EXISTENTIAL PROPOSITIONS

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I certify that I have read this dissertation and that, in my opinion, it is fully adequate in scope and quality as a dissertation for the degree of Doctor of Philosophy.

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Paul Kiparsky

Approved for the University Committee on Graduate Studies.

Abstract

This dissertation investigates the semantics of existential sentences (existentials) such as (1).

(1) There's whiskey in the jar.

Most semantic literature on existentials has focused on the so-called definiteness effect (DE), namely the observation that certain NP types do not easily occur in the construction. Here it is argued that it is profitable to set the DE aside and ask more directly what propositions are expressed by existentials and how such propositions are formed. In answer to this question an analysis is proposed in which the main predicate of an existential is the post-copular NP (the "pivot", e.g. *whiskey* in (1)). This predicate has a single argument which is implicit and which must be interpreted as a set. The value of this argument is determined by context or by contextual modifiers expressed by the constituent following the pivot (the "coda", e.g. *in the jar* in (1)). A formal semantics encoding this theory of existential propositions is developed and its advantages in accounting for the range of interpretations available to simple existentials is demonstrated. Various phenomena are analyzed, some of which have not been noted or have not been analyzed in the literature. These include existentials with quantified codas and multiple codas, adjectival codas, part-whole readings, codas with free relatives and the licensing of free choice items. An approach to the DE is presented which relates it to the predicative nature of pivots. An analysis of pivots quantifying over kinds (McNally 1992) is sketched out which in turn facilitates an analysis of the diffrential distribution of NP types in English and modern Hebrew.

Glossing conventions

1,2,3	1st, 2nd, 3rd person
cop	copula
cs	construct state
def	definite
EX	existential lexeme
f	feminine
fut	future
m	masculine
neg	negation
neg-p	negative polarity item
pl	plural
prs	present
pst	past
sg	singular

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Until a relatively late stage of thinking about this dissertation, my relationship with formal semantics had been turbulent to say the least. If today this relationship has moved from angst to harmony, this is largely thanks to David Beaver. David patiently kept a foot in the semantic door for me, calmly humoring all sorts of folly, and when the opportunity arose he lured me back. I thank him for countless hours of conversation and argument, for his friendship, and for the instant coffee.

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Science is often said to be blind to its own conditions of possibility. My dissertation does nothing to alleviate this, but I am not blind to the conditions, material and epistemic, that made it possible for me to write it.

I thank David Beaver and Beth Levin for indispensable financial support.

I am happily grateful to Galit Hasan-Rokem, Freddie Rokem and Ariel Rokem for being there when we needed them and for providing me (and not only me) with the time and peace of mind needed to complete a dissertation, through their loving care for my (and not just my) daughter.

Nissim and Tikva Francez have a very special role in my relation to language, and

Nissim has had a very special role in my relation to semantics as well as significant impact on the contents of this dissertation. I thank him for this. I thank them both for my love of learning, and I thank my family for a life full of tenderness and generosity.

I thank Na'ama for taking me with her, and Alma for coming when she did. There is no greater love.

Contents

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Chapter 1

Introduction: the existential question

This work deals with the semantic content of existential constructions (existentials), exemplified by the italicized sentence in (2).

(2) *There are problems in these times*, but none of them are mine.
(Lou Reed, Beginning to see the light, 1967)

Specifically, its main aim is to provide an answer to the question in (3).

(3) **The existential question**:
What propositions do existentials express, and how do they come to express them?

Despite its apparent immediacy, the existential question has rarely been addressed directly and in its own right in the extensive semantic literature. Rather, answers to this question have been given indirectly, with other issues in the grammar of existentials in mind. Specifically, the attention of researchers has focused on two issues: the *definiteness effect* exemplified in (4) and to a somewhat lesser extent also the *predicate restriction* exemplified in (5).

(4) There is a phone / no phone / ??every phone in the office.

(5) There's a librarian available / *diligent.

This work redirects the focus of attention to the existential question and argues for a new answer to it.

For many cases the existential question seems rather trivial. A sentence like (6) seems clearly to express a proposition that is true if some phone has the property of being in the office.

(6) There's a phone in the office.

I refer to the post-copular NP (*a phone* in (6)) as the *pivot*, and to the constituent following it (*in the office* in (6)) as the *coda* (this terminology is discussed in more detail in chapter 2). The answer to the existential question that seems immediately to suggest itself is thus that existential propositions are formed by simple predication of the property denoted by the coda of the entity or entities denoted by the pivot. This answer is very common. It is argued for by e.g. Keenan (1987), and it is assumed implicitly or explicitly in much research on existentials that is not concerned with an explicit semantic analysis of the construction, such as the various "small clause" analyses found in the syntactic literature (see e.g. Chomsky 1981; Safir 1982). This view is also presupposed by proponents of the claim that existential and copular constructions have a common underlying structure (e.g. Lyons 1967; Clark 1978; Freeze 1992). One of the major claims of this work is that this view of existential propositions cannot be correct.

The analysis of existentials developed in the following chapters stems from two simple observations about existential propositions. The first is that they are radically context dependent, in the sense that their content cannot be determined without information provided by context. For example, it is impossible to tell which proposition is expressed by (7) without contextual information.

(7) There are no more apples.

I refer to existentials with no coda such as (7) as *bare existentials*. This sentence can be used to express the proposition that apples do not exist anymore, and the analysis of existentials in Barwise and Cooper (1981) and Keenan (1987) would predict exactly this meaning for it. On these analyses, bare existentials are interpreted as involving, instead of the coda, the universal property that applies to everything in the domain. I call this kind of approach *strong existentialism*.

Strong existentialism raises several questions. To begin with, it is not clear what general grammatical motivation there is for positing the universal property as the understood predicate in the absence of an explicit main predicate. I am not aware of any other construction

in which the universal property functions as the main predicate when no other predicate is specified. In fact, it is not clear to me that there are any examples of freely omissible main predicates (except in contexts of ellipsis, which in any case do not involve the universal property).

But more importantly, strong existentialism is inconsistent with the observation that bare existentials involve a contextually determined constituent. Strong existentialism predicts that sentence (7) should be false in a model in which the domain of quantification contains apples, but this is clearly not the case. (7) can be perfectly true in a model rich with apples. Furthermore, strong existentialism cannot deal with examples like (8). This sentence is true if most students who went to some museum knew that there was a discount *in that museum*, not in the domain of quantification of the model.

(8) Most students who went to a museum knew there was a discount.

The first premise of this work is therefore that existential propositions crucially involve a contextually determined constituent.

The second observation is that, despite the expectations created by examples like (6), codas and pivots cannot possibly stand in a subject-predicate relation in the general case. For example, (9a) does not describe a soldier who has the property of being on every train, nor does (9b) describe a train that is every half hour.

(9) a. There's a soldier on every train.

b. There's a train every half hour.

A more natural analysis seems to be that the phrases *on every train* and *every half hour* have the same function in (9) as they do in (10).

(10) a. I read novels on every train.

b. I cried every half hour.

The second premise of this work is thus that codas are not predicates of pivots but rather modifiers.

These two simple observations suffice to make it clear that the answer to the existential question suggested earlier cannot be correct, or at least not entirely correct. Existential propositions are not formed by simply applying the coda predicate to a pivot subject. In the

following chapters I argue that no existing analysis of existentials provides a satisfactory answer to the existential question, i.e. one that accounts both for the role of context in the determination of existential propositions and the role of codas in them. Instead, a new analysis is required which is based on the two premises just described.

My analysis of existential propositions starts out from their context dependence, and the answer I suggest to the existential question affords context a direct role in them. Specifically, I argue that pivots are not the subjects of any predicate, neither one contributed by the coda nor one contributed by *there be*. Rather, pivots are themselves the main predicates of the construction. The context dependence of existentials arises from the fact that pivot predicates are syntactically fully saturated but semantically unsaturated. The single argument of the pivot is therefore an implicit argument, i.e. a semantic (but not syntactic) argument the value of which must be retrieved from context. In section 4.3 I provide evidence for the assumption that pivots have an implicit argument in the form of parallels between the range of interpretations available to implicit arguments in other contexts and those available to bare existentials.

The implicit argument of pivots can be thought of as a contextual variable, similar to the familiar contextual interval variables standardly used in the analysis of temporal modification. For example, an eventive sentence like *Mary left* is understood relative to a contextual interval – it is true relative to such an interval if the interval contains an event of Mary leaving. More generally, the implicit argument of the pivot is a *contextual domain*, defined as a set (of individuals, times, locations, worlds, or possibly other types of entities) determined by context or by contextual modifiers. Intuitively, the function of existentials on this theory is to convey information about such contextual domains, and particularly to say what a domain or a set of domains *contains* or does not contain.[1]

Formally, the analysis follows Barwise and Cooper (1981) in assigning pivots generalized quantifier (GQ) denotations. However, beyond the difference in the treatment of bare existentials, it differs crucially from previous GQ analyses in the analysis of codas. Unlike Barwise and Cooper and Zucchi (1995), it does not model codas as NP internal modifiers contributing to the restriction of the quantifier in the pivot, and unlike Keenan (1987), it

[1]This analysis can be seen as generalizing and formalizing Borschev and Partee's idea (e.g. Borschev and Partee 2001) that existentials function to specify what is in a location.

does not model them as directly supplying the scope set for that quantifier. Rather, it models them as contextual modifiers operating on the meaning of a bare existential. The result is a proposition in which the pivot is applied to a contextual domain that is constructed (in a way made precise in chapter 5) from a relation and an individual (possibly an interval, location, etc.) specified by the coda. For example, a coda such as *in the office* specifies the domain of things related to the office by some relation expressible by the preposition *in*. In chapter 4 I present a range of data demonstrating properties of the contextual domains determined by codas that distinguish them clearly from the sets determined by corresponding predicates in copular constructions (when such exist). I argue that these differences receive a natural explanation if codas are viewed as contextual modifiers. One of the important advantages of the analysis of codas I suggest is that it provides a natural way of capturing the meaning of codas with quantifiers as in (9) above and of existentials with multiple codas such as (11). Such examples have not been analyzed in the literature and are not readily captured by a theory assigning codas property (or type $\langle e, t\rangle$) denotations, without the assumption of obligatory quantifier raising and the assumption of a single coda with multiple embedding of PPs.

