbal DP of an existential ‘there’-sentence can never be topical. While it is frequently held that occurrences of existential ‘there’-sentences are always all-focus (e.g. Kuno (1972), Kuroda (1972), Babby (1980), Lambrecht (1994)), some have argued that the codas of existential ‘there’-sentences are obligatorily topical (e.g. Rando and Napoli (1978)) or optionally topical (e.g. Bentley et al. (2012), Cruschina (2012), Cruschina (2015)).

However, the literature also contains a weaker position, which holds that the unmarked option is to understand occurrences of post-verbal DPs as non-topical. One advocate of this weaker view is Leonetti (2008, 2016), who claims that occurrences of coda-less ‘there’-sentences are all-focus in the ‘unmarked case’, but that contextual factors may bring about different choices of IS, including the topicality of the post-verbal DP. Compelling evidence for this weaker position is provided in Rando and Napoli (1978), where it is argued that the two most common prosodic patterns for existential ‘there’-sentences both involve a falling pitch accent on the NP, as in the following examples:<sup>34</sup>

21. (a) There are some KINGs in the yard.  
 (b) There are some KINGs in the YARD.

It is reasonable to classify these prosodic patterns as neutral prosody for existential ‘there’-sentences. Clearly, such prosody is incompatible with the topicality of the DP or its restrictor. This suggests that the unmarked option is to understand occurrences of post-verbal DPs and restrictors as non-topical, but that deviations from neutral prosody may render these items topical. The weaker position observes that data such as (17), (18a) and (18b) simply show that attempting to force the topicality of post-verbal DPs often sounds unnatural, without demonstrating the impossibility of construing post-verbal DPs as topical in certain settings. For example, the challenge of coming up with an indefinite expression anaphoric with the DP in (17) (i.e. the definite ‘them’ will not suffice) might be used to argue that left-dislocating a DP from a ‘there’ construction generates difficulties independent of its putative non-topicality. Similarly, (18a) is improved if it occurs relative to a slightly different question that continues to render the post-verbal DP of the answer a likely topic, such as ‘Where are there (some / three / at least three / many) kings?’.

I will accept this weaker position. Nevertheless, I wish to identify the circumstances in which the post-verbal DP of an occurrence of an existential ‘there’-sentence *is* a possible topic, in order to confirm their markedness and explain some prominent counter-examples to the strong view that post-verbal DPs are never topical. My claim is as follows, where ‘ $\beta$ ’ and ‘ $\beta'$ ’ represent optional post-verbal material that is possibly NP-internal or NP-external, and where ‘Wh’ represents a ‘wh’-phrase appropriate for ‘ $\beta'$ ’:

**Topicable Post-Verbal DPs:** For an occurrence of an existential ‘there’-sentence with the form ‘There be Det N ( $\beta$ )( $\beta'$ )’, ‘Det N’ is a potential topic when the occurrence is congruent with a QUD reflected by either: (i) ‘Be there Det N ( $\beta$ )( $\beta'$ )?’, or (ii) ‘Wh be (there) Det N ( $\beta$ )?’.

For example, ‘some kings’ is a reasonable candidate for the topic of the responses in (22a) – (23b):

22. (a) (Are there some kings?)  
 There [ARE]<sub>F</sub> some kings.  
 (b) (Are there some kings living in New York?)

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<sup>34</sup>Rando and Napoli (1978) claim that the most common prosodic pattern for *contextualised* ‘there’-sentences involves a rising accent on the post-verbal NP.

There [ARE]<sub>F</sub> some kings living in New York.

23. (a) (Where are there some kings?)

There are some kings [living in New YORK]<sub>F</sub>.

- (b) (Where are some kings living?)

There are some kings living [in New YORK]<sub>F</sub>.

It is important to note that the post-verbal DPs are possible but not obligatory topics of the responses to (22a) – (23b). That is, there is always some alternative choice of topic compatible with the QUD, such as the restrictor (e.g. ‘kings’) or an additional DP (e.g. ‘New York’). However, the crucial point is that the prosody of the responses to (22a) – (23b) is marked, by virtue of diverging from neutral prosody for existential ‘there’-sentences.

The idea that the post-verbal DP of an occurrence of a coda-less ‘there’-sentences is understood as topical only relative to an appropriate QUD explains prominent examples that have been advanced in the literature in order to oppose the view that post-verbal DPs are never topical. For instance, McNally (2011) (p.1834.) provides the following purported counter-example to the strong view, where the left dislocation of ‘a solution’ in the second sentence of the conjunction renders it the obligatory topic of that sentence:

24. They told us there was a solution, and indeed a solution, there was.

It is clear that the first sentence of the conjunction plays a crucial role in licensing this apparent counter-example. That is, infelicity emerges when the second conjunct opens a discourse (as in (25a)), and when an alternative first conjunct that includes the DP is chosen (as in (25b)):

25. (a) ? (Indeed) a solution, there was.

- (b) ? (We discovered that / We didn’t care if) there was a solution, and indeed a solution, there was.

A consideration of the type of sentences that license the immediate occurrence of McNally’s second conjunct indicates that they are ones that suggest a search for a solution without resolving the matter of whether or not a solution turned out to exist. Such sentences are likely to induce individuals to accommodate a QUD expressed by a sentence of the form ‘Was there a solution?’, to be answered by subsequent utterances. It follows that the first conjunct of McNally’s purported counter-example to the hypothesis that post-verbal DPs are non-topical invites the accommodation of an unanswered polar QUD pertaining to the existence of a solution, with the DP ‘a solution’ therefore being licensed as the topic of the subsequent answer.

Similarly, Borshev and Partee (2002) present examples of negative existential sentences in Russian for which they take the DP to be the theme. They define ‘theme’ as ‘what is being talked about in a sentence, which is presupposed to be familiar to the hearer’, which accords with my notion of a ‘sentence topic’. Their key example is the following:

26. (Ja iskal kefir.) Kefira v magazine ne bylo.

(I looked-for kefir<sub>ACC.M.SG.</sub>) Kefir<sub>GEN.M.SG</sub> in store *NEG* was<sub>N.SG.</sub>

‘(I was looking for kefir.) There wasn’t kefir in the store’.

The rules governing word order and prosody in Russian have been repeatedly argued to depend on theme-rheme structure (e.g. Sgall et al. (1986)), and the relevant principles classify ‘kefira’ as part of the theme. Borschev and Partee (2002) therefore conclude that the rheme of (26) is ‘ne bylo’ (*NEG* was’), with ‘v magazine’ (‘in the store’) joining ‘kefira’ as part of the theme.

It is possible to challenge this view of the IS of (26). As observed by Borschev and Partee, Babby (1980) argues that word order is no longer an indicator of theme in Russian negative existential sentences, as such sentences are always all-rheme. However, if the topicality of the bare DP is accepted, then this is again explained by my observation about the circumstances that license topical occurrences of post-verbal DPs. That is, the context is stipulated to include the information that the real or imaginary speaker was searching for kefir, without resolving whether or not she found kefir. Provided an assessor understands the store to be a salient searching location, it follows that the assessor is induced to accommodate the implicit QUD expressed by a sentence of the form ‘Was there kefir in the store?’. This licenses the topicality of the subsequent occurrence of ‘kefir in the store’.

In sum, I have argued that the unmarked option is to understand occurrences of the post-verbal DPs and restrictors of existential ‘there’-sentences as non-topical. The most significant evidence supporting this position is the identification of neutral prosody for existential ‘there’-sentences provided in Rando and Napoli (1978). In light of my acceptance of the view of Fodor (2002), which holds that assessors assign to out-of-context sentences ‘the most natural (default) prosodic contour for the construction’ (see §(2.3.1)), it follows that an assessor of an out-of-context existential ‘there’-sentence would be highly likely to consider an occurrence that has neutral prosody and assign IS in a manner consistent with such prosody. Of course, the post-verbal DP of an occurrence of a ‘there’-sentence may be understood as topical when it is issued relative to an explicit QUD reflected by one of the two types of question detailed above, or clues that induce the accommodation of an implicit QUD reflected by one of the two types of question; however, out-of-context presentations of ‘there’-sentences will lack such features. In light of the topic-sensitive, presuppositional approach to the problem of contingently empty restrictors, an explanation of ‘There’ Acceptability immediately follows: DPs with empty restrictors will be highly unlikely to elicit the oddness response when they occur in the post-verbal position of out-of-context existential ‘there’-sentences.

I conclude that my topic-sensitive, presuppositional account meets all three desiderata for a solution to the problem of contingently empty restrictors. Firstly, it attains descriptive adequacy: it predicts assessors’ responses to out-of-context presentations of sentences with perceived contingently empty restrictors, in addition to predicting assessors’ responses when such sentences are issued relative to an indication of their prosody or the QUD. Secondly, it attains explanatory adequacy: Definite Variance and ‘There’ Acceptability are explained by my claims that assessors of out-of-context sentences will be highly likely to construe clause-initial definite DPs as topical, will possibly construe clause-initial indefinite DPs as topical, and will be highly unlikely to construe the post-verbal DPs or restrictors of existential ‘there’-sentences as topical. While the explanation of Definite Variance is not par-

ticularly ‘deep’ – it is based on the hypothesis that definite DPs include a lexically-encoded preference to be understood as topical that emerges when they occur as clause-initial – the explanation of ‘There’ Acceptability derives from the independently motivated views that assessors of out-of-context sentences assign a choice of IS compatible with neutral prosody, and that neutral prosody for existential ‘there’-sentences involves a pitch accent on the post-verbal NP. Finally, my account attains generality: it relies upon independently motivated views pertaining to a system of file cards, the existence presuppositions associated with topics, and the likely IS of out-of-context and contextualised occurrences of sentences.

#### 4.4.2 Identifying Existentially Acceptable Occurrences of DPs

§(1.2) discussed attempts at identifying the occurrences of DPs that are acceptable in the post-verbal position of existential ‘there’-sentences. While a characterisation of the class of existentially acceptable occurrences of DPs is both tangential to the problem of contingently empty restrictors and beyond the scope of the current project, it is worth here noting an interesting connection between IS and existential acceptability. I will begin by taking a position on the file cards that the information expressed by occurrences of ‘there’-sentences is stored upon. I will then sketch a proposal pertaining to the means by which my system of file cards serves to illuminate the problem of existential acceptability.

Regarding the file cards with respect to which information storage occurs for ‘there’-sentences, observations from preceding sections entail a position on this matter. There are two possibilities for the IS of an occurrence of a ‘there’-sentence: firstly, that it is all-focus, and secondly, that it includes a sentence topic. In the first case, I predict that the information expressed is stored on a file card representing either *D* or some contextually supplied proper subset of *D*. In the second case, I predict that information storage would occur with respect to the file card associated with the topic. These are the central predictions of my position, deriving from the views advanced in §(2). However, I also have a perspective on the matter of which items in ‘there’-sentences are potential topics. Firstly, in the previous subsection I accepted the topicability of the post-verbal DP in certain marked cases. Secondly, I reject the possibility that the ‘There be’ construction is topicable, since such IS would be indistinguishable from sentence-wide focus in terms of both prosody (the final pitch accent would fall on the clause-final content word in both cases) and information storage (the aboutness object would presumably be some proper or improper subset of *D* in both cases). I also reject the possibility that implicit ‘stage’ topics are present, due to arguments in §(2.3.4). This leaves the possibility that material from the post-verbal NP and from the coda is topicable, which I will not rule out at this point.

This proposal about the way in which the information expressed by occurrences of ‘there’-sentences is stored is attractive for several reasons. Firstly, it accords with the semantics for ‘there’-sentences given by both Keenan (2003) and Francez (2009, 2010), which §(1.2) argued were the most promising semantic accounts. The connection with Francez’s account emerges particularly clearly in light of the idea that the implicit argument he invokes in Francez (2010) should be equated with a stage topic, as suggested by Cruschina (2015) (p.59.). Although I have rejected the possibility of implicit stage topics, an advocate of Francez’s account could revise this rejection whilst upholding my central proposal that information storage occurs with respect to the file card associated with any sentence topic present. Francez does not discuss the pragmatic effects of his implicit arguments, hence

this strategy would provide a useful means of incorporating them into a broader theory of information storage within common grounds.

However, combining my position with Francez's semantics for 'there'-sentences would yield predictions upon which my original position remains neutral. Francez's view that the implicit stage topic provides the quantifier's second argument for coda-less 'there'-sentences predicts that the information expressed by occurrences of coda-less 'there'-sentences will always be stored on a file card representing the contextually supplied set that ends up as the quantifier's second argument. However, the position I have sketched does not commit itself to this prediction, since the weak verification principle leaves open the possibility that an assessor understands an occurrence of a sentence as being about a set that plays no role in the semantic analysis (see the discussion of contextual domain restriction in §(3)). Still, an advocate of Francez's account might welcome this stronger prediction.

Yet the fact that my position allows information storage to occur with respect to a set that fails to contribute to the semantic analysis renders it compatible with Keenan's semantics. That is, there is no conflict between the claim that information storage sometimes occurs with respect to a file card representing some proper subset of  $D$  and the claim that coda-less 'there'-sentences are analysed in terms of quantifiers that always take  $D$  as their second arguments. An advocate of Keenan's approach would have cause to accept my position not only because it situates their account within a theory of information storage, but also because it allows a compelling explanation of Francez's impression that coda-less 'there'-sentences are analysed in terms of a quantifier that takes a proper subset of  $D$  as its second argument: an occurrence of such a sentence will be understood to be *about* some proper subset of  $D$  whenever information storage occurs with respect to a proper subset of  $D$ , even though it is not semantically analysed in terms of a quantifier that takes that subset as its second argument. Interlocutors might understand the speaker as intending to convey a proposition for which the quantifier's second argument is the relevant proper subset of  $D$  even when this proposition is distinct from the one expressed by the occurrence of the sentence, and semantic analyses such as Francez's might have failed to appreciate the distinction between the proposition literally expressed and the one understood to be conveyed.

As in §(1.2), I will continue to remain neutral about whether Francez's or Keenan's semantics for 'there'-sentences should be accepted. The point I have emphasised is that the position I have sketched regarding information storage for 'there'-sentences is compatible with both approaches, which contributes to its appeal.

There are additional reasons to consider the sketched position appealing. Firstly, it is compatible with the view that constituents other than the DP may be topical in occurrences of 'there'-sentences, a position that has been argued for recently in Bentley et al. (2012), Cruschina (2012) and Cruschina (2015). It therefore accords with the data captured in (19a) – (20d) and (26). On the other hand, the proposal that information is stored on the file card associated with any topic that is present is compatible with the imposition of constraints regarding which items in a 'there'-sentence are topicable. For instance, a theorist may argue that the restrictor of a 'there'-sentence is never topicable, provided she is able to account for the apparent topicability of the restrictors in (19a) and (20a). My proposal can therefore be reconciled with the traditional view that occurrences of 'there'-sentences are always all-focus (e.g. Kuroda (1972), Kuno (1972), Babby (1980), Lambrecht (1994)).

A second advantage of my proposal regarding the IS of 'there'-sentences is that it pro-

vides a natural explanation of the results of corpus studies showing that monotone decreasing DPs occur far more frequently in 'there'-sentences than in the canonical variants, as reported by Beaver et al. (2005). The explanation is that only the information expressed by marked occurrences of 'there'-sentences is stored on file cards associated with the post-verbal DP, hence post-verbal position is a convenient location for DPs that cannot be associated with file cards. Thirdly, it serves to illuminate the coda condition advanced by Zucchi (1995) and Keenan (2003), which stated that the coda of an occurrence of a 'there'-sentence provides the domain relative to which it is understood. My proposal illuminates the coda condition by suggesting that an occurrence of a 'there'-sentence is understood with respect to a restricted domain provided by coda material if and only if information storage occurs on the file card associated with that material. My proposal does not predict that information storage will invariably occur with respect to coda material, although supplementing my proposal with the view that the coda of an occurrence of an existential 'there'-sentence is obligatorily topical (e.g. Rando and Napoli (1978)) would yield such a prediction. Yet even without such supplementation, my proposal predicts that information storage will commonly occur with respect to coda material: for it will often be the case that the coda is topical, denotes a salient set or includes focus-external lexical material that is used to reconstruct an implicit QUD.

My account of information storage with respect to occurrences of 'there'-sentences allows the formulation of a generalisation about the connection between IS and existential acceptability: a definite DP is acceptable in post-verbal position if and only if the information expressed by the occurrence of the 'there'-sentence is stored on a file card representing a proper subset of  $D$ . In contrast, all-focus occurrences of 'there'-sentences with indefinite post-verbal DPs may be stored on a file card representing  $D$ . Given that this generalisation is tangential to the current project, I will not attempt to explain why it should hold; though an explanation based on some of the differing semantic properties of definite and indefinite determiners (for example, intersectivity) would be appealing. Furthermore, I shall not present detailed arguments in support of the generalisation. However, I will provide several considerations that favour it. Firstly, its empirical predictions are borne out. Secondly, a brief comparison with two other extant accounts linking existential acceptability to IS (Erteschik-Shir (2007) and Leonetti (2016)) reveals a number of points in favour of my proposal. Thirdly, it allows an informative explanation of the sense in which contextualised 'there'-sentences require special contexts. I shall consider each reason in turn.

My generalisation yields several empirical predictions. The first prediction is that, for occurrences of 'there'-sentences where prosody or the QUD forces sentence-wide focus, definite post-verbal DPs will be acceptable if and only if the context supplies some proper subset of  $D$  as the set to be represented by the file card with respect to which information storage occurs. As discussed in §(3.4), there is good reason to think that assessors access file cards representing proper subsets on the basis of an explicit QUD, the contextual salience of a particular set of items or focus-external lexical material. The second prediction is that all-focus occurrences of 'there'-sentences with indefinite post-verbal DPs may be acceptable even relative to contexts where no proper subset of  $D$  is available. The third prediction is that, for occurrences of 'there'-sentences where prosody or the QUD renders material from the DP or coda topical, and this material is associated with a file card that represents a proper subset of  $D$ , definite post-verbal DPs will be acceptable. These predictions will now

be tested:

27. (What's happening?)  
(a) ? [There are the KINGs]<sub>F</sub>.  
(b) ? [There is every king in the YARD]<sub>F</sub>.
28. (What's happening?)  
(a) [There are three KINGs]<sub>F</sub>.  
(b) [There are some kings in the YARD]<sub>F</sub>.
29. (Who's available to mow the lawn?)  
(a) [There are the KINGs]<sub>F</sub>.  
(What's happening in the yard?)  
(b) [There is every KING]<sub>F</sub> [in the yard]<sub>T</sub>.

(27a) – (27b) are clearly unacceptable, in contrast with (28a) – (28b) and (29a) – (29b). My proposal attributes the unacceptability of occurrences of sentences such as (27a) and (27b) to the fact that the information expressed may only be stored on a file card representing *D*, since no other file card is rendered available by the presence of a sentence topic or an appropriate QUD. On the other hand, such sentences are acceptable when they occur relative to contexts where the sentence topic or an explicit QUD causes information to be stored on a file card representing a proper subset of *D*, such as the set of individuals available to mow the lawn for (29a) and the set of items in the yard for (29b). For sentences such as (28a) and (28b), the idea that information storage occurs with respect to a file card representing *D* is supported firstly by the fact that assessors judge them acceptable even when no proper subset of *D* is supplied; and, secondly, it is natural to construe occurrences of such existential 'there'-sentences as being about what is happening *everywhere*, or what there is *tout court*.

There are two other approaches of which I am aware that use observations about information storage to explain the reason that definite post-verbal DPs are generally unacceptable and the circumstances in which they become acceptable. The first approach is sketched in Erteschik-Shir (2007) (pp.119-20.), where it is argued that occurrences of 'there'-sentences are always all-focus, with information storage therefore occurring with respect to a 'stage card' (see §(2.1.4) and §(2.3.4) for discussion of this notion). However, a distinctive feature of 'there'-sentences is that the time or location parameter of the stage card is often contextually unavailable. Occurrences of 'there'-sentences therefore define a 'new' stage card by adding the absent time or location parameter to the current stage, frequently by means of a coda. She explains the fact that definite DPs are generally excluded from post-verbal position as follows (p.120): 'Definites presuppose a referent associated with a location. Located referents are therefore incompatible with the interpretation of a new stage'. On the other hand, she claims that definite post-verbal DPs are acceptable when the stage card associated with an occurrence of a 'there'-sentence is fully specified by the context; for in such a scenario, the sentence does not induce updating of a parameter on the stage card in a way that might clash with the location parameter associated with a definite DP.

Erteschik-Shir's proposal does not appear to yield empirical predictions, since she does not elaborate on the sort of factors that cause the parameters of a stage card to be fully or

partially supplied by the context. Furthermore, her proposal may be objected to on theoretical grounds: it is inextricable from her system of information storage, since it relies on the notions of stage cards, implicit stage topics and location-presupposing file cards for definite DPs. Yet I presented considerations against her system of information storage in §(2.1.4) and §(2.3.4). Nevertheless, some aspects of Erteschik-Shir's proposal overlap with my own proposal: her observation that post-verbal definite DPs are acceptable when the context fully specifies a time and location with respect to which information storage should occur echoes my claim that such DPs are acceptable when the context supplies some proper subset of *D* for information storage purposes. However, my proposal differs from hers in permitting the information expressed by occurrences of 'there'-sentences with indefinite post-verbal DPs to be stored on file cards representing *D*, an approach that receives support from the fact that occurrences of (28a) and (28b) seem to be about *D*.