(11) a. There's meat in most dishes in every Balkan restaurant.

b. There are new exhibitions in the antiquity section in two museums.

My analysis of codas thus follows McNally (1992) in assigning them adjunctive status and in modeling them semantically as modifiers. Furthermore, the analysis of adjectival codas I argue for in section 5.7 essentially recasts McNally's analysis of such codas in terms of my proposed semantics. However, there is also a crucial difference between the two analyses of codas. For McNally, codas are secondary predicates and receive property denotations. This is necessitated by her view that existentials predicate instantiation of a property. A coda modifier on her analysis must be "controlled", i.e. must apply to, the individual(s) instantiating the property denoted by the pivot. Thus codas end up having the same meaning as in analyses in which they are modeled as predicates. All the arguments against a simple property denotation for codas I advance against such analyses in chapter 4 therefore carry over to McNally's analysis. The analysis of codas as contextual modifiers I argue for maintains McNally's view of codas as modifiers but avoids the pitfalls of viewing them as secondary predicates.

The structure of the rest of this dissertation is as follows. Chapter 2 presents the range of possibilities for the syntactic analysis of existentials, focusing for simplicity on English. The terminology used to talk about the parts of an existential construction throughout is introduced. I point out the stakes for a semantic analysis involved in choosing between the various possible syntactic structures. While I do not argue for a particular syntactic analysis in any detail, the semantic choices involved in analyzing existential propositions do have consequences for syntactic analysis, and these are pointed out.

Chapter 3 surveys the range of semantic possibilities for the analysis of existential propositions that is available in the literature. I discuss McNally's analysis in terms of an instantiation predicate and a property denotation for pivots and the various analyses based on a GQ denotation for pivots. I raise several arguments against adopting an instantiation analysis, and discuss the issues involved in choosing between the various GQ analyses. I conclude that if a GQ analysis is adopted, then the semantic contribution of codas must be to the scope of the quantification introduced by the pivot, as in Keenan (1987), and not to the restriction as in Barwise and Cooper (1981) and Zucchi (1995).

In chapter 4 I discuss the core data motivating a new answer to the existential question. As discussed above, these data have to do with the role of context and the proper analysis of codas. I discuss a host of facts that have either not been discussed at all in the literature or have not been properly analyzed, and argue that all of these facts point towards an analysis of existential propositions along the lines described above, i.e. an analysis in which the main predicate of an existential is the pivot, the single argument of the pivot is an implicit set-denoting argument, and codas are contextual modifiers.

Chapter 5 implements formally my answer to the existential question, and exemplifies how this formal analysis deals with some of the facts described in chapter 4, and with adjectival codas.

In chapter 6 I discuss the so-called definiteness effect, a phenomenon that has for decades been at the center of research on existentials. I point out that the definiteness effect and the existential question are independent issues, and that the existence of the former has no bearing on the answers most analyses give to the latter (the important exception is McNally's answer). I then discuss the various approaches to characterizing and explaining the phenomenon, and outline an approach to it based on the theory developed in the preceding chapters. The main idea of this approach is that the definiteness effect arises

due to the role of pivots as main predicates in the construction. One of the suggestions I am driven to make as a consequence of my approach is that NPs involving quantification over kinds (e.g. *every type of string instrument*) are semantically indefinite. I discuss the relation of this suggestion to McNally's elegant account of the same set of facts.

Chapter 2

The syntactic space of possibilities

The existential question is a question about the core semantic predication expressed by existentials. If existentials are a semantic class, then their truth–conditional meaning is expected to generally be invariant across languages. The background assumption behind the existential question is that such a universal meaning can indeed be identified and modeled compositionally. Since, in the general case, semantic composition and clause structure stand in a highly regular correlation (on some theories, such as Montague Grammar, to the level of homomorphism), determining the core constituents of an existential proposition should go hand in hand with determining the constituents of an existential sentence.

Existentials provide a wealth of morphosyntactic problems, and the syntactic literature on them is immense. Here I am only concerned with those aspects of the structure of existentials in which a semantic analysis has direct stakes, namely in the basic constituency and hierarchical structure of the construction. This section lays out the main syntactic structures that have been proposed for English existentials in the literature. At this point, no argument is made for or against any of these structures. However, on the (standard) assumption that semantic and syntactic choices are mutually constrained, semantics becomes a powerful arbiter between syntactic alternatives, and one which is relatively independent of particular frameworks. The taxonomy of syntactic structures laid out in this chapter proves useful in the next section, where the semantic space of possibilities is discussed. As specific semantic decisions are made, some of the syntactic structures prominent in the literature can be ruled out on semantic grounds.

2.1 Terminology: the anatomy of existentials

Terminological confusion arises easily in the analysis of existentials, and hence some terminology must be fixed at the outset. Consider the English existentials in (12).

(12) a. There's time.

b. There is a dead cat here.

Existential clauses in English consist minimally of three elements: *there*, the copula *be* and an NP/DP.[1] Optionally, some material can occur to the right of the common noun in the NP, e.g. *here* in (12b). The semantic and grammatical status of this material is a matter of considerable debate discussed extensively in this work. For the moment, this material can be identified simply as the material following the head noun in the single NP in the existential. I use the terminology in (13) to talk about the anatomy of existentials, i.e these four identifiable units that make up an English existential clause.

(13) **Anatomy**:

expletive	copula	**pivot**	(**coda**)
there	is	something	here
there	is	time	

Of the elements in (13), the pivot is the only one that is obligatory in the structure crosslinguistically. Codas are strictly optional, as shown for English by (12a). I am unaware of languages in which codas are obligatory. Expletives are obligatory in languages that have them, but only a small minority of the world's languages do. Existentials without expletives are exemplified by the Hebrew sentence in (14).[2,3]

(14) yeS [$_{NP}$ mayim (xamim)].
EX water[m.pl] hot[m.pl]
There is (hot) water.

[1] I am not concerned with the NP/DP distinction in any way in this dissertation and henceforth use NP to refer to the phrasal projections headed by nouns or determiners.

[2] I transcribe Hebrew throughout as it is pronounced in my variety, disregarding other pronunciations that are historically motivated, synchronically available as variants, or prescriptively required.

[3] I use hyphens (-) to mark prosodic dependency, [] to mark grammatical information conveyed by inflection and derivation.

That a copula is not universally required in existentials is shown in the Maori examples in (15) from Bauer (1993), cited by Chung and Ladusaw (2004).

(15) a. Āe, he taniwha.
yes a taniwha
Yes, there are taniwhas.

b. he aitu ā i runga i te huarahi i te ata nei.
a accident at top at the road in the morning this
There was an *accident* on the road this morning.[4]

Whether copulas are obligatory or not varies widely across languages, and the conditions under which they are omissible are complex. In Russian, for example, the copula *jest'* in the present tense is obligatory in the absence of a coda, but optional when a coda is present. In the non-present, the equivalent of the verb *be* is required and is obligatory.

(16) a. na stole (jest') kniga.
on table cop book
There's a book on the table.

b. kniga *(jest')
book cop
There's a book.

I use the term *copula* loosely here to include not only *be* and *have* verbs, but also main verbs bleached of their lexical meaning, e.g. German *geben* 'give' or Swedish *finnas* 'find', as well as other elements found in existentials across languages such as prepositions (e.g. Palestinian Arabic *fi* 'in') and special existential lexemes such as Hebrew *yeS* and *en*. I cannot say anything here about the many interesting problems and subtleties surrounding the grammatical properties of existential copulas.

The generalizations about which parts of the anatomy of existentials are universally present and which are language-dependent thus seem to be the following:

- **Expletives** are not universally available. If a language requires expletives, it requires them obligatorily.

[4] Italics in the original.

- **Copulas** are not universally available. If a language requires a copula of some sort, it may or may not require it obligatorily.
- **Codas** are universally available and optional.
- **Pivots** are universally available and obligatory.

Table 2.1 summarizes the status of the elements of an existential clause according to (a) whether it is available in the clause across languages and (b) whether it is obligatory in the clause in languages where it occurs.

ELEMENT	UNIVERSALLY AVAILABLE	OBLIGATORY
Expletive	–	+
copulas	–	+/–
Pivots	+	+
Codas	+	–

Table 2.1: The basic elements of existential clauses

One of the central claims of this work is that pivots are the main predicates of existential constructions. The fact that pivots are the only elements that are both universally present and obligatory in the clause gives some indication that this is correct, even before having made any assumptions about the syntax or semantics of the construction.

2.1.1 Excluding expletives

The element of the existential anatomy that is least likely to make a semantic contribution is the expletive and I assume here that it is a meaningless element, present in the structure for reasons of clause architecture, e.g. to fill a position that some languages require to be filled in any finite clause.[5] While it is fairly uncontroversial that expletives are meaningless, on occasion they have been claimed to be meaningful.

One possibility, argued for among others by Lyons (1967) and Bolinger (1977), is that *there* is locative and means something similar to deictic *there*. However, there is much

[5]The formal expression of the role of expletives, whether it is stated in terms of the EPP and/or feature checking or some other terms is immaterial here.

evidence against this view. For example, it is clear that existential *there* cannot be the locative indexical *there* as in (17).

(17) John is (right) there.