The second approach is given in Leonetti (2008, 2016), where it is argued that post-verbal DPs headed by definite determiners are acceptable in 'there'-sentences if and only if they receive 'narrow focus' (i.e. the focus is co-extensive with the DP). Leonetti's explanation of this is based on the idea that definite DPs semantically encode givenness whereas 'there'-sentences require their post-verbal DPs to be novel. Leonetti (2016) (p.109) claims that narrow focus on the DP 'forces the interpreter to infer an adequate background where the referent can be considered as a candidate to fulfill some role', due to indicating a set of contextual alternatives relevant to understanding the focused constituent. This means that the novelty condition of 'there'-sentences is fulfilled, since the relation between the DP and the context is novel even though the DP itself is given.

Leonetti's proposal may be challenged on empirical grounds. Firstly, certain occurrences of coda-less English 'there'-sentences that have post-verbal definite DPs with simple NP restrictors are acceptable (e.g. (29a)); yet his proposal could only explain the acceptability of such occurrences were he to allow structures like (30b). Hence his proposal appears to predict that coda-less 'there'-sentences may be all-focus (as in (30a)) or involve narrow focus (as in (30b)), with definite determiners' being acceptable replacements for 'Det' in the latter but not the former case:

30. (a) [There be Det N]<sub>F</sub>.  
 (b) There be [Det N]<sub>F</sub>.

I am reluctant to accept the hypothesis that coda-less 'there'-sentences in English may have narrow focus on the DP: for such occurrences would be indistinguishable from those with sentence-wide focus in terms of both prosody and information storage. The fact that there would be no way to empirically distinguish between narrow focus on the post-verbal DP of a coda-less 'there'-sentence and sentence wide focus therefore renders unappealing a theory based on such a distinction.

It is worth noting that my proposal is able to explain why one might perceive a connection between narrow focus on the post-verbal DP and the acceptability of a post-verbal definite DP: the topicality of DP-external material entails the inclusion of the DP in a non-sentence-wide focus, and such a scenario will frequently correspond with the acceptability of a post-verbal definite DP. However, the topicality of DP-external material is not necessary for acceptability of a post-verbal definite DP: a topical restrictor will also suffice, as will sentence-wide focus when an explicit QUD or the salience of a set causes information

storage to occur with respect to a file card representing a proper subset of  $D$ . Neither is the topicality of DP-external material sufficient for acceptability of a post-verbal definite DP: a topical coda that denotes  $D$  (e.g. 'in the universe') would allow storage to occur with respect to a file card representing a proper subset of  $D$  only if the context supplies such a subset.

Several widely observed features of 'there'-sentences make sense in light of my generalisation. Firstly, as discussed by Abbott and others, the contextualised 'there'-sentences in which definite post-verbal DPs freely occur are acceptable only when considered relative to a special context. Abbott (1992) (p.1.) claims that contextualised 'there'-sentences 'virtually require a context in which a question has been raised about the existence of some entity to fill a certain need or other role', which is to say that they are generally felicitous relative to contexts in which the QUD includes constant content interpreted as some proper subset of  $D$  (i.e. the set of individuals suitable for the relevant role). However, given that my proposal allows a file card representing a proper subset of  $D$  to be rendered available by the contextual salience of a particular item, I predict that a QUD pertaining to availability for a role is not necessary for the felicity of contextualised 'there'-sentences. For instance, I predict the acceptability of (31) relative to a context where 'here' is understood as some salient proper subset of  $D$ , such as the people present at a party:

(Who's here?)

31. There are the kings in the yard.

Since it is not particularly natural to describe 'Who's here?' as a question 'about the existence of some entity to fill a certain need or other role', my description of the type of contexts required for the acceptability of contextualised 'there'-sentences appears more general than Abbott's. My proposal also includes a simple explanation for the fact that contextualised 'there'-sentences are unacceptable when opening a discourse or presented out-of-context: the real or imaginary contexts associated with such sentences are insufficiently rich to include the type of QUD or salient item required for the availability of a file card representing a proper subset of  $D$ .

In this subsection, I have elucidated the predictions issued by my system of file cards with respect to the information storage for occurrences of 'there'-sentences: information is stored on the file card associated with the topic when there is one, and with the file card representing  $D$  or some contextually supplied subset when focus is sentence-wide. This proposal is not only compatible with the best semantics of 'there'-sentences, but serves to informatively situate them within a theory of structured common grounds. I have also sketched a generalisation regarding a connection between the existential acceptability of occurrences of DPs and IS: a definite DP is acceptable in post-verbal position if and only if the information expressed by the occurrence of the 'there'-sentence is stored on a file card representing a proper subset of  $D$ . This generalisation receives empirical support, and furthermore explains some key features of the type of contexts that license contextualised 'there'-sentences. It is also worth noting that my generalisation follows the recommendation of Ward and Birner (1995), inasmuch as it attributes existential acceptability to pragmatic factors. While these observations about 'there'-sentences are orthogonal to the problem of contingently empty restrictors, it is the discussion of 'There' Acceptability that has served to illuminate them.

## Summary of §(4.4)

In §(4.4.1), I argued that assessors of out-of-context sentences will be highly likely to construe clause-initial definite DPs as topical, will possibly construe clause-initial indefinite DPs as topical, and will be highly unlikely to construe the post-verbal DPs or restrictors of existential ‘there’-sentences as topical. When combined with my view that existence presuppositions are triggered by the topicality of a DP and fail when its restrictor is empty, Definite Variance and ‘There’ Acceptability are immediately predicted. I furthermore argued that the resulting topic-sensitive, presuppositional account meets all three desiderata for a solution to the problem of contingently empty restrictors.

In §(4.4.2), I briefly discussed some tangential issues concerning ‘there’-sentences. I observed that my account of IS and file cards predicts that the information expressed by an occurrence of a ‘there’-sentence is stored on a file card associated with its topic when there is one, and a file card representing either *D* or some contextually supplied proper subset of *D* otherwise. I left open the possibility that the codas and restrictors of ‘there’-sentences are topicable; though in light of the view advanced in §(4.4.1), the unmarked option for existential ‘there’-sentences consists of the non-topicality of the post-verbal DP and its restrictor. I then stated the generalisation that a definite DP is acceptable in post-verbal position if and only if the information expressed by the occurrence of the ‘there’-sentence is stored on a file card representing a proper subset of *D*.

## Chapter Summary

I began by describing the problem of contingently empty restrictors, and assessed the potential for each of four treatments to adequately address it. I concluded that presuppositional accounts best met the desiderata, though extant versions of such accounts lack a coherent explanation of the differing judgements of occurrences of sentences with definite and indefinite DPs. I therefore gave a topic-sensitive, presuppositional account, whereby being topical causes an occurrence of a DP to presuppose the existence of a file card representing a minimal witness set of its denotation. In cases where a DP’s restrictor is perceived to be empty, such a file card can neither be already present in the CG nor accommodated, since there is no non-empty minimal witness set for it to represent. The failure of this existence presupposition results in the oddness response. I then argued that this account is able to meet all three desiderata for a solution to the problem of contingently empty restrictors: it attains both descriptive and explanatory adequacy, and it relies on independent mechanisms with general applicability.

## Chapter 5

# Category Mistakes

In this chapter, I will consider the matter of *how to account for the sense of oddness associated with occurrences of sentences traditionally thought to exhibit category mistakes*. I will challenge extant accounts of category mistakes, before providing an account based on general, pragmatic mechanisms relating to the storage of information in structured common grounds.

In §(5.1), I will provide some background information, before presenting two types of unexpected data that arise with respect to occurrences of certain sentences that are traditionally thought to exhibit category mistakes. I will also show how no extant account of category mistakes is able to predict the unexpected data. This will lead to my first conclusion: extant accounts are descriptively inadequate. In §(5.2), I will develop the proposal that the sentences traditionally classified as exhibiting category mistakes comprise a proper subclass of the sentences that are prone to exhibit ‘storage problems’: that is, it is often difficult to store the information expressed by occurrences of them within an imaginary or real-life common ground, but the provision of a suitably rich context causes assessors to assign the expected truth values. This leads to my second conclusion: assessors’ responses to so-called ‘category mistakes’ are best captured and explained by an account that avoids postulating a type of defectiveness unique to a class of category mistake-exhibiting sentences.

### 5.1 Against Extant Accounts of Category Mistakes

In §(5.1.1), I will give an overview of category mistakes. I will divide the class of sentences traditionally thought to be category mistake-exhibiting into two groups: those that are treated as category mistakes solely due to the inclusion of an empty restrictor, and those that are considered category mistakes for reasons independent of the presence of an empty restrictor. I shall then show that the same data that arises with respect to contingently empty restrictors – Definite Variance and ‘There’ Acceptability – also arises with respect to necessarily empty restrictors. I will go on to argue that these data threaten the descriptive adequacy of all extant accounts of category mistakes. In §(5.1.2), I will claim that every syntactic account of category mistakes will struggle to predict the data associated with Definite Variance and ‘There’ Acceptability, since it is challenging to explain how the syntactic defect involved in category mistakes could be neutralised by the presence of certain constructions. In §(5.1.3), I shall argue that no semantic account is able to predict the data associated with ‘There’ Acceptability, since it is difficult to argue that ‘there’-sentences and their canonical

variants vary with respect to whatever semantic defect is proposed to underlie category mistakes. In §(5.1.4), I will show that the only extant pragmatic account is unable to predict Definite Variance and ‘There’ Acceptability, since data involving presupposition triggers in determiners’ restrictors fails to provide the required projection facts.

### 5.1.1 Category Mistakes

It is widely held that the propensity to trigger an oddness response is a necessary but insufficient condition for a sentence to be classified as exhibiting a *category mistake*. As stated in §(4.1.1), I define an occurrence of a sentence as eliciting an *oddness response* if and only if an assessor has a sense that the occurrence is defective or infelicitous, and the assessor additionally encounters difficulty in assigning it a truth value. The connection between a propensity to elicit an oddness response and the presence of a category mistake is demonstrated by the following sentences, based on a list given in Magidor (2013):

1. (a) Yasma is drinking water.
- (b) Yasma is drinking water and Yasma is drinking water.
- (c) ? Yasma is shminging water.
- (d) ? The American king is drinking water.
- (e) ? Yasma is drinking the theory of relativity.
- (f) ? The theory of relativity is drinking water.
- (g) ? The red number is divisible by three.

Although ordinary occurrences of (1c) – (1g) are likely to elicit an oddness response, only (1e) – (1g) are typically classified as category mistake-exhibiting. That is, the oddness that is likely to be elicited by occurrences of (1c) and (1d) is attributable to the presence of, respectively, a word that fails to be in the English lexicon (‘shminging’) and a perceived contingently empty restrictor (‘American king’). In contrast, the oddness that is likely to be elicited by occurrences of (1e) – (1g) cannot be attributed to such sources.