As pointed out by Keenan (1987), the truth of an existential does not in general depend on the location of utterance, as would be expected if expletive *there* were the deictic locative *there*. For example, the truth of *there are even and odd numbers* does not depend on where the utterance is made, nor does it depend on a demonstration. Existential *there* differs from deictic *there* also in that it cannot be preceded by the adverbial *right*, as in (17). Finally, even the homophony between existential and locative *there* is not necessary. In English, both diachronically and across dialects, existentials also occur with the expletive *it*. In other languages such as German, French or Scandinavian, expletives are also not homophonous with a locative.

Perhaps the most far reaching attempt to defend the view that expletives are meaningful is the one put forth by Moro (1997). According to Moro, English *there* and its corresponding Italian particle *ci* are not only not meaningless, but are in fact predicates predicated of the pivot. Their occurrence in subject position is an instance of predicate raising and Moro derives a wide range of seemingly unrelated empirical facts about the syntax of existentials in English and Italian from this. However, Moro does not provide any semantics for the construction, and without some statement about the meaning of expletives the claim that they are predicates is difficult to evaluate.

It is interesting to note in this regard that English does seem to have a predicate *there* that does not have the deictic meaning. Consider the sentences in (18).

(18) a. My father was always there (to help me).

b. Volunteers are there for anyone who decides to donate.

The truth of these sentences also does not depend on the location of utterance. On the relevant reading, sentence (18a) does not mean that there is a location distal to the location of utterance such that my father was never at that location. Rather, it means that there was no time at which my father was not in some relevant sense present or available. (18b) similarly does not mean that our volunteers are in some location distal to the location of utterance, but rather that they are present or available in the contextually relevant situations. *There*

in (18) and existential *there* are also similar in that neither of them can receive contrastive stress without changing the meaning of the sentence. Furthermore, the existentials in (19) might seem to provide near–paraphrases of (18).

(19) a. There was always my father (to help me).
b. There are volunteers for anyone who decides to donate.

The meaning of the predicate *there* in (18) is not obvious and I am unaware of any attempts to characterize it. Whatever the suggestive force of such examples, without further research they can hardly be counted as evidence that expletive *there* contributes meaning. I therefore maintain the standard assumption in the semantic literature that expletives are meaningless elements fulfilling a purely structural role.

2.2 Possible relations between pivot and coda

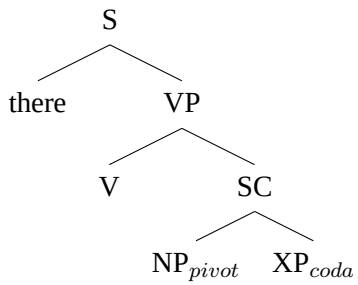
2.2.1 Pivot and coda as subject and predicate

One of the most widespread views of the structure of existentials in the GB tradition is that the copula *be* takes as its argument a unit including the pivot and the coda in which they stand in a syntactic predication relation: the coda is a predicate, the pivot its subject.

There are various ways of implementing this idea. In the GB tradition, a widespread view is that the pivot and coda form a constituent called a *small clause* and consisting of a predicate and its subject (see e.g. Chomsky 1981; Safir 1982). The structure assigned to existentials in such analyses is given in (20).[6]

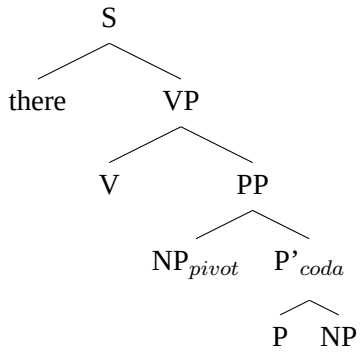
[6] I use simplified syntactic structures throughout, abstracting away from functional categories such as e.g. IP, CP and the various other categories abundantly found in the literature. The status and role of such categories in syntactic representation is largely a framework-particular issue and has no bearing on the questions at hand. The crucial hierarchical relations are represented clearly in the simplified structures used.

(20) **Small clause structure**:



The analysis presented in Freeze (1992) and represented in (21) implements the same idea, but features a PP instead of a small clause. This is because Freeze only considers existentials in which PPs follow the pivot, an assumption warranted for many languages but not for English.

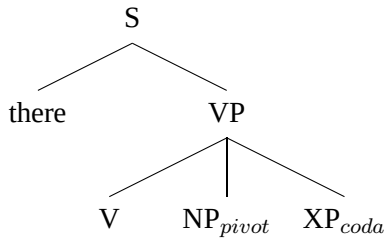
(21) **Freeze's (1992) PP structure for existentials**



2.2.2 Pivot and coda as co–arguments

Another possibility is that pivots and codas are two separate constituents, both arguments of the copula, occurring in a flat ternary structure as represented in (22). This structure is assigned to existentials by Keenan (1987).

(22) **Flat ternary structure**:



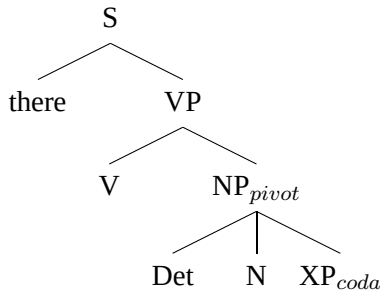
This structure is compatible with the idea that codas are predicates and pivots are their subjects. For example, Williams (1983) develops a theory in which syntactic predication is defined independently of the presence of a clausal constituent.[7] He defines predication as a relation holding between a maximal projection and some phrase external to that projection. The specifics of Williams' theory do not concern me here, but one of its important consequences is that, because subjects are by definition external to the maximal units of which they are subjects, there can be no small clause constituent encoding a subject–predicate relation.

It is important to note here that unlike the small clause analysis, the co–argument analysis does not identify the relation between pivot and coda with that between a main clausal predicate and its subject (e.g. between a VP and a subject NP). The co–argument analysis is therefore independent of (though compatible with) the view that pivots are subjects of codas.

2.2.3 The bare–NP analysis

Another possibility is that all material that occurs to the right of the common noun in the pivot is in fact an element of the pivot, i.e. a post–nominal modifier, as represented in (23). This analysis is often referred to as the NP-analysis, and I refer to the structure it assumes as the NP structure.

(23) **NP structure**:



This view was assumed by Barwise and Cooper (1981) and argued for also by e.g. Jenkins (1975) and Williams (1994). Clearly, this analysis is not compatible with the view that

[7] Williams does not apply this theory to existentials, and in fact in other work (Williams 1994) explicitly argues against considering the pivot–coda relation to be a subject–predicate one.

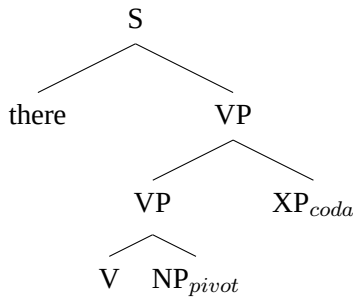
pivots are subjects of codas. Instead, it models them as modifiers of the common noun in the pivot.

2.2.4 Codas as adjuncts

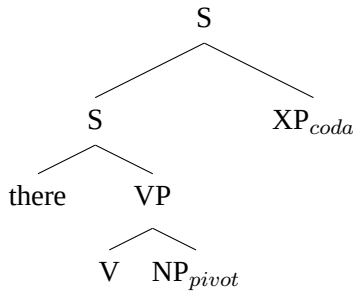
The last option for the structural analysis of existentials models codas as neither predicates not arguments but rather as adjuncts.

As adjuncts, there are two possible attachment sites for codas. They can attach to VP, or they can attach to S. The two structures are represented in (24) and (25) respectively.

(24) **VP adjunction structure**:



(25) **Sentence adjunction structure**:



As pointed out by McNally (1992:49), the VP adjunction structure is not significantly different from the co–argument structure, and most arguments for one over the other hang largely on framework particular architecture. It is however radically different from the small clause structure which assimilates codas to main clausal predicates.

The structural difference between sentence and VP adjunction is in many cases semantically insignificant, and it is hence often difficult to choose between an S-adjunction and VP-adjunction structure. This is particularly true in existentials, since on the assumption, shared by both structures, that codas are adjuncts, there is no meaningful element in the sentence that is not also in the VP.

2.3 An amended definition of codas

So far I have been using *coda* indiscriminately to refer to any material occurring to the right of the common noun in the pivot. This usage is prevalent in the literature. The question about the structural status of codas is usually presented as a question about the bracketed material in sentences like (87).

(26) There was a cop [in the room/available/eating a donut]

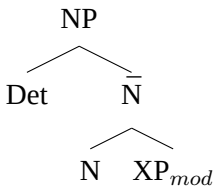
This usage presupposes however that there is a unified semantic and syntactic analysis covering this "bracketed material"; either that it is always a post–nominal modifier, or that it is always a separate constituent relating in some way or another to the pivot NP. McNally (1992) explicitly challenges this assumption. She reserves the term *coda* for VP–adjuncts, and argues that while some cases of material occurring to the right of the common noun are codas, other cases are best analyzed as post–nominal modifiers. Whether or not McNally's specific divisions are correct, the general point, namely that there is no single category covering all material occurring to the right of the pivot, is crucial.

Since pivots are NPs, and NPs can have internal modifiers such as *with glasses* in (27), pivots can in principle always involve post–nominal modifiers.

(27) You wouldn't hit [a guy [with glasses]$_{mod}$]$_{NP}$, would you?

In other words, pivots must be allowed to have the structure in (28) or a corresponding flat structure.