Accounts of category mistakes may be classified according to the proposed source of the defect that yeilds an oddness response. I shall follow Magidor (2013) in distinguishing between syntactic, semantic and pragmatic accounts of category mistakes. I will assume that an adequate account of category mistakes should meet two desiderata that are generally expected of an account of any linguistic phenomenon: firstly, it should be *descriptively adequate*, predicting whether occurrences of complex sentences formed from expressions that cause simple sentences to exhibit category mistakes will strike assessors as odd. Secondly, it should be *explanatorily adequate*, explaining what aspect of category mistake-exhibiting sentences causes assessors to deem occurrences of them odd. It is in attempting to attain explanatory adequacy that accounts of category mistakes typically endorse the following claim:

**Unique Defectiveness:** There is a class of category mistake-exhibiting sentences consisting of all and only the sentences afflicted by a particular defect.<sup>1</sup>

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<sup>1</sup>Note that an account should still count as endorsing Unique Defectiveness if it accepts that there is a class of category mistake-exhibiting sentences consisting of all and only those afflicted by *at least one of a particular class of defects*; though I am not aware of any account that endorses such a variant.

Unique Defectiveness is not only an appealing assumption to make in seeking a uniform explanation of the sentences traditionally thought to exhibit category mistakes, but is furthermore crucial to a range of proposals that attempt to use category mistake-exhibiting sentences to characterise some independent linguistic phenomenon. For example, Lappin (1981) (p.2) claims that the class of category mistakes is co-extensive with the class of sentences that are simultaneously syntactically well-formed and semantically ill-formed, meaning that ‘a theory of [category mistakes] constitutes a theory of semantic ill-formedness in sentences’. Similarly, accounts of metaphors frequently hold that a category mistake must be present to trigger a metaphorical reading, which it achieves by precluding the literal reading (e.g. Beardsley (1962)). According to such a view, an analysis of category mistakes is essential to an account of non-literal meaning. An important result of my arguments in this chapter is that it is misguided to use a class of category mistake-exhibiting sentences to characterise any other linguistic phenomenon, since no unique defect may be used to isolate such a class.

Since I will ultimately reject Unique Defectiveness, I deny the existence of any criteria that may be used to define a ‘category mistake’. I will therefore identify the class of sentences of current concern as follows. The first group of sentences with which I am concerned consists of those that include expressions like ‘red number’ as the restrictor of a determiner. By analogy with the contingently empty restrictors discussed in §(4), I shall call such expressions *necessarily empty restrictors*, since (for example) the set of red numbers is empty relative to the worlds of all ordinary contexts. Perceived necessarily empty restrictors are paradigm cases of constituents that are traditionally taken to generate category mistakes. The second group of sentences with which this chapter is concerned, of which I will delay consideration until §(5.2.2), may be roughly identified as consisting of those that are traditionally considered category mistakes for reasons independent of the presence of an empty restrictor.

As discussed in §(4.1.1), it has been widely observed that sentences with contingently empty restrictors display an unexpected pattern of acceptability. This pattern turned out to consist of the following two facts: an assessor of an out-of-context sentence where a clause-initial DP’s restrictor is perceived to be contingently empty is highly likely to experience an oddness response when the DP is definite and may or may not experience an oddness response when the DP is indefinite (Definite Variance); and an assessor of an out-of-context ‘there’-sentence where the post-verbal DP’s restrictor is perceived to be contingently empty is highly unlikely to experience an oddness response (‘There’ Acceptability).

It has previously been overlooked, both in the literature on quantifiers and on category mistakes, that the same data arises with respect to perceived *necessarily empty restrictors*. By analogy with sentences with contingently empty restrictors, it is predicted that assessors will be highly likely to judge (2a) - (2d) odd (due to the inclusion of definite determiners), may consider (3a) - (3d) either odd or valued (due to the inclusion of indefinite determiners), and will judge (4a) - (4d) valued:

2. (a) ? Every red number is divisible by three.
- (b) ? The red number is divisible by three.
- (c) ? The two red numbers are divisible by three.
- (d) ? Most red numbers are divisible by three.

3. (a) (?) Some red numbers are divisible by three.  
 (b) (?) No red numbers are divisible by three.  
 (c) (?) Two red numbers are divisible by three.  
 (d) (?) Many red numbers are divisible by three.
4. (a) There are some red numbers divisible by three.  
 (b) There are no red numbers divisible by three.  
 (c) There are two red numbers divisible by three.  
 (d) There are many red numbers divisible by three.

These predictions appear to be borne out. In particular, it is natural to assign (4a) – (4d) the values predicted by the truth conditions (that is, *true* for (4b) and *false* for the remainder).

This subsection has shown the – often overlooked – nuances of the judgements elicited by occurrences of sentences with necessarily empty restrictors. In the following subsections, I will argue that extant accounts of category mistake-exhibiting sentences fail to predict the Definite Variance and ‘There’ Acceptability data reflected by (2a) – (4d).

### 5.1.2 Syntactic Accounts

I will argue that syntactic accounts of category mistakes must explain how indefinite determiners or the ‘there be’ construction neutralise the syntactic defect displayed by category mistake-exhibiting constituents, and that no syntactic account is able to offer the required explanation.

The only prominent advocate of a syntactic account is Chomsky (1965). He claimed that the lexical entries for nouns should be associated with collections of *selectional features*. For example, ‘number’ will be marked as being not only of category N, but also as a count noun and an abstract noun. The lexical entries for verbs and adjectives include *selectional restrictions* pertaining to the features of their arguments. For instance, the adjective ‘red’ requires its argument to be marked as non-abstract, hence the application of ‘red’ to the argument ‘number’ would involve a violation of this restriction. The sentences that Chomsky takes to involve violations of selectional restrictions thus coincide with those sentences typically classified as category mistake-exhibiting. Given this notion of category mistakes, it is clear that such an account is committed to Unique Defectiveness: the oddness evoked by occurrences of all and only category mistake-exhibiting sentences derives from the violation of selectional restrictions.

Chomsky’s account initially appears to entail the prediction that any occurrence of any sentence which attempts to apply ‘red’ to ‘number’ will induce an oddness response in assessors. For simplicity, I will focus on the predictions that arise with respect to (2a), (3a) and (4a). The prediction would seem to emerge that if (2a) elicits an oddness response due to the NP ‘red number’, then (3a) and (4a) will also do so: for if a sentence that attempts to apply a definite determiner to a syntactically ill-formed item is replaced with a variant where an indefinite determiner is substituted, or with a variant including the ‘there be’ construction, then the syntactic ill-formedness of the item generally persists. For example, ‘Every very number is divisible by three’ is no less syntactically ill-formed than ‘Some very number is divisible by three’, or ‘There is some very number divisible by three’. Hence

one would expect Chomsky's account to predict that occurrences of (2a), (3a) and (4a) will invariably elicit an oddness response, a prediction which is correct only with respect to (2a).

However, Chomsky notes that certain constructions allow selectional restrictions to be violated without inducing an oddness response. For instance, Chomsky (1965) (p.157) predicts that occurrences of 'It is nonsense to speak of red numbers' will be deemed acceptable. He attributes the potential for acceptable interpretations of selectional restriction-violating constituents to the lexical entries for words such as 'nonsense' and 'speak of', which may somehow remove the incongruity of constituents they dominate. One might therefore wonder whether a syntactic account could invoke a similar mechanism for occurrences of sentences such as (3a) and (4a).

The trouble is that it is implausible to hold that the lexical entries for indefinite determiners or the 'there be' construction include information that permits selectional restrictions to be violated. Firstly, Definite Variance consists of the observation that assessors *sometimes* consider occurrences of sentences where an indefinite determiner applies to an empty restrictor to be acceptable, whereas the presence of a lexically-encoded relaxation of selectional restrictions predicts the acceptability of *all* occurrences of such sentences. Secondly, 'There' Acceptability describes the contrasting potential of (3a) and (4a) to elicit an oddness response, which would lack an explanation if the suspension of selectional restrictions is induced by occurrences of indefinite determiners in 'there'-sentences and canonical ones alike. Thirdly, it would be necessary to provide an explanation of the reason that indefinite determiners encode a relaxation of selectional restrictions while definite determiners do not. Finally, while constructions such as 'It is nonsense to speak of' might be argued to permit the violation of all selectional restrictions in constituents they dominate, indefinite determiners and the 'there be' construction clearly do not, which requires explanation. For example, while occurrences of 'It is nonsense to speak of three dirt(s)' might be argued to be acceptable, despite the violation of the selectional restriction that arises when a determiner requiring a count noun is applied to a non-count noun, occurrences of 'There (is / are) three dirt(s)' clearly elicit an oddness response.

These arguments suggest that, while it would be challenging to detail the means by which 'It is nonsense to speak of' induces the relaxation of selectional restrictions, it would be even more difficult to explain how the constructions involved in (3a) and (4a) induce such relaxation. For it would be necessary to complicate the lexical entries for indefinite determiners, in addition to explaining the following facts about them: why some but not all occurrences bring about a relaxation of selectional restrictions, why occurrences in 'there'-sentences are more likely to bring about this relaxation, why they differ from definite determiners in their lexical encoding of this property, and why they allow the suspension of some but not all types of selectional restriction. These challenges may well be insurmountable.

While the literature lacks alternative implementations of syntactic accounts of category mistakes, presumably *any* syntactic account would trace the oddness generated by certain occurrences of 'red number' to some syntactic property of the phrase itself. Any such account would then be required to explain how the sorts of constructions involved in (3a) and (4a) affect this property. Hence my arguments about the challenges faced by such an approach apply to all possible syntactic accounts of category mistakes.

### 5.1.3 Semantic Accounts

I will argue that all semantic accounts are required to explain how ‘there’-sentences and their canonical variants vary with respect to the semantic defect they attribute to category mistakes, and that no semantic account is able to provide a viable explanation.

All extant semantic approaches (e.g. Ryle (1938), Fodor and Katz (1963), van Fraassen (1971), Thomason (1972), Lappin (1981) and Asher (2011)) endorse Unique Defectiveness, treating a sentence as category mistake-exhibiting if and only if it involves a particular type of semantic ill-formedness. For instance, Lappin (1981) proposes that a sentence is category mistake-exhibiting if and only if it is syntactically well-formed but lacks truth conditions, meaning that its value is necessarily undefined. Asher (2011) holds that a sentence is category mistake-exhibiting if and only if a violation of a *type constraint* (a presupposition he associates with predicates, which encode restrictions on the types of their arguments) is identifiable in the logical form at the relevant context, which causes its value to be undefined.