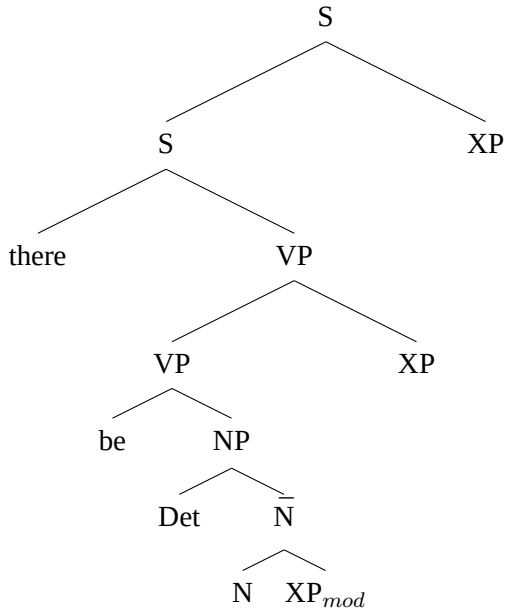
(28) **Maximal structure of pivots**:



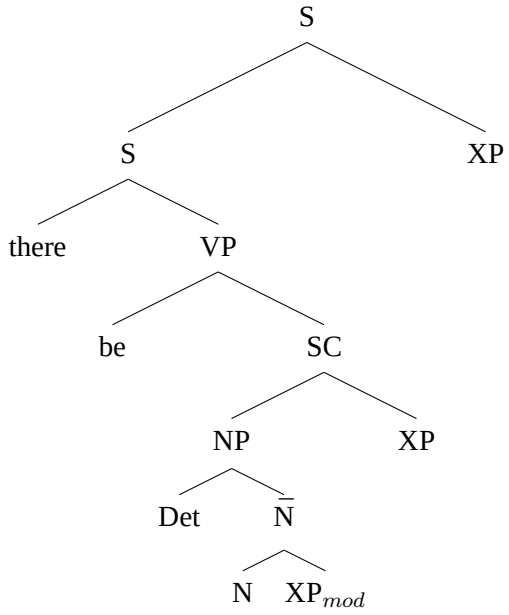
Whether or not all material following the common noun is an NP–internal modifier or not is a separate question, and on the face of it, is not one that is likely to receive a positive answer. Since VPs can generally be followed by VP modifiers and sentential modifiers, it is difficult to see why existentials should be any different. In other words, there is no

principled reason why a full blown structure like (29)[8] or (30) in the case of the small clause analysis could not be generated.

(29) **Full blown structure for existentials**:



(30) **Full blown small clause structure for existentials**:



[8]Or an equivalent flatter structure.

Sentences that could plausibly be assigned one of these structures are not hard to come by. An example is given in (31).

(31) [$_S$ There [$_{VP}$ was [$_{NP}$ a guy [$_{PP}$ with glasses]] here] earlier.]

If structures such as (29) and (30) are possible, then no single category is depicted by the definition "material to the right of the common noun in the pivot". Rather, post–nominal constituents can have one of several analyses, and criteria must be established that can decide for any constituent whether it is a small clause predicate, a post–nominal modifier, a VP modifier or an S-modifier. The same criteria should decide on the status of the relevant expressions when they occur alone as in (32).

(32) a. There was a guy [earlier].
b. There was a guy [here].
c. There was a guy [with glasses].

In order for the term *coda* to be useful, its use must accordingly be restricted so as to cover some identifiable subset of the constituents that can follow the common noun in the pivot. I use *coda* henceforth to designate any constituent that follows the pivot NP and is external to it. A consequence of this redefinition of codas is that VP and S modifiers are collapsed under the term *coda*. In the next chapter I argue that this consequence is desirable.

In light of the new definition of the term *coda*, the structural analyses of existentials discussed so far can be divided according to whether they admit of coda constituents or not. All of the structures except for the bare–NP structure involve codas in this new sense. The bare NP analysis on the other hand claims that codas do not exist and any potential coda is a post–nominal modifier.

2.4 Arguments and nonarguments against the bare–NP analysis

Keenan (1987) and McNally (1992) (among others) have argued against the bare–NP analysis and for the existence of codas on syntactic grounds. I adopt their final judgment on this

analysis, but I believe some of their arguments do not constitute *syntactic* evidence against this analysis. Here I review three arguments:

- The argument from extraction.
- The argument from distribution.
- The argument from relativization.

I argue that the first of these is inconclusive. The second is illuminating, but does not constitute a syntactic argument against the bare–NP analysis. It does however introduce an interesting semantic complication for such an analysis. The third I find convincing.

2.4.1 The argument from extraction

McNally points out that extraction of the pivot out of a `pivot-XP` string doesn't yield ungrammaticality, whereas extraction from an NP stranding an NP–internal modifier generally does. She cites the following examples.

(33) a. Who is there performing at the Academy this week?
b. * Who do the musicians admire performing at the Academy this week?

However, judgments on sentences like (33) vary among native speakers, and furthermore data such as (34) show that extraction of a noun stranding an internal modifier is quite possible in English, with prepositional as well as adjectival modifiers. This argument therefore seems inconclusive.

(34) a. What songs do you know about animals that tell a story?[9]
b. So, which book did you read about how to do low-carb correctly?[10]
c. Matt I need to get two mini servos, what do you recommend available in England please.[11]
d. Who else do you know stupid enough to take up Snake Knee-Capping for a living?[12]

[9] www.theatreworksusa.org/uploads/studyguide/studyguide_203.pdf

[10] livinlavidalocarb.blogspot.com/2005/09/eberstein-sets-record-straight-on-low.html

[11] www.rcgroups.com/forums/ showthread.php?t=61113&page=5

[12] www.wetcanvas.com/forums/showthread.php?t=172423

2.4.2 The argument from NP distribution

Another argument against the bare–NP analysis is that in some cases, the unit consisting of the pivot and a following constituent does not have the distribution of an NP. For example, this unit sometimes cannot occur in subject position. The examples in (35) are from Keenan (1987).

(35) a. There are [no students who you know enrolled in the class].
b. *[No students who you know enrolled in the class] asked about you.

The degree to which the pivot and the following constituent (the `pivot-XP` sequence) can occur in subject position depends on the XP. The examples in (36) involving an adjective are perfectly grammatical.

(36) a. There were *people available*.
b. *No one available* wants to work that particular job.[13]
c. *Most people available through our service* are seeking a time-limited role.[14]
d. *Many options available through contextual menus* are considered shortcuts for menu and/or toolbar choices. [15]

Examples like (35b) furthermore do not actually argue *syntactically* against a bare–NP analysis, since the phrase *No students who you know enrolled in the class* does in fact occur as the subject of a finite verb in (37).

(37) No students who you know enrolled in the class doesn't mean you won't enjoy it.

(37) is an instance of a more general pattern, more examples of which are given in (38) and (39).

(38) a. There are [workers angry about the pay].
b. [Workers angry about the pay] is exactly the kind of situation we are trying to avoid.

[13] www.freepatentsonline.com/20050114195.html

[14] www.shropshire-rcc.org.uk/voluntary_sector_support/independent_examiners/index.html

[15] www.adobe.com/education/instruction/webtech/CS2/unit_planning1/glb_site_window.html

(39) a. There's [an angry mob advancing towards the parliament in every occupied capital].

b. [An angry mob advancing towards the parliament in every occupied capital] would satisfy the partisans.

While such examples show clearly that some `pivot-XP` sequences occur as subjects, they do not show that these sequences are NPs, since NPs are not the only constituents licensed in subject position. Safir (1983) argues that the subject strings in sentences like (38b) and (39b) are not NPs but small clauses. He points out that the morphosyntax of the subject constituents in these examples is different from that of regular NPs in that they do not trigger agreement on the verb. This is seen in the contrast between (40a) and (40b). Safir concludes from this that the relevant strings are not NPs.

(40) a. [Workers angry about the pay] are/*is easy to mobilize.

b. [Workers angry about the pay] *mean/means potential demonstrations and strikes.

But as argued in Baltin (1998), Safir's conclusion is unwarranted. The agreement facts do not establish that the relevant strings are small clauses. The same agreement facts occur with constituents for which it is difficult to justify any categorial status other than NP. As an example, Baltin provides example (41a) (Baltin's example (5a)). More examples are given in (41b–d).

(41) a. [Several angry workers] is just the sort of situation that the ad campaign was designed to avoid.

b. [No students] means you won't be nervous (when you give the talk).

c. [Few cars] means we'll get there faster.

d. [Many guests] means many presents.[16]

Safir and Baltin both note that the subject in all these examples has a special interpretation which they describe as being interpreted as a situation. This semantic fact accounts both for the ungrammaticality of some `pivot-XP` sequences in the subject position of some verbs and, as Baltin argues, for the agreement facts in (40). The contrast between

[16] I thank Beth Levin for pointing this example out to me.

the ungrammatical (35b) and the grammatical (37) is due to the semantic selectional restrictions of the verb. The verb in (35b) is *ask*, which requires its subject to be an agent and therefore to refer to or quantify over individuals. Expressions that are interpreted as situations, or whatever the relevant semantic entity is, neither denote nor quantify over individuals, and are therefore ruled out as subjects of verbs like *ask*. The verb in (37) is *mean*, which does not have an agent subject and does not require its subject to refer to or quantify over entities. The subject of *mean* can denote or quantify over individuals as in (42a), or it can be interpreted a something closer to a proposition, fact, or event.

(42) a. This note means your life is in danger. (entity)
b. That you got this note means your life is in danger. (proposition)
c. Getting this note means your life is in danger. (proposition)

Expressions interpreted as situations or propositions do not generally have number/person features, and hence it is not surprising that agreement on the verb is impersonal.

What the contrast in (35) shows therefore is that some `pivot-XP` constituents do not denote individuals or generalized quantifiers over individuals like other NPs do. Whether this means that they are not NPs syntactically is an open question which I can shed no light on here. The objection to the bare–NP analysis is therefore not that `pivot-XP` strings do not have the distribution of NPs, but that they do not have the distribution of NPs with standard denotations (i.e. denoting individuals or generalized quantifiers over individuals). The only available bare–NP analysis that is semantically explicit, that of Barwise and Cooper (1981) discussed in the next chapter, treats all `pivot-XP` strings as generalized quantifiers over individuals, and therefore cannot handle the contrast in (35).