I will now argue that no semantic account is able to capture the diverging acceptability of (3a) and (4a). In §(1.2), I concluded that the most promising semantics for ‘there’-sentences are those provided by Keenan (2003) and Francez (2009). According to the former, a ‘there’-sentence with a coda is *semantically equivalent* to its canonical variant, insofar as they are assigned an extension relative to each context according to the application of the same functions to the same arguments in the same order.<sup>2</sup> Any account that identifies category mistake-exhibiting sentences as those that involve a particular form of semantic ill-formedness, in addition to accepting Keenan’s semantics for ‘there’-sentences, therefore appears to commit itself to the view that both (3a) and (4a) are alike with respect to whether they exhibit category mistakes.<sup>3</sup> Yet if the potential to elicit an oddness response correlates with the presence of a category mistake, the prediction emerges that assessors will react to occurrences of (3a) and (4a) in the same way. This prediction is contradicted by Definite Variance and ‘There’ Acceptability.

There are three ways that an advocate of a semantic account could respond to this argument. Firstly, she might propose a semantics for ‘there’-sentences with codas whereby such sentences are semantically non-equivalent to the canonical variants. Secondly, she might concede the semantic equivalence of (3a) and (4a), but deny that this entails that both are alike with respect to whether they exhibit category mistakes. Thirdly, she might accept that either both or neither of (3a) and (4a) are category mistake-exhibiting, before arguing that their differing propensities to elicit an oddness response are attributable to a phenomenon independent of category mistakes. I will argue that none of these responses succeed.

The first response might begin by endorsing the semantics provided by Milsark (1974), Abbott (1993), McNally (1997) or Francez (2009), all of which assign distinct truth conditions to ‘there’-sentences with codas and their canonical variants. Pursuing this strategy with respect to any of the first three accounts would not be promising, since I presented objections to them in §(1.2.1). Furthermore, none of the first three accounts would provide an obvious way to render innocuous a constituent that ordinarily yields category mistake-exhibiting

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<sup>2</sup>See the notion of *intensional identity* (in contrast with *extensional equivalence*) of propositions given in Lappin (2013).

<sup>3</sup>Note that there is an interpretation of (3a) and (4a) as ‘there’-sentences with codas, even if there is also an interpretation of them as coda-less ‘there’-sentences with complex post-verbal NPs.

sentences.<sup>4</sup> In §(1.2.4), I concluded that Francez's semantics appear equally as promising as Keenan's. Furthermore, Francez (2009) uses the predicted semantic non-equivalence of 'there'-sentences and their canonical variants to explain different understandings that are sometimes fostered by occurrences of each type of sentence. An advocate of a semantic account of category mistakes might therefore be tempted to adopt Francez's semantics for 'there'-sentences in order to exploit a similar strategy of attributing the different responses elicited by (3a) and (4a) to their semantic non-equivalence.

However, there is good reason to think that such a strategy would not allow an advocate of a semantic account of category mistakes to attain descriptive adequacy. Francez's view that coda material is a sentential modifier when it occurs in a 'there'-sentence and an ordinary predicate when it occurs in a canonical variant fails to provide a natural explanation of why (3a) would contain the semantic defect characteristic of category mistake-exhibiting sentences and (4a) would not. Firstly, if it were to be argued that a necessarily empty restrictor will fail to yield a category mistake-exhibiting sentence when an appropriate sentential modifier is present, then the fact that 'There' Acceptability extends to coda-less 'there'-sentences (e.g. it is natural to assign a value to occurrences of 'There are no red numbers') would require an explanation. On the other hand, advocates of semantic accounts might claim that a necessarily empty restrictor yields a category mistake-exhibiting sentence only if the DP it forms combines with a predicate. However, extant semantic accounts of category mistakes tend to pursue compositional approaches, whereby the property of being a category mistake-exhibiting sentence is recursively defined so as to derive from the semantic deviance associated with an attempt at combining a pair of constituents such as 'red' and 'number' (e.g. Lappin (1981), Asher (2011)). Hence it is difficult to see how such accounts could be reconciled with the view that the presence of the semantic defect associated with category mistake-exhibiting sentences depends on the syntactic properties of higher constituents. Furthermore, this version of the first response would be required to provide an entirely separate explanation of the Definite Variance data, since there is no variance in the syntactic structure of such sentences. Clearly, an account that provided a uniform explanation of 'There' Acceptability and Definite Variance would be more parsimonious. The semantic non-equivalence of (3a) and (4a) would therefore be insufficient to explain why only the former yields a category mistake-exhibiting sentence. It follows that advocates of semantic accounts should seek another explanation for their propensities to elicit different responses.

The second response might begin with the observation that truth-conditionally equivalent sentences sometimes display divergent properties relevant to semantic phenomena. For example, it is standard to analyse the sentences 'Three kings live in New York' and 'At least three kings live in New York' as truth-conditionally equivalent, insofar as each one is true if and only if the set of kings living in New York is of cardinality three or greater. However, it has been claimed that discourse anaphors that follow DPs headed by bare cardinals

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<sup>4</sup>For example, Milsark (1974) claims that the semantics of 'there'-sentences differs from that of their canonical variants with respect to the inclusion of a requirement that the determiner specify a cardinality, and the presence of a non-emptiness condition on the intersection of the denotations of the NP and the coda. Clearly, the former requirement should have no effect on constituents other than determiners. The latter requirement will affect restrictors only by disallowing post-verbal DPs with necessarily empty restrictors, which would result in the prediction that 'there'-sentences with necessarily empty restrictors should be *unacceptable*, in conflict with the observations of 'There' Acceptability.

are understood non-exhaustively whereas those that follow DPs headed by modified cardinals are understood exhaustively (see §(2.2.3)). Similarly, it might be claimed that (3a) and (4a) are semantically equivalent, but nevertheless diverge with respect to a property that confers acceptability on a constituent that otherwise displays a particular type of semantic ill-formedness. Hence some occurrences of (3a), and all occurrences of (4a), fail to exhibit category mistakes, due to possession of this property. The trouble with this approach is that a non-ad hoc account of the postulated property would need to be provided, and it is difficult to imagine what this explanation could involve.

The third response grants that either both of (3a) and (4a) exhibit category mistakes, or neither of them do. Advocates of the former variant would need to explain why an oddness response fails to arise for some occurrences of (3a) and for all occurrences of (4a), despite the fact that the sentences are category mistake-exhibiting. Even if such an explanation were to be provided, this position would remain problematic, since (as stated in §(5.1.1)) the propensity to elicit an oddness response relative to any ordinary context is normally taken to be a necessary condition for a sentence to exhibit a category mistake. Advocates of the latter variant of the third response would need to explain the source of the oddness response when it is elicited by occurrences of (3a), since it must be something other than a category mistake. However, there is a worry that, if one attributes the sense of oddness associated with certain expressions that tend to produce category mistakes to pragmatic factors, then one undermines the view that the oddness associated with occurrences of category mistakes derives from whatever unique defect one uses to characterise category mistakes. That is, whatever pragmatic factor is invoked to explain the oddness response that arises with respect to some occurrences of (3a) might also explain the oddness response that invariably arises with respect to sentences where a definite determiner applies to a necessarily empty restrictor; yet sentences such as (2b), featuring the definite article, are taken to be paradigm cases of category mistake-exhibiting sentences. It therefore looks as if a semantic account that treated (3a) and (4a) as failing to exhibit category mistakes would undermine whatever semantic mechanism was invoked in the analysis of category mistakes in the first place.

In sum, I argued that the fact that ‘there’-sentences and their canonical variants are often analysed as semantically equivalent makes it difficult for semantic accounts of category mistakes to explain their differing propensities to elicit an oddness response. Three strategies appear to be available. Firstly, it might be claimed that ‘there’-sentences are semantically non-equivalent to their canonical variants. Secondly, it might be conceded that ‘there’-sentences are semantically equivalent to their canonical variants, whilst being denied that this entails that both are alike with respect to whether they exhibit category mistakes. Thirdly, it might be claimed that ‘there’-sentences and their canonical variants are always alike with respect to whether they are category mistake-exhibiting, but that their differing propensities to elicit an oddness response derive from a phenomenon independent of category mistakes. I argued that none of these responses succeed.

#### **5.1.4 Pragmatic Accounts**

I will argue that the only extant pragmatic account must endorse the view that the projection of presuppositions triggered by constituents in determiners’ restrictors depends on the type of determiner involved and the presence of the ‘there be’ construction, but that the data contradicts this view.

Magidor is the only current advocate of a pragmatic account. She claims that certain predicates are *presupposition triggers*, insofar as they are associated with particular presuppositions in a number of settings. She considers a *presupposition* to be information that must already be present in the common ground if the occurrence of the expression that triggers it is to be felicitous. While semantic notions of presuppositions (e.g. Asher (2011)) hold that presupposition failure leads to semantic undefinedness, Magidor's notion holds that it simply causes meaningful, valued occurrences of sentences to elicit a sense of pragmatic infelicity in assessors. She argues that simple category mistake-exhibiting sentences are cases where a presupposition triggered by a predicate fails. Given that occurrences of non-category mistake-exhibiting sentences might also involve presupposition failure, an advocate of this position need not commit herself to Unique Defectiveness; however, Magidor (2013) (pp.1-2) accepts Unique Defectiveness on the grounds that the sentences typically classified as category mistake-exhibiting 'seem infelicitous in a similar manner ... [which] points to a linguistic phenomenon: the phenomenon of category mistakes'.

Magidor issues direct predictions regarding the propensity for certain simple sentences to elicit an oddness response. For instance, she states that occurrences of the predicate 'red' trigger the presupposition that the predicate's argument's extension consists of coloured items, whereas ordinary common grounds will include the information that the extension of 'number' does *not* consist of coloured items, resulting in an oddness response. She relies on general facts about the projection of presuppositions from simpler to more complex constructions in order to predict the transmission of category mistake-exhibiting status to complex sentences. Therefore, her account's predictions regarding whether occurrences of sentences such as (2a), (3a) and (4a) will elicit an oddness response can be established only on the basis of determining the general projection rules for presupposition triggers embedded in such sentences. Yet Magidor (2013) (p.122) concedes that quantification is an 'area where the projection properties are still very much under debate', with a discussion of the role of presuppositions in determiners' restrictors' being virtually absent from the literature.

If general projection facts are to predict Definite Variance and 'There' Acceptability, then they must include the following three pieces of data. Suppose  $p$  is a presupposition triggered by some constituent of the NP 'N'. Then, firstly,  $p$  must consistently arise for occurrences of 'Det N be  $\beta$ ' when 'Det' is a definite determiner. Secondly,  $p$  must sometimes arise and sometimes fail to arise for occurrences of 'Det N be  $\beta$ ' when 'Det' is an indefinite determiner. Thirdly,  $p$  should never arise for occurrences of 'There be Det N  $\beta$ '. I will now consider sentences that include (possibly non-empty) restrictors containing presupposition triggers. I will argue that these sentences indicate that the general projection facts do not include the three pieces of data required to bestow descriptive adequacy on Magidor's account.