2.4.3 The argument from relativization

Keenan (1987) points out (p. 302) that `pivot-NP` sequences do not behave like NPs with respect to relativization, as demonstrated by the contrast between (43) (= Keenan's (29)) and (44). Head nouns can be relativized together with their modifiers (43b), and cannot be relativized without them (43c), whereas pivots can only be relativized *without* codas (44b,c).

(43) a. John painted [the shelves in my living room] purple.
b. [$_{NP}$ The shelves in my living room that John painted purple]
c. *The shelves that John painted _ _ in my living room purple.

(44) a. There were shelves in my living room.
b. *The shelves in my living room that there were (disappeared).
c. The shelves that there were __ in my living room.

The bare–NP analysis wrongly predicts the pattern in (43) for relativization of pivots.

I conclude from these considerations that the bare NP–analysis is most probably not syntactically viable for English, at least in some cases, and hence that coda constituents (in the sense defined in the previous section) are required for those cases. For other cases, even if a bare–NP analysis is correct, it requires a non–standard semantics for NPs which resembles the semantics standardly associated with sentences or clauses. Examples such as those in (41) seem to indicate that such a semantics is in any case needed. The analysis of existentials developed in chapter (5) will have something to say about this apparent semantic affinity between NPs and sentences.

2.5 Summary

To summarize, there are four major structural options for existentials: the small clause structure, the NP structure, the flat ternary structure and the two adjunction structures. The NP structure does not admit the existence of coda constituents, where *coda* is defined as any constituent that follows the pivot NP and is not internal to it. All other structures maintain that codas exist. The main difference between these latter structures is in how they model the relation between pivot and coda. The small clause analysis models it as predication, by which I mean whatever relation holds between a main clausal predicate and its subject. The adjunct structures models it as VP/S modification. The flat structure is compatible with either predication or VP/S modification. This is summarized in table (2.5).

	PIVOT–CODA RELATION	
STRUCTURE	Predication	VP/S modification
Small clause	✓	
Adjunction		✓
Flat	✓	✓

Table 2.2: Syntactic structures and the pivot–coda relation

In the next chapter I discuss existing semantic analyses of existentials and the restrictions imposed by semantic considerations on the choice of structure.

Chapter 3

The semantic space of possibilities

If there is indeed an invariant meaning expressed by existential constructions across languages, it must be expressible with only those elements that are universally present in existential clauses (since languages that lack expletives or auxiliaries can nevertheless express an existential proposition). Table 2.1 shows that the only elements that are universally present in existentials are the pivot and the coda, and so existential propositions must be expressible with just these elements. Furthermore, given that codas are optional, the core meaning of an existential must somehow be contained in the pivot alone, and one of the central aims of this dissertation is to develop a semantics that does exactly that.

However, each of the four elements in the existential anatomy could in principle contribute to the proposition expressed, and all of them have in fact been claimed to be meaningful in the literature. This chapter discusses core existing approaches to existential propositions and organizes them according to the meaning they assign to each element. I consider four analyses representative of each core position.

- McNally's *instantiation* analysis (McNally 1992, 1998).
- Barwise and Cooper (1981) GQ analysis.
- Zucchi's *domain restriction* analysis (Zucchi 1995)
- Keenan's GQ analysis (Keenan 1987, 2003).

After describing each of these analyses, I discuss the issues involved in choosing between

them and argue that Keenan's analysis is essentially the correct one, though it too must be revised somewhat.

3.1 McNally's instantiation analysis

McNally (1992; 1998) provides a very rich and complex semantic analysis of existentials. The main intuition driving McNally's approach is that the main predicate in an existential, denoted by *there be*, is an intransitive predicate meaning *to be instantiated*. The pivot is the sole argument of this predicate, and it is sortally restricted to denote a property. The instantiation predicate is true of the pivot if the property denoted by the pivot is instantiated by some entity at some index. She summarizes the key ideas of her proposal in (45) (McNally 1992:77).

(45) **McNally's proposal**:
The existential predicate in English is interpreted as a property of a *description of an entity*, specifically the property that the description is instantiated by some entity at some index. The addition of a (non–agentive, non–modalized) existential sentence to a context entails the introduction of a discourse referent into the domain of the context that corresponds to the instantiation of the description-argument. An additional felicity condition requires this referent to be novel.

McNally's answer to the existential question is therefore that existential propositions are constructed by applying an instantiation predicate to a description of an entity, i.e. to a property.

Formally, McNally views pivots as denoting nominalized functions in the property-theoretic sense (see Chierchia and Turner 1988). In Chierchia and Turner's system, the domain of individuals E is sorted into two mutually exclusive sorts, the "ordinary" individuals (type u) and the nominalized functions (type nf). Nominalized functions are the entity correlates of properties, where properties are complex, functional expressions (type $\langle \alpha, \beta \rangle$, where α, β are simple types). The reader is referred to McNally's work for full detail.[1]f

In McNally's system, common nouns denote properties. For example, the noun *dog* denotes a property: that property that all and only dogs have. An extension function *ext*

[1]See also Landman (2004) for a related theory of pivots as property-denoting.

assigns n-tuples of individuals to every property relative to an index, where an index is a triple made of a time, world and location. McNally adopts a distinction between quantificational and non–quantificational DPs. A DP such as *a dog* for example is taken to be non–quantificational. The determiner *a* is interpreted as the function *ent*, which maps properties (such as the property denoted by *dog*) to their entity correlate of type *nf*. The DP *a dog* therefore denotes the nominalized function *ent(dog)*[2]. Intuitively, the denotation of *ent(dog)* is an entity: the property of being a dog.

McNally's semantics for existential sentences is then set up as follows. The main predicate of an existential construction is an existential predicate be_{exist}. The meaning of this predicate is a property of nominalized functions. This property holds of an individual x of type nf at an index iff there is some individual y of type u such that y falls in the denotation of *ext(x)*, the extension of the property denoted by x, relative to that index. In other words, if there is an entity that instantiates the property denoted by the pivot. For example, the sentence *there is a dog* is true at a an index $\langle w, t, l\rangle$ iff there is an individual which instantiates the property of being a dog at $\langle w, t, l\rangle$. Formally, McNally's truth conditions for an existential are given in (46) (McNally 1992:105).

(46) For all $g, x_{nf}, \Delta(\mathbf{be_{exist}}(x_{nf}))(g)$ at $\langle w, t, l\rangle$ iff $\exists y$ such that $y \in ext'_{\langle w,t,l\rangle}(x_{nf})$

In (46), the operator Δ is a truth operator mapping information units to sets of propositions. The nature of propositions is not defined in McNally's system, but can be seen as e.g. a set of world–time pairs. The variable g ranges over assignment functions. In McNally's dynamic system, all interpretations are functions from assignment functions to information units. What (46) says is that for any assignment function g and any nominalized function x, applying the interpretation of *there be*$_{exist}$ *x* to g at the index $\langle w, t, l\rangle$ yields a true information unit iff there is an entity instantiating the property x at that index.

In the somewhat simpler but essentially similar framework of McNally (1998), the truth conditions of an existential are as in (47).

(47) **McNally's (1998) truth conditions for existentials** (McNally 1998:376):
For all models M, $[[NP]]^{M,g} \in [[$ *there be* $]]^{M,g}$ iff $[[NP]]^{M,g}$ is non-empty.

[2]It also has a referential use in which case it denotes an "ordinary" individual of type u, but this is not relevant here.

I focus on the system in McNally (1992) because it is only in this system that she explicitly defines the semantics of codas.

McNally's analysis of the basic meaning of existentials does not involve the coda in any way, but only involves the auxiliary and the pivot. This analysis therefore rules out the small clause structure, as the complement of existential *be* is just an NP.

Codas are analyzed by McNally as secondary predicates modifying the spatiotemporal parameters of the main predication, on a par with depictive and circumstantial adjuncts such as *alive* in (48). The semantic role she assigns to them is to "restrict the spatiotemporal parameters over which the main predication is said to hold" (McNally 1992:152).

(48) The fish ate Jonah alive.

In (48), *alive* contributes a property that is said to hold of Jonah at the time and place at which he is eaten by the fish. Similarly, a coda provides a property that is said to hold of the entity or entities that instantiate the property denoted by the pivot at the spatiotemporal parameters of instantiation. For example, the coda *sick* in (49) restricts the spatiotemporal parameters in which the property denoted by *a child* is instantiated by some entity a, by requiring that those parameters also be parameters in which a is sick.

(49) There's a child sick.

In order to model codas as depictives, McNally augments her model with a set of intervals T and a set of locations L, both of which are partially ordered by a relation $\leq$ (i.e. form a semi-lattice), and defines an overlap relation as in (50) for locations, where $\wedge$ is the meet relation. The definition for times is not given but is presumably identical.

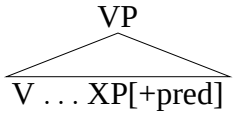
(50) For any $l, l' \in L$, $l \circ l'$ iff there is some l'' such that $l \wedge l' = l''$

She also defines two functions, *int* ("hold time") and *loc* ("location"), which range over pairs of properties and individuals. For any property and individual, these functions return the time/location at which the individual has the property.

Syntactically, McNally adopts the VP adjunction structure,[3] which has been motivated for depictive predicates e.g. by Rapoport (1991). The interpretation of a VP modified by a predicative adjunct is mitigated by a rule of *controller–controlee coindexation*:

[3]More precisely, she adopts a $\overline{\text{V}}$-adjunction analysis, for reasons that do not concern me here.