I will assume that, in simple sentences, the NPs 'king(s) who know(s) that Yasma is a mathematician' and 'king(s) who (is / are) (a) better mathematician(s) than Yasma' trigger the presupposition *that Yasma is a mathematician*, and 'king(s) who stopped talking to Yasma' triggers the presupposition *that the relevant kings have previously talked to Yasma*. Now consider whether these presuppositions arise for occurrences of the following sentences:

5. (a) Every king who knows that Yasma is a mathematician lives in New York.
- (b) Every king who is a better mathematician than Yasma lives in New York.
- (c) Every king who stopped talking to Yasma lives in New York.

6. (a) Some kings who know that Yasma is a mathematician live in New York.  
 (b) Some kings who are better mathematicians than Yasma live in New York.  
 (c) Some kings who stopped talking to Yasma live in New York.
7. (a) There are some kings who know that Yasma is a mathematician living in New York.  
 (b) There are some kings who are better mathematicians than Yasma living in New York.  
 (c) There are some kings who stopped talking to Yasma living in New York.

It seems that (5a) – (7c) display a robust propensity to elicit the relevant presuppositions, with no discernible difference in this propensity between the three groups of sentences. This observation emerges fairly clearly from attempts at detecting the presence of a presupposition via introspection, in addition to receiving support from the standard tests for presupposition.<sup>5</sup>

An advocate of Magidor’s account might object that (5a) – (7c) entail the relevant propositions in addition to presupposing them, and that this obscures attempts at determining whether the presuppositions persist in the various settings. In order to counter this objection, we may consider variants of (5a) – (7c) where we replace ‘know(s)’, ‘(is / are) (a) better’ and ‘stopped’ with, respectively, ‘(doesn’t / don’t) know’, ‘(isn’t / aren’t) (a) better’ and ‘didn’t stop’. Standard accounts of presupposition projection predict that these negative variants will trigger the same presuppositions as (5a) – (7c), without entailing those presuppositions. Like (5a) – (7c), the negative variants appear to elicit the relevant presuppositions, with no discernible differences between the three groups of sentences, as evidenced by introspection and the standard tests for presupposition.<sup>6</sup>

Hence Magidor’s reliance on general projection facts yields the predictions that occurrences of (2a), (3a) and (4a) will all generate an oddness response, since the presupposition associated with ‘red’ will project in each case. It follows that the only extant pragmatic account fails to predict Definite Variance and ‘There’ Acceptability.

## Summary of §(5.1)

The current section observed that sentences that contain perceived necessarily empty restrictors compose an important class of the sentences that have traditionally been thought to exhibit category mistakes. I claimed that the Definite Variance and ‘There’ Acceptability data that arises with respect to contingently empty restrictors also arises with respect to

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<sup>5</sup>For example, the application of the cancellability test to each of the sentences suggests the presence of a non-cancellable presupposition; e.g. ‘Some kings who know that Yasma is a mathematician live in New York ... not that Yasma is a mathematician’ sounds infelicitous. Similarly, the application of the ‘Hey, wait a minute!’ test to each of the sentences indicates the potential to interrupt the conversation to query the putative presupposition; e.g. (6a) may reasonably be followed up with: ‘Hey, wait a minute! I had no idea that Yasma was a mathematician’.

<sup>6</sup>For example, the application of the cancellability and ‘Hey, wait a minute!’ tests to the negative variants support the presence of presuppositions; e.g. ‘Some kings who don’t know that Yasma is a mathematician live in New York’ cannot be felicitously followed up with ‘... not that Yasma is a mathematician’, whereas it may be reasonably followed up with ‘Hey, wait a minute! I had no idea that Yasma was a mathematician’.

necessarily empty ones. I argued that the specific accounts of category mistakes considered, in addition to syntactic accounts and semantic accounts in general, fail to generate correct predictions about the transmission of the oddness response. Here is the first conclusion to be drawn, then: *all extant accounts of category mistakes are descriptively inadequate.*

## 5.2 Accounting for ‘Category Mistakes’

In this section, I advance an account of the sentences typically classified as category mistake-exhibiting that relies on general pragmatic mechanisms. I argue that such sentences comprise a proper subclass of those with a propensity to exhibit ‘storage problems’ when assessors attempt to incorporate them into a common ground. In §(5.2.1), I will claim that my solution to the problem of contingently empty restrictors straightforwardly applies to sentences with necessarily empty restrictors. This proposal is able to explain Definite Variance and ‘There’ Acceptability, which it achieves whilst rejecting Unique Defectiveness. I shall then observe that, in order to support my proposal as the sole account of the data, rather than using it to supplement a rival account of category mistakes, it must be shown that other sentences that supposedly exhibit category mistakes can be handled by an account that relies on general mechanisms and rejects Unique Defectiveness. In §(5.2.2), I will sketch such an account for the class of sentences that are traditionally classified as category mistake-exhibiting for reasons independent of the presence of an empty restrictor. Finally, in §(5.2.3), I will clarify the sense in which my account of ‘category mistakes’ provides a uniform explanation of the two classes of sentence, in addition to the way in which it relies on general, independently-motivated mechanisms.

### 5.2.1 The First Group of ‘Category Mistakes’

I will briefly show how my solution to the problem of contingently empty restrictors straightforwardly applies to sentences with necessarily empty restrictors, before considering the implications for extant accounts of category mistakes.

In the previous chapter, I argued for a topic-sensitive, presuppositional account whereby an occurrence of a topical expression presupposes the presence in the common ground of the file card with which it is associated. When a DP’s restrictor denotes the empty set, neither the DP nor the restrictor can be associated with a file card. It follows that sentences where a DP with a perceived empty restrictor occurs as the topic elicit an oddness response due to the emergence and failure of an existence presupposition. I then claimed that assessors of out-of-context sentences in canonical form are highly likely to understand a clause-initial definite DP as topical, and display no significant tendency to understand a clause-initial indefinite DP as topical. This predicts Definite Variance. I also claimed that assessors of out-of-context existential ‘there’-sentences are highly likely to understand the post-verbal DP as non-topical. This predicts ‘There’ Acceptability. All aspects of this proposal extend straightforwardly to DPs with necessarily empty restrictors.

In order to confirm that the non-topicality of perceived necessarily empty restrictors renders acceptability judgements likely, I shall alter the IS of some of the previously encountered sentences:

8. (What is divisible by three?)

- (a) Every red NUMBER is divisible by three.
- (b) The red NUMBER is divisible by three.
- (c) Some red NUMBERS are divisible by three.
- (d) Many red NUMBERS are divisible by three.

It is significantly easier to respond to these sentences with value assignments than it was in the case of (2a) – (3d). Descriptive and explanatory adequacy are therefore attained with respect to the data raised in §(5.1.1). However, my proposal relies on general pragmatic mechanisms that predict and explain the data for sentences with both perceived necessarily empty restrictors *and* perceived contingently empty restrictors. Hence my account proceeds without endorsing the claim that there is a class of category mistake-exhibiting sentences with some unique defect.

I shall now consider the implications that my proposal holds for Unique Defectiveness-endorsing accounts of category mistakes. The contrast between the responses that are likely to be elicited by (2a) – (3d) and by (8a) – (8d) clearly demonstrates that topicality has an effect on assessors' responses to occurrences of perceived necessarily empty restrictors. Any account of perceived necessarily empty restrictors must therefore be sensitive to topic choice. The fact that syntactic, semantic and extant pragmatic accounts of category mistakes are unable to predict Definite Variance and 'There' Acceptability is therefore unsurprising: none of them are topic-sensitive. On the other hand, the topic-sensitive account that I have developed attains descriptive and explanatory adequacy without endorsing Unique Defectiveness. My arguments therefore pose a dilemma: in order to attain descriptive adequacy with respect to perceived necessarily empty restrictors, extant accounts of category mistakes require supplementation with a topic-sensitive account of such restrictors; yet topic-sensitive accounts have no need to defend Unique Defectiveness.

A rival account of category mistakes might attempt to adopt my Unique Defectiveness-rejecting explanation of the data whilst maintaining its own central theses. One way of doing this would be to claim that sentences with perceived necessarily empty restrictors do not belong to the class of category mistake-exhibiting sentences, and therefore lack the defect that uniquely underlies the oddness of category mistakes. This strategy would allow accounts of category mistakes to preserve Unique Defectiveness and other central features of their approach with respect to category mistake-exhibiting sentences, whilst endorsing my explanation of the Definite Variance and 'There' Acceptability data. However, this strategy would seem to classify sentences in an ad hoc way: for example, a sentence such as 'The number is drinking the theory of relativity' would count as category mistake-exhibiting (by analogy with (1e)), whereas a sentence like 'The red number is drinking the theory of relativity' would not count as such (due to the inclusion of a necessarily empty restrictor). I therefore take this first strategy to be implausible.

A more viable means for a rival account of category mistakes to render itself topic-sensitive would be to maintain that sentences with perceived necessarily empty restrictors *are* category mistake-exhibiting, at the same time as claiming that my topicality account of perceived empty restrictors may play a supplementary role in capturing the relevant data. However, this strategy would require two concessions. The first concession is that the infelicity of some sentences is overdetermined, on the grounds that an oddness response is predicted for many occurrences of (2a) – (3d) due to their possessing the defect unique to

category mistakes and additionally due to their involving the failure of existence presuppositions. The second concession is that occurrences of category mistake-exhibiting sentences need not invariably prompt an oddness response, on the grounds that occurrences of (3a) – (4d) are acceptable when their DPs are construed as non-topical.

We might doubt the potential for syntactic and semantic accounts of category mistakes to make the second concession: if a sentence is uniquely defective due to syntactic or semantic factors, then it is difficult to imagine how aspects of the context could render it acceptable. It appears easier for a pragmatic account such as Magidor's to make both concessions, given that the pragmatic mechanism such accounts invoke to explain the defectiveness of category mistakes could be said to interact with various features of the context and with competing pragmatic mechanisms. Nevertheless, I will here assume that any Unique Defectiveness-endorsing account could supplement itself with my topic-based proposal in order to attain descriptive adequacy with respect to the data.

In order to analyse sentences with necessarily empty restrictors, one would therefore have a choice: one might accept my pragmatic, topic-based account alone, or one might accept it in addition to a rival analysis of category mistakes. Clearly, the former choice results in a more parsimonious theory. The only motivation for the latter choice would be if it were able to capture a broader range of data. An advocate of a rival account could emphasise the fact that a significant number of putative category mistakes do not involve perceived empty restrictors, preventing my proposal from applying to them. The advocate of the rival account could then point out that an account that endorses Unique Defectiveness holds the potential to explain the sense of oddness generated by all occurrences of supposed category mistakes via a single mechanism.