(51) **Controller–Controlee Coindexation** (McNally 1992:155):
If XP[+pred] in the configuration:



is not an argument of V, then label XP[+pred] with the index of the theme argument of [[V]].

This rule says that a predicative adjunct is controlled by the internal argument in the VP it modifies. VP–adjuncts are then interpreted via an adjunct rule defined in (52). (McNally's original formulation involves $\overline{\text{V}}$ rather than VP. I replace $\overline{\text{V}}$ with VP throughout, which does not affect the content of the rule.)

(52) **Adjunct rule** (Mcnally 1992:156)
[[[VP$_1$ XP[+pred]$_{x_i}$]$_{VP_2}$]] is a function f of the same sort as [[VP$_1$]], such that for all $y \in ext_{\langle w,t,l\rangle}$([[VP$_1$]]),
$y \in ext_{\langle w,t,l\rangle}(f)$ iff $int([[\text{VP}_1]], y) \leq_T int([[\text{ XP[+pred] }]], x_i)$ and
there is some l such that $loc([[\text{VP}_1]], y) \wedge loc([[\text{ XP[+pred] }]], x_i) = l$.

This rule can be read as saying that a VP modified by an adjunct denotes a property that holds of an individual if there is locational overlap and/or temporal inclusion between the location and/or time at which the main predicate holds of that individual and the location/time at which the property denoted by the adjunct holds of the internal argument in the VP.

Since the internal argument of the existential predicate (the pivot) does not denote an individual but a nominalized function, it can not directly control the predicate adjunct in the coda. Consider for example (53) (McNally's example 288).

(53) There was a dog barking.

The internal argument of the existential predicate (the pivot *a dog*) is property denoting, but the coda *barking* must apply to an individual. McNally resolves this by coindexing the entity instantiating the property with the entity to which the coda applies in the truth clause for the sentence. She describes the semantic result of combining the existential predicate with the coda *barking* as follows (p. 169): "...the result of combining [[be$_{exist}$]] with the interpretation of the XP *barking* is going to be a 1-place propositional function

whose extension is a set of *nf*s. An *nf* α will be in this extension iff: (1) An individual $\beta \in U$ that is in $ext_{\langle w,t,l\rangle}(\alpha)$ is in $ext_{\langle w,t,l\rangle}([[\text{barking}]])$; and (2) $int([[\text{be}_{exist}]], \alpha) \leq_T int([[\text{barking}]], \beta)$ and there is an l such that $l = loc([[\text{be}_{exist}]], \alpha) \wedge loc([[\text{barking}]], \beta)$." In other words, the sentence is true iff there is an entity instantiating the property denoted by *a dog* at the time and location at which that entity is barking. While these truth conditions are intuitively correct, it is not clear how they can be reached by means of the controller–controlee coindexation rule above, since the truth clause for existentials in (46) includes no reference to an entity instantiating the property denoted by the pivot. That entity is existentially quantified over in McNally's truth conditions. The relevant entity is introduced not in the truth conditions but in the context change potential (the details of the dynamic aspect of McNally's account are not relevant here). It therefore remains somewhat unclear how exactly the coindexation required by this analysis is achieved.

A related issue pointed out by McNally is that the adjunct rule applies to one place propositional functions to yield one place propositional functions, and must therefore apply to the existential predicate before that predicate combines with its subject, the pivot, and as McNally notes this gives rise to a non-compositional analysis given the syntax she is assuming. This problem is not unique to existentials, but would arise with any intransitive predicate with a single argument (e.g. in a sentence like *The coffee arrived cold*). She points out directions around this problem, involving either an amendment of the adjunct rule or amendment of the arity of the existential predicate. While neither of these directions is spelled out in any detail, neither of them seems to significantly change the core analysis.

To summarize, McNally's answer to the existential question is given in (54). The meanings she assigns to the elements of an existential clause are summarized in (55).

(54) $[[\textit{there be}]]([[\textit{pivot}]])$

(55)

AUX	PIVOT	CODA
be instantiated	property	secondary property

3.1.1 Problems for McNally's analysis

While McNally's analysis is intuitively appealing, several objections might render it untenable. The more significant of these have to do with the analysis of pivots as properties, with the analysis of codas as depictives and more generally with tying existentials to a notion of instantiation, which is inherently tied to space and time.

Scope

One consequence of modeling pivots as denoting properties is that pivots have no quantificational force. This is in line with the observation in the literature that pivots generally take scope below any sentence level operators such as modals or negation (see e.g. Heim (1987)). For example, consider a situation in which you are waiting for a shuttle van that only leaves after it has collected ten passengers. In such a scenario, if sentence (56a) is true, the shuttle won't leave; but whether or not sentence (56b) is true or not is immaterial to the truck's leaving, since what matters is how many people are in the van, not how many are *not* in it.

(56) a. There aren't ten people in the van.

b. Ten people aren't in the van.

Presumably the reason for this contrast is that, for whatever reason, the NP *ten people* cannot scope over the sentential negation in the existential, whereas it can in the copular clause.

However, there are counterexamples to the claim that pivots cannot take scope over sentential operators. The counterexamples come from the interaction of existentials with modals. Consider for example sentence (57).[4]

(57) There could be three outcomes to these elections.

This sentence does not mean that these elections, unlike normal elections, could end up having three outcomes rather than one. Rather it means that three outcomes are possible in the relevant elections. In other words, the scopal relation seems to be `three < could` (ignoring for now the status of the phrase *to these elections*).

An analysis in which an NP like *three outcomes* (or *three outcomes to these elections* if that is the right analysis) denotes a property does not allow the possibility that this NP exhibit scopal interaction with any scope taking operators. Instead it requires this NP to denote the property of being a plural individual consisting of three outcomes. The sentence can than only say that such a property could be instantiated, which is clearly the wrong meaning. More examples exemplifying the same point are given in (58).

[4]This example is based on an example discussed in Gendler Szabó (2006). Szabó's original example is *This election could have three outcomes*. The context of his discussion is unrelated to the semantics of existentials.

(58) a. There can be three winners at this point in the race.
b. There may be any number of endings to your script.

Examples such as (57) or (58) have to my knowledge not been discussed in the literature. Their analysis depends among other things on how such phrases as *to this race* or *to these elections* are analyzed. Also, not all modals can scope under pivots. For example, necessity modals such as epistemic *must* cannot. This is demonstrated by (59), which can only mean that this problem has to have three solutions.

(59) There must be three solutions to this problem.

The important point here is that such examples exhibit a scopal interaction between modals and pivots, clearly indicating that pivots must be able to scope above modals. This is not a possibility on a property analysis of pivots.

Property–denoting expressions that cannot be pivots

One of the original motivations for property theory comes from cases where properties seem to be objects of which things are predicated, as in (60).

(60) Being honest is a virtue.

Since expressions like *being honest* are very likely examples of nominalized function denotation, they should be grammatical as pivots, modulo syntactic restrictions. However as the sentences in (61) show, they are not, even though there is no restriction syntactically against gerunds in pivot position.

(61) a. *There is being a dog in the room. (cf. There is dancing in the hallway)
b. *There is being stupid in the room.

The unavailability of such prototypical property denoting nominals in pivot function casts at least some doubt on the viability of a nominalized function analysis of pivots.

Existentials beyond space and time

While existentials often convey information about instantiation in space and time, they do not have to. Many existentials have meanings that do not depend on instantiations in space and time. Some examples are given in (62).

(62) a. There is a philosopher–king in the ideal state.
b. There is a three personed God in Christianity.
c. There is mutual aid in an anarchistic prison.

The truth of (62a) and (62b) does not depend on whether the properties of being a philosopher–king or a three personed god are instantiated or not. For example, it is true that there is a three personed God in Christianity regardless of whether an entity instantiating the property of being a three personed God (whatever that property is) is instantiated at some index or not. (62c) is a generic sentence about anarchistic prisons. Its truth does not even require the instantiation of anarchistic prisons, let alone of mutual aid.

Some existentials not only do not require instantiation, but preclude it, as in (63).

(63) a. There was a disaster prevented.
b. There were two people absent in the meeting.

(63a) is true only if any entity that might have instantiated the property *a disaster* did not in fact instantiate it. In (63b), if *two people* denotes the property of being a plural individual made of two people, then the sentence is true if a plural entity instantiating that property is *not* instantiated at the index determined by the coda(s) *absent in the meeting*.

The instantiation predicate

Finally, an instantiation analysis makes an instantiation predicate the main predicate of the construction. However, as discussed above (section 2.1), there are many languages in which there is no overt element that could contribute the instantiation semantics. It is always possible to assume an empty instantiation predicate, but this is a fairly costly move. While it is common for arguments to be semantically present but not expressed in the morphosyntax, the main predicate generally forms the core of the assertion expressed by a sentence. Positing a null main predicate is highly counterintuitive given what is known about the morphosyntactic realization of predicates and their arguments. I am not aware of any other construction for which it has been proposed that the main semantic predicate is phonetically null. The fact that the alleged instantiation predicate is, in some languages, not expressed by any lexeme in the lexicon is especially surprising given that predicate imposes very strict selectional restrictions on its single argument.

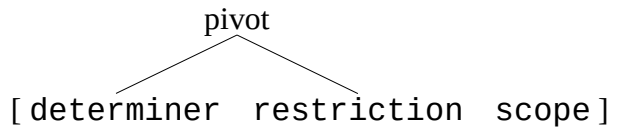
For these reasons, I conclude that an instantiation based analysis of existentials and a property denotation for pivots are not desirable. If pivots do not denote properties, what do they denote? It is clear that they do not denote individuals of type e. The only remaining denotation for them according to standard assumptions is as generalized quantifiers, and this is indeed the meaning assigned to pivots in the analyses I now turn to.

3.2 Pivots as generalized quantifiers

The rest of the analyses discussed in this chapter start with the assumption that pivots denote generalized quantifiers (GQs) (for general discussion of generalized quantifiers see e.g. Barwise and Cooper 1981; van Benthem 1986; Keenan and Stavi 1986; Keenan and Moss 1984; Peters and Westerståhl 2006). GQs are sets of sets of individuals. For example, a noun phrase like *two clowns* can be modeled as denoting the set of sets that include two clowns.

Thinking about GQs as sets of sets in this way should not obscure the fact that they are in fact complex expressions, composed of a determiner and a common noun. Determiners generally denote relations between sets. For example, the determiner *three* denotes the relation between sets that holds of two sets A, B if their intersection includes three elements[5]. The general terminology prevalent in the literature for talking about determiners (as well as other operators) and their set arguments involves a "tripartite structure", consisting of the determiner, a *restriction set* and a *scope set* (see e.g. Partee 1991; Roberts 1995). A GQ consists of the determiner and the restriction. This is represented in (64).

(64) **Tripartite structure induced by pivots**:



The GQ denotes the property of being a set that stands in the relation denoted by the determiner to the restriction set.

Since GQ–denoting NPs are most commonly found in argument position as in (65), they are usually thought of as denoting the set of properties that **hold** of a number/quantity

[5]In this sense, determiners express transitive relations similar to prepositions.

of individuals[6]. Thus (65) is true if the property of being edible is true of some fruit.

(65) Some fruit are edible.

In this case, the NP denoting the GQ is not a predicate but an argument, selected for by the verb, which also provides the scope set for the quantifier.

Analyses of existentials that assume a GQ denotation for pivots must determine how the scope set is contributed in bare existentials, i.e. existentials with no coda, and how it is contributed in existentials with a coda. For the first case, all GQ analyses I am aware of are in agreement and assume the semantics proposed originally by Barwise and Cooper (1981) (BC). BC's semantics is based on the intuition that existentials express existence claims. They claim that, relative to a model M, existential propositions are formed by applying the GQ denoted by the pivot to E, the domain of quantification of M. Their semantics is given in (66).

(66) **Barwise and Cooper's semantics for existentials**:
$[[$*There be NP*$]]^M = [[NP]]^M(E)$,
where E is the domain of quantification of M.

Where the various analyses differ is in how they model existentials with a coda. While all the relevant theories agree (as with McNally's analysis) that codas denote properties of individuals, they disagree on what the role of the coda property is in the quantificational structure. Two options have been proposed. The first is that the coda property intersects with the common noun in the pivot to form part of the restriction (BC, Zucchi 1995), in which case the scope is the domain of quantification E as in bare existentials. The second is that the coda property provides the scope set for the quantifier in the pivot (Keenan 1987, 2003). In what follows I review the relevant GQ analyses, then turn to the issues involved in choosing between them.

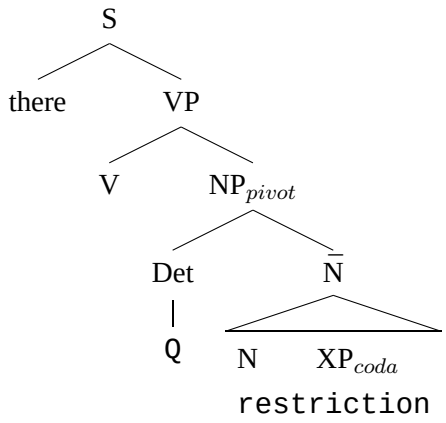
[6]For current purposes, it does not matter what exactly a quantity is. All that matters is that all natural language quantifiers are associated with quantities, classes of quantities or relations between quantities. For example, the quantifier *most vegetables* is true of a set containing a quantity of vegetables bigger than the quantity of vegetables not contained in it.

3.2.1 Codas as part of the restriction

Barwise and Cooper (1981)

Barwise and Cooper (1981) (BC) were the first to analyze existentials as involving GQs. As mentioned above, in their analysis, all existentials have the bare NP structure, and therefore any material following the common noun in the pivot is not a coda but a post–nominal modifier. Since BC argue that all NPs denote GQs, and GQs are comprised of a determiner and a restriction, any modifiers within the NP must be interpreted as contributing to the restriction (via set intersection). The structure and meaning of existentials on BC's analysis is given in (67).

(67) **Barwise and Cooper's analysis of existentials**:



As (67) makes clear, there is no material in the existential that can provide the scope set for the quantifier in the pivot. The scope set is provided by the domain of quantification as in (66) above.

Zucchi's (1995) domain restriction analysis

Zucchi (1995) suggests a somewhat different approach to the role of codas, though truth conditionally his analysis is identical to BC's analysis. Zucchi does not treat codas as part of the pivot but as separate constituents in a flat ternary structure. His key idea is that the role of codas is to *restrict the domain* relative to which pivots are interpreted. Coda constituents are thus an instance of the more general phenomenon of *contextual domain restriction*. Contextual restriction of the domains of quantifying expressions is ubiquitous

in natural language (e.g. Von Fintel 1994; Roberts 1995; Gawron 1996). For example, the sentence in (142) is not understood to entail that animals are now extinct.

(68) Coli endotoxin caused death in all animals within 16 to 29 hours.[7]

In such cases, the common noun is understood to have a denotation restricted to a contextually supplied "context set". The relevant animals in (142) are just those animals used in the experiment salient in the context.

In Zucchi's analysis, codas provide a context set for the common noun in the pivot. The meaning of an existential sentence such as (69a) is as in (69b).

(69) a. There are [two lakes] [here].

b. *Two(lakes$_{here}$, exist)*

More formally, Zucchi's truth conditions for existentials with a coda are given in (70). In bare existentials, the domain restriction is determined by context.

(70) $[[$*there be NP$_i$ XP*$]]^g{}_{M,c}$ = 1 just in case $E \in [[NP_i]]^g{}_{M,c'}$
where c' is identical to c except for the fact that $D(c') = [[XP]]^g{}_{M,c}$

This restriction analysis shares with BC's analysis the view that codas contribute to the restriction of the quantifier in the pivot. It differs from BC's in that codas provide contextual information, i.e. are contextual modifiers. In Zucchi's system, the coda contributes meaning not through the compositional build up of the proposition expressed, but rather by shifting the context relative to which the pivot is interpreted.

One non-standard aspect of Zucchi's general setup is the way in which contextual update and propositional structure interact. In (70), the context relative to which the proposition expressed by an existential with a coda is changed from c to c' within the truth clause for the sentence. Thus, truth conditional content and context change potential (*ccp*) for the sentence are interleaved and computed at the same time. On standard dynamic theories of meaning, *ccp* is computed separately from truth conditional content, with one feeding the other. But there is no general theory of operations interleaving *ccp* and truth conditional content that states what the constraints on them are.

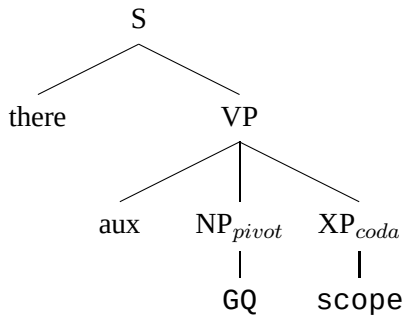
[7] jcm.asm.org/cgi/reprint/41/7/3051.pdf

In any case, Zucchi's analysis ends up incorporating a property denoted by the coda into the restriction of the quantification in the pivot in much the same way as BC's analysis does. The scope set is again taken to be the domain of quantification.

3.2.2 Codas as scope sets

In the work of Keenan (1987; 2003), codas provide the scope set for the quantification in the pivot. Keenan also assumes a flat ternary structure, but in his analysis existential propositions are formed by simply applying the GQ–denoting pivot to the property–denoting coda, as in (71). An existential is true if the property denoted by the coda (p_{xp}) falls in the denotation of the GQ denoted by the pivot (Q_{NP}). In other words, if the property denoted by the coda holds of the individuals quantified over by the pivot.

(71) **Keenan's (1987) analysis of existentials**:



$[[$*There be NP XP*$]] = [[NP]]([[XP]]) = 1$ iff $p_{XP} \in Q_{NP}$

In this analysis, codas and pivots compose in the same manner as any other predicate–subject combination.

Existing analyses can thus be summarized as in table (3.1), according to the semantic contribution assigned to each of the three relevant elements of an existential construction. Recall that the term *coda* refers to any expression following the pivot that is external to it. I have argued in section 3.1.1 that the instantiation analysis is not a viable option, and the remaining choice is between the three GQ analyses.

ANALYSIS	SEMANTIC CONTRIBUTION		
	copula	pivot	coda
McNally (1992)	*be instantiated*	property	secondary property
BC (1981)	—	GQ	–
Zucchi (1995)	—	GQ	domain restrictor, restriction of GQ
Keenan (1987)	—	GQ	predicate property, scope of GQ

Table 3.1: Semantic analyses of existentials

3.3 Choosing between GQ analyses

Of the three GQ analyses, BC's is the only one that assumes the bare–NP structure and does not involve codas at all. In section 2.4 it was shown that the bare–NP analysis is not always the right one syntactically and that therefore codas must be posited. Furthermore, BC's semantics assumes that any `pivot-XP` sequence denotes a GQ over individuals, which was shown in that section not to be the case. This means that BC's analysis cannot generally be the right one.

The semantic choice involved in deciding between the remaining two analyses, Keenan's and Zucchi's is whether codas contribute the scope set or a restriction set. Recall that on both analyses (as in McNally's analysis) codas denote properties of individuals.

If codas are taken to contribute a restriction, something must be said about the scope of the quantification. As mentioned earlier, the answer provided by Zucchi is that the scope set is the domain of quantification E, as in BC's analysis. Given this, the choice is then between the quantificational structures in (72), where D is the meaning of the determiner in the pivot, N is the meaning of the common noun in the pivot and C is the meaning of the coda.