In order to challenge this line of reasoning, I will argue that general, independently-motivated mechanisms may be used to explain the occurrence of an oddness response with respect to the full range of putative category mistakes. These considerations provide reasons to reject both Unique Defectiveness and rival accounts of category mistakes.

### 5.2.2 The Second Group of 'Category Mistakes'

I will now argue that sentences that are typically classified as category mistake-exhibiting for reasons independent of the presence of an empty restrictor, such as (1e) and (1f), are simply difficult to *contextualise* (that is, to situate within a rich context). This is a property that they share with many sentences that are *not* typically thought to involve category mistakes. General pragmatic features may be used to explain this property, and to predict when assessors will judge such sentences to be valued.

I have repeatedly claimed that individuals required to assess a sentence presented out-of-context will consider an occurrence of it relative to an imagined context. This imagined context will often be *minimal*, by which I mean that it includes only an assignment of IS to the sentence and a QUD derived from the resulting focus value (see §(2.3.1)). This situates the sentence within a discourse that is unrealistically basic, but serves to indicate both the immediate communicative needs of the imaginary discourse participants and the file card on which the information conveyed by the occurrence of the sentence should be stored. However, I will describe a sentence as '*contextualised*' only when it is considered relative to a context richer than a minimal one. Assessors might imagine an enriched context by envisaging discourse participants in a particular environment, perhaps with the inclusion

in the common ground of certain information conveyed by previous assertions or QUDs. They might also imagine that the sentence occurs as an answer to a more specific QUD than the one derived from its focus value. It is plausible to suppose that, the richer the context that is imagined, the easier it is to assess a sentence, due to its being securely situated as a contribution to a broader discourse.<sup>7</sup> Furthermore, the ease with which an assessor may enrich the minimal context will correlate with the ease by which she is able to assess the sentence.

Out-of-context sentences that are prototypically tokened within everyday discourses (e.g. ‘The table is brown’ or ‘The table is flat’) allow a context of considerable richness to be reconstructed almost instantaneously.<sup>8</sup> On the other hand, some out-of-context sentences are sufficiently unusual that contextualisation is fairly taxing. For example, consider the following:

9. (a) The table is bitter.
- (b) The table is underground.

The form of both of these sentences renders them appropriate answers to the question ‘What feature does the table have?’, hence there should be no complications in reconstructing a suitable *minimal* context. However, it is not immediately obvious how to enrich the context in such a way that this QUD and answer make sense within a broader discourse. Sentences with perceived non-empty restrictors that are typically classified as category mistake-exhibiting are similarly difficult to contextualise. For example:

10. (a) Yasma is drinking the table.
- (b) The table is drinking water.

Difficulty in contextualising a sentence may yield a sense of infelicity and problems with assigning truth values; in other words, an oddness response may emerge. However, if sentences that are difficult to contextualise are presented alongside sufficient clues about the envisaged context, and this context is revealed to be relatively ordinary, then assessors are likely to assign values with greater ease. For example, the following are greatly improved when considered relative to CGs that include the indicated information:

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<sup>7</sup>I will remain neutral about whether some sentences may be assessed relative to minimal contexts, or whether all sentences must be assessed relative to contexts that are richer than minimal ones. If the latter position turns out to be true, then a mistaken impression that the former is true may be attributed to the idea that some sentences can be contextualised so easily that the assessor is barely aware of the process, insofar as she does not realise that she is envisaging (say) imaginary discourse participants and previous QUDs.

<sup>8</sup>I will not delineate the various factors that cause an assessor to classify a sentence as one that is prototypically tokened within everyday discourses. However, such factors presumably include: presence of a DP that denotes common items, attribution of an expected property, and correspondence with a QUD with which ordinary interlocutors are frequently concerned. Seemingly, assessors are able to reconstruct an imaginary context of sufficient richness to assign values to (4a) - (4d) and (8a) - (8d) out-of-context. A plausible reason for this is that the restrictors and nuclear scopes in these sentences contain terms that are prototypically associated with each other (i.e. ‘American’ and ‘New York’, and ‘number’ and ‘divisible (by three)’). Hence if we overlook the speaker’s use of a perceived empty restrictor, there is a sense in which he has attributed an expected property: for instance, during a conversation about New York, it would be natural for someone to share his belief that some American kings live there. In contrast, there are significant difficulties in contextualising sentences such as: ‘As for New York, its inhabitants include (every / some) red number(s)’ and ‘As for things divisible by three, they include (every / some) American king(s)’.

(9a)' (A child is gnawing on the leg of a table, which has an unpleasant flavour. An adult asks: 'How does the table taste?')

The table is bitter.

(9b)' (Two people are in the process of moving their possessions to a subterranean bomb shelter. One of them has already moved a particular table. The other person asks: 'What happened to the table?')

The table is underground.

(10a)' (A group of friends are sitting at a table in a pub, playing a game where they try to utter nothing but falsehoods. Whenever someone accidentally provides a true answer to a question, they lose the game. One person asks: 'What's Yasma drinking?')

Yasma is drinking the table.

(10b)' (A child has spilled water on the surface of a table, but is reluctant to admit responsibility. An adult asks: 'What happened to the table?')

The table is drinking water.

While my proposal does not delineate the exact circumstances in which sentences with perceived non-empty restrictors will be difficult to contextualise, it does predict that embedding a constituent that serves as a locus for such difficulties within a more complex sentence will generally yield another sentence that is difficult to contextualise; this is sufficient for the proposal to attain descriptive adequacy as earlier defined. Explanatory adequacy emerges due to the idea that an assessor who is struggling to situate an occurrence of a sentence within a suitably rich discourse is likely to experience an oddness response, due to her uncertainty about how to incorporate the relevant information into a common ground.

I therefore claim that assessors find out-of-context presentations of (9a) – (10b) challenging to make sense of because they are difficult to contextualise, but it is natural to assign them truth values once they have been suitably contextualised. One might object to this proposal by maintaining that the oddness response sometimes elicited by occurrences of (9a) – (9b) is different in kind to the oddness response associated with (10a) – (10b). An argument like the following may be used to support this objection: while many in the literature have analysed (10a) – (10b) as meaningless or truth-valueless, no one has analysed (9a) – (9b) as such; therefore, there is a crucial difference in the natural response to the two groups of sentence, which suggests that each group involves distinct phenomena. I will challenge this objection with two arguments. Firstly, I will show that an informative explanation may be given for the sense in which (9a) – (9b) differ from (10a) – (10b) that avoids postulating different types of oddness response or different underlying phenomena. Secondly, I will present evidence against the view that sentences traditionally classified as category mistake-exhibiting elicit a distinctive type of oddness.

My first argument centres upon the claim that there is a difference in *degree* rather than *kind* between (9a) – (9b) and (10a) – (10b). That is, the property of being difficult to contextualise comes in degrees. It is more difficult to contextualise a sentence if its occurrences obviously express necessary falsehoods (e.g. (10a) – (10b)) or necessary truths than it is to

contextualise one that is assigned contingent truth values (e.g. (9a) – (9b)). This is the case because a context in which a proposition is asserted that is widely recognised to take the same value relative to every context of evaluation requires an interlocutor who is notably confused, playful or uncooperative, as in the contrived scenarios given in (10a)' and (10b)'. Yet it is more taxing to conjure up such a scenario than it is to imagine a context where relatively well-informed interlocutors are issuing sincere utterances in response to an ordinary question under discussion. Hence one may concede that there is a difference in assessors' responses to (9a) – (9b) and to (10a) – (10b), and one may provide an informative explanation for this difference, without conceding that the difference indicates that distinct phenomena underlie the two groups of sentences.

My second argument consists of the claim that the sentences traditionally classified as category mistake-exhibiting do not elicit a distinctive response in all assessors. This argument begins with the observation that some in the literature have denied that certain sentences often considered category mistake-exhibiting genuinely are. For instance, Pap (1960) claims that explicit 'type predications' are not category mistakes. Similarly, Magidor (p.c.) claims that occurrences of copular sentences that assert (rather than presuppose) that a particular argument's denotation has properties that it necessarily lacks will fail to exhibit the defect her pragmatic account attributes to category mistakes. From these views, the prediction would seem to emerge that (11a) – (11c) do *not* exhibit category mistakes, whereas (12a) – (12c) *do*:<sup>9</sup>

- 11. (a) Yasma is the theory of relativity.
- (b) The number is a table.
- (c) The number is coloured.
  
- 12. (a) Yasma is drinking the theory of relativity.
- (b) The number is under a table.
- (c) The number is red.

In my view, it is difficult to discern a contrast between (11a) – (11c) versus (12a) – (12c): all of the sentences are likely to elicit the same sort of oddness response without adequate contextualisation. Moreover, the provision of a sufficiently rich context allows an assessor to assign the value *false* to the latter group just as easily as it does to the former. This supports my proposal for two reasons. Firstly, the fact that there is debate within the literature over whether (11a) – (11c) are category mistake-exhibiting, in addition to the fact that no significant contrast is discernible within (11a) – (12c), makes it harder to maintain that there is a sharp difference in assessors' responses to category mistake-exhibiting sentences and non-category mistake-exhibiting ones. This in turn suggests that there is no distinctive oddness response correlating with some unique defect of category mistakes. Secondly, if Pap

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<sup>9</sup>Note that care is required in establishing the predictions of Magidor's view on this matter, since (11a) – (11c) might trigger additional presuppositions and the failure of these presuppositions may yield the type of infelicity she takes to characterise category mistakes. Of course, we might be fairly confident that (11a) – (11c) lack any presupposition triggers. However, Magidor (p.c.) cautions that the mere possibility of additional presuppositions is sufficient to recommend care in judging particular examples to be non-category mistakes. Furthermore, Magidor allows that occurrences of (11a) – (11c) may be infelicitous for reasons independent of the phenomenon of category mistakes. For instance, the fact that they are trivially false may induce an oddness response in assessors.

and Magidor are correct that (11a) – (11c) may be judged to be acceptable, and if I am correct that there is no discernible difference between (11a) – (11c) and (12a) – (12c), then it is difficult to deny my claim that the latter sentences do not invariably prompt an oddness response.

In sum, I have argued that the oddness responses frequently elicited by items in the second group of sentences traditionally thought to exhibit category mistakes emerge due to assessors' struggling to contextualise such sentences. The propensity to be difficult to contextualise is a property shared by many sentences not traditionally thought to exhibit category mistakes, differing in degree but not in kind.

### 5.2.3 A Uniform Explanation

I shall now clarify the sense in which my proposal provides a pragmatic account of all sentences traditionally thought to exhibit category mistakes. I will also observe that my account's reliance on general, independently-motivated mechanisms renders it more parsimonious than those that endorse Unique Defectiveness.

My proposal is that the sentences traditionally classified as category mistake-exhibiting may be divided into two groups, with the first group consisting of those that are treated as category mistakes solely due to the inclusion of an empty restrictor. I argued that, when sentences from the first group include clause-initial definite determiners with perceived empty restrictors and are presented out-of-context, the assessor is likely to consider an occurrence where the DP is topical and an existence presupposition subsequently emerges and fails. This results in an oddness response, no matter how rich the context imagined by the assessor is. However, when sentences from the first group include indefinite determiners with perceived empty restrictors, or occur with an indication that the DP is *not* topical, an assessor is often able to assign the value predicted by accounts of generalized quantifiers. On the other hand, when sentences from the second group (that is, those that are considered category mistakes for reasons independent of the presence of an empty restrictor) are considered out-of-context, any sense of oddness is attributable to the fact that it is taxing to enrich the imagined minimal context to the degree that the sentence may be situated within a coherent discourse. In other words, of the sentences traditionally thought to exhibit category mistakes, those in the first group frequently yield an oddness response even when they occur relative to a rich context, whereas those in the second group will be assigned the expected value by assessors when they occur relative to a sufficiently rich context. It is therefore my claim that, for any sentence traditionally classified as category mistake-exhibiting, there are some occurrences of it for which assessors will naturally assign a value. Whilst there are also some occurrences for which assessors are likely to encounter an oddness response, this is attributable to general, pragmatic mechanisms.

An additional point in favour of my proposal is the parsimony fostered by its reliance on independently motivated mechanisms with general applicability. Unique Defectiveness-Endorsing accounts typically pursue explanatory adequacy by invoking specialised mechanisms that are exclusively targeted towards, and motivated by, category mistake-exhibiting sentences. For example, Magidor's pragmatic account attributes far more complexity to both the lexicon and the common ground than standard approaches to semantics and pragmatics. That is, she attributes presuppositions to any predicate that can be used to generate a category mistake-exhibiting sentence, including most verbs, adjectives, adverbs, and

prepositions.<sup>10</sup> Requiring such a number of predicates to be presupposition triggers would complicate their lexical entries, and requiring common grounds to include the information supposedly presupposed by an occurrence of a predicate would vastly increase the information that interlocutors are required to assume for a felicitous discourse. An advocate of Magidor's account might maintain that there are independent reasons to think that lexical entries or common grounds display the postulated richness. However, it is surely preferable to endorse an account that remains neutral with respect to this issue, as opposed to an account that commits itself to such complex lexical entries and common grounds.

My proposal therefore includes a uniform account of the sentences that are typically classified as category mistake-exhibiting: they are a proper subclass of a class of sentences that have a notable propensity to display '*storage problems*', by which I mean that it is often difficult to store the information expressed by occurrences of them within an imaginary or real-life common ground. I take an assessor's experiencing an oddness response to correlate with her encountering storage problems. Crucially, a propensity to display storage problems must not be treated as a defect unique to a phenomenon of category mistakes: many other sentences (e.g. those with topical occurrences of DPs with contingently empty restrictors, (9a) – (9b), etc.) are similarly challenging to store.

### Summary of §(5.2)

I began by showing how the topic-sensitive, presuppositional account of contingently empty restrictors developed in §(4.3) – §(4.3) applies to sentences with necessarily empty restrictors. Of the two groups of sentence that are typically classified as category mistake-exhibiting, this proposal accounts for the first group while relying on general pragmatic mechanisms and rejecting Unique Defectiveness. I then observed that a rival account of category mistakes could attempt to supplement itself with my topic-sensitive account for the first group of sentences, whilst maintaining its indispensability in accounting for the second group of sentences. Hence I argued that the second group of sentences may also be accounted for by means of general pragmatic mechanisms.

## Chapter Summary

I suggested that accounts of the sentences traditionally thought to exhibit category mistakes must display both descriptive and explanatory adequacy. In order to explain why such sentences often prompt an oddness response in assessors, it is frequently claimed that they exhibit a form of defectiveness unique to the class of category mistakes.

I began by singling out the group of putative category mistakes that are considered as such solely due to the presence of perceived necessarily empty restrictors. I argued that Definite Variance and 'There' Acceptability data emerges with respect to these sentences,

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<sup>10</sup>The list of presupposition-triggering predicates she explicitly gives (pp.141-5.) includes 'pregnant' (which presupposes that the argument can be pregnant), 'dreaming' (which presupposes that the argument has mental states), 'prime' (which presupposes that the argument is either prime or composite), 'drinks' (which presupposes that the first argument is capable of drinking, and the second is capable of being drunk), 'furiously' (which presupposes that an action is performed with some emotion) and 'under' (which presupposes that the argument is located in space).

data which no extant account of category mistakes is able to predict. This prevents these accounts from displaying descriptive adequacy.

I then suggested the following natural explanation of Definite Variance and 'There' Acceptability with respect to both necessarily and contingently empty restrictors: topical DPs are associated with pragmatic existence presuppositions, and the failure of these presuppositions yields an oddness response. As argued in §(4.4.1), assessors of out-of-context sentences will be highly likely to construe clause-initial definite DPs as topical, will possibly construe clause-initial indefinite DPs as topical, and will be highly unlikely to construe the post-verbal DPs or restrictors of existential 'there'-sentences as topical. This perspective indicates that sentences with perceived necessarily empty restrictors that supposedly exhibit category mistakes may be analysed by means of general, pragmatic mechanisms.

I then observed that an advocate of a rival account of category mistakes might attempt to supplement her Unique Defectiveness-accepting account with the topic-sensitive approach required to predict Definite Variance and 'There' Acceptability. I argued that the reduced parsimony of such an approach would be justified only if a Unique Defectiveness-accepting account is necessary to predict and explain assessors' responses to sentences with perceived non-empty restrictors. I therefore considered a second group of the sentences traditionally classified as category mistake-exhibiting, consisting of those classified as such for reasons independent of the presence of empty restrictors. I argued that assessors are likely to assign truth values to such sentences relative to a suitably rich context. Hence the sense of oddness often elicited by such sentences may be explained by general, pragmatic mechanisms.

My Unique Defectiveness-denying approach therefore displays descriptive and explanatory adequacy with respect to the class of sentences typically classified as category mistake-exhibiting. It is my view that such sentences are simply a proper subclass of those that are prone to exhibit storage problems, insofar as it is often difficult to store the information expressed by occurrences of them within an imaginary or real-life common ground. It follows that there are no category mistakes; that is, there is no class of category mistake-exhibiting sentences consisting of all and only the sentences afflicted by a particular defect.

# Conclusion

The main conclusions reached in this thesis are as follows:

1. All determiner phrases should be analysed as denoting generalized quantifiers (§(1.1.2)).
2. The best semantics for 'there'-sentences are either those given in Keenan (2003) or Francez (2009), and the best explanation for the problem of existential acceptability is a pragmatic one (§(1.2)).
3. A sentence topic should be thought of as the constituent that indicates the aboutness item with respect to which information storage should occur (§(2.1.2)).
4. A structured common ground should be used to model discourse, where topical occurrences of DPs are associated with file cards representing one of their minimal witness sets (§(2.2)).
5. The weak verification condition should be accepted, which holds that the file card with respect to which information storage occurs affects the way in which an occurrence of a sentence is understood (§(2.2.4)).
6. It should be accepted that out-of-context sentences are assessed relative to imagined contexts, and that neutral prosody for a sentence may be used to reconstruct a minimal context in the absence of additional clues about the envisaged context (§(2.3.1)).
7. The Triggering Question is partially answered with the claim that a focus-based, domain restricted understanding of an occurrence of a sentence with a DP headed by 'every' or 'most' is possible only if its focus includes a proper part of the DP-external material (§(3.3.1)).
8. A domain restricted understanding of an occurrence of a sentence with a DP headed by 'every' or 'most' arises if and only if information storage occurs with respect to a file card that is not supplied solely by the IS of the occurrence of the sentence, and which represents a proper subset of the DP's restrictor's extension (§(3.4)).
9. The Triggering Question is partially answered in a more informative (but more controversial) way with the claim that a domain restricted understanding of an occurrence of a sentence with a DP headed by 'every' or 'most' is possible only if some file card supplied solely by IS represents a proper or improper superset of a minimal witness set of the DP. (§(3.4)).

10. The problem of contingently empty restrictors is best addressed by treating topical occurrences of expressions as presupposing the presence in the common ground of the file card with which they are associated (§(4.3.1)).
11. When an oddness response is elicited by an occurrence of a monotone decreasing DP, this should be attributed either to a failed existence presupposition triggered by the topicality of its restrictor, or a conversational implicature that the real or imaginary speaker of the occurrence does not take herself to be in a position to assert that the restrictor is empty (§(4.3.2)).
12. The truth conditions of 'the'-headed DPs should include a cardinality constraint on the quantifier's first argument as a condition for truth, rather than a condition for definedness, with an existence presupposition's emerging when such DPs are topical (§(4.3.3)).
13. Definite Variance is explained by the view that, for sentences in canonical form presented out-of-context, clause-initial definite DPs are highly likely to be construed as topics, whereas clause-initial indefinite DPs display a less robust likelihood to be construed as such (§(4.4.1)).
14. 'There' Acceptability is explained by the view that, for existential 'there'-sentences presented out-of-context, post-verbal DPs and their restrictors are highly likely to be construed as non-topical (§(4.4.1)).
15. Progress towards a solution to the problem of existential acceptability is fostered by the generalisation that a definite DP is acceptable in post-verbal position if and only if the information expressed by the occurrence of the 'there'-sentence is stored on a file card representing a proper subset of  $D$ , whereas all-focus occurrences of 'there'-sentences with indefinite post-verbal DPs may be stored on a file card representing  $D$ . (§(4.4.2)).
16. Definite Variance and 'There' Acceptability arises with respect to sentences that include DPs with perceived necessarily empty restrictors, which prevents all extant accounts of category mistakes from attaining descriptive adequacy (§(5.1)).
17. Those sentences that are traditionally thought to exhibit category mistakes are a proper subclass of those sentences that display a propensity to cause storage problems, and are best explained by an account that denies the existence of a class of 'category mistakes' consisting of all and only the sentences that display a unique defect (§(5.2)).
18. An assessor's experiencing an oddness responses is characteristic of her encountering storage problems (§(5.2)).

These conclusions include solutions to the long-standing philosophical puzzles with which this thesis is directly concerned, along with a number of insights about the correct analysis of quantifier expressions. Furthermore, a new model of the pragmatics of ordinary discourse has been developed in §(2) and refined in subsequent chapters. Finally, I have emphasised certain information-theoretic notions – including topic, focus and questions under discussion – and shown their potential to help philosophers of language with a broad range of problems.

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