(72) **Quantificational structures for existentials**:
- $D(N \cap C)(E)$ (Zucchi 1995).
- $D(N)(C)$ (Keenan 1987).

The problem with these two quantificational structures is that they are not model–theoretically distinguishable from one another for the majority of determiners. As Keenan (1987) observed, for certain determiners, the equivalence in (73) holds for any two sets A and B.

(73) $D(A, B) \equiv D(A \cap B)(E)$

Clearly the two quantificational structures in (72) are each an instance of one side of Keenan's equivalence relation.

(73) holds for any determiner D denoting a relation between sets that depends for truth only on the cardinality of the intersection of those sets, i.e. any intersective determiner. The equivalence holds because for any two sets A and B, the cardinality of $(A \cap B)$ is the same as the cardinality of $((A \cap B) \cap E)$. For pivots constructed with intersective determiners, therefore, Keenan's and Zucchi's analysis will yield exactly the same truth conditions. This equivalence is easily intuited by comparing copular sentences of the form *D A's are P* with sentences of the form *D A's that are P exist*. Thus (74a,b) are truth–conditionally equivalent.

(74) a. Two insects are poisonous.

b. Two insects that are poisonous exist.

However, as Keenan notes, the equivalence does not hold for non–intersective determiners, i.e. determiners that denote relations between sets that depend for their truth on more than the cardinality of the sets' intersection, such as proportional determiners like *most* or *every*. For example, a determiner like *every* denotes a relation between sets that holds of two sets A, B iff their intersection includes the set A (regardless of the cardinality of either A or $A \cap B$). Keenan calls determiners for which the equivalence in (73) holds *existential* determiners. The ones for which it does not hold are non–existential. That the equivalence does not hold for such determiners can be intuited in examples parallel to (74) such as (75). (75a) is false, but (75b) is trivially and necessarily true.

(75) a. All insects are poisonous.

b. All insects that are poisonous exist.

The equivalence does not hold for non–existential determiners because the relations they denote crucially do not depend merely on the intersection of their set arguments, but on relations between that intersection and other sets. Thus, while for any sets A, B, the cardinality of $A \cap B$ is always the same as the cardinality of $(A \cap B) \cap E$[8], whether some

[8]Or more generally, the same as the cardinality of $(A \cap B) \cap P$ for any $P \supseteq A, B$.

relation holds between A and B is independent of whether the same relation holds between $A \cap B$ and some other set.

Take for example the determiner *most*. The meaning of this determiner is in terms of the sets in (76).

(76) most$(A, B) = 1$ iff $|A \cap B| \geq |A - B|$

A quantificational structure introduced by a pivot with the determiner *most*, e.g. *most insects*, would be (77) if codas contribute scope sets, but it would be (78) if they contribute restriction sets (recall that N is the meaning of the common noun in the pivot and C the meaning of the coda).

(77) most$(N)(C)$

(78) most$(N \cap C)(E)$

The two quantificational structures clearly differ in truth–conditions. (77) is true iff the number of Ns that are Cs is larger than the number of Ns that are not. (78), the structure predicted by any analysis in which codas provide a restriction, is true if the number of Ns that are Cs that exist is larger than the number of Ns that are Cs that do not, i.e. iff $|N \cap C| \geq |(N \cap C) - E|$. Since $|(N \cap C) - E| = \emptyset$, (78) is true for any N and any C.

Keenan's and Zucchi's analyses therefore make different predictions with respect to existentials with non–existential determiners. Keenan predicts they should have contingent meanings (the same meanings as their copular counterparts), whereas Zucchi predicts them to be trivially true. Of course, Keenan's reason for calling certain determiners and NPs "non–existential" and others "existential" is that non–existential determiners do not occur freely in English existentials (the so-called *definiteness effect* (DE), see section 6 for discussion), and it is his purpose to provide a formal characterization of those NPs that do occur freely. Nevertheless, in contexts in which NPs with non-existential determiners do occur in English, and in languages (such as modern Hebrew or Italian) in which the DE is much weaker than in English, the predictions of the two approaches can be tested.

As pointed out by Lumsden (1988) and discussed extensively by McNally, non–existential determiners occur freely in pivots when the common noun is interpreted as a kind[9], as in (79a). (79b) is an example from Hebrew.

[9]McNally's analysis is the only one I am aware of that explains this fact, see section 6.

(79) a. There's every kind of meat in that restaurant.

b. yeS et kol ha-sfarim Sela ba-sifriya
EX acc all the-books of[3.f.sg] in.def library
They have all her books in the library. (Lit.: There have all of her books in the library.

In terms of quantificational structures, the meaning assigned to (79a) by each analysis is given in (80a) and (80b) respectively (abstracting away from issues having to do with the exact treatment of kind denoting terms).

(80) a. every($\{x$: kind-of-meat$(x)\}$)($\{y : in(y,$ restaurant$)\}$)

b. every($\{x$: kind-of-meat$(x)\} \cap \{x : in(x,$ restaurant$)\}$)(E)

The structure in (80b) is true if the set of things that are kinds of meat in the restaurant is a proper subset of the domain of quantification E. Since every set is a subset of E, including the empty set, this structure will be true in all models. The same is true for (79a). Yet it is plain to see that neither of these sentences is trivially true. The truth of the first depends on the menu of the restaurant, the truth of the second on the inventory of the library.

Existentials with non–existential determiners therefore clearly show that codas must contribute the scope set and not a restriction, and that between the two GQ analyses under consideration (including BC's analysis), Keenan's is the preferable one.

3.4 Summary

I have presented four possibilities for the semantic analysis of existential propositions: McNally's instantiation analysis and three GQ analyses. The GQ analyses are Barwise and Cooper's (1981) bare–NP analysis, Zucchi's (1995) analysis in terms of domain restriction and Keenan's (1987) analysis with predicative codas. I argued for a GQ analysis over an instantiation analysis. Furthermore, I argued against GQ analyses in which the coda is interpreted as part of the restriction in the quantificational structure introduced by the pivot. The argument against the latter crucially relies on data from pivots containing non–intersective quantifiers. Such determiners clearly show that an analysis along the lines of Keenan (1987) is required if pivots indeed denote GQs. In the next chapter I point out

some problems that call for a refinement of Keenan's analysis having to do with context sensitivity as well as a restatement of the meaning and role of codas.

Chapter 4

Semantic desiderata for a theory of existential propositions

GQ-denoting expressions are semantically unsaturated (type $\langle\langle e, t\rangle, t\rangle$) and in order to form a proposition they must compose with an expression providing a scope set . If pivots denote GQs, then an adequate answer to the existential question must say something about how the scope of the quantification introduced by pivots is determined.

In Keenan's analysis, which was the one outlined at the end of the previous chapter, the scope set is contributed in two different ways. When a coda is present, the property it denotes determines the scope of quantification. In bare existentials, the scope is stipulated to be determined by the trivial property which Keenan calls 1 and which determines the entire domain of quantification for any given model. Thus, on Keenan's analysis existential propositions are always formed by applying a GQ-denoting pivot to some property of individuals. The relevant property is the one denoted by the coda when there is one. In bare existentials, the interpretation defaults to the trivial property, since no other property is specified.

While, given that they denote GQs, there is no doubt that pivots combine with set-denoting elements, as is required by their semantic type, the existential question asks how these set-denoting expressions are contributed. This chapter argues that there are many cases where the relevant sets are not contributed in the way predicted by Keenan's analysis.

In the case of codas, Keenan's semantics predicts that codas combine with pivots in exactly the same way as any other predicate combines with a quantificational argument, and

specifically in the way post-copular predicates combine with their subjects.[1] In the next section, I present data which indicate that codas do not behave like other (main) predicates, and specifically that they do not pattern with post-copular predicates in copular constructions. For bare existentials, In section 4.3 I present data from the role of context in their interpretation which an analysis of them in terms of the trivial predicate ignores.

An account of these data must be part of any answer to the existential question, and many of them have never been addressed in the semantic literature. My conclusion will be that there is no direct predication relation between coda and pivot, but rather that context is involved in the core predication expressed by existential clauses. This must be done without compromising the main conclusion of the previous chapter, namely that codas contribute to the scope of the quantification introduced by the pivot. The main purpose of this dissertation is to propose such an account which retains the GQ denotation for pivots, but incorporates the intuition about codas found in McNally's instantiation analysis, which takes bare existentials as basic and treats codas as adjunct modifiers rather than predicates. Unlike McNally, however, I do not view all codas as depictive adjuncts or secondary predicates.

Specifically, I argue that existential propositions are formed by applying pivots to implicit contextual arguments, and that codas are contextual modifiers restricting these arguments, in much the same way as other contextual modifiers restrict the contextual parameters relative to which non-existential sentences are interpreted. An analyis in which bare existentials are basic and codas are modifiers also holds a significant advantage in terms of the syntax-semantics interface since, as discussed in chapter 2, pivots are the only elements that appear obligatorily in an existential clause, while codas are generally optional. I outline such an analysis in informal terms at the end of this chapter. In chapter 5 I provide a formal analysis and show how that analysis deals with the various data presented below.

[1]Keenan's analysis does *not* predict that existential and copular constructions are always identical in meaning. Since the two differ in syntactic structure, the analysis is compatible with differences having to do with syntactic position, e.g. with the scope of pivots relative to sentential operators such as negation.

4.1 Codas vs. predicates

4.1.1 Codas with quantifiers

Alongside the standard types of PP or adverbial codas discussed in the literature, such as *in the room* or *here*, pivots can also be followed by PPs containing quantifiers. Some more examples are given in (81).

(81) a. There were two people on every ride.
b. There were some Danish actors in every movie.
c. There's a bus every half hour.
d. There's a show most nights.

To my knowledge, quantified PP codas were first discussed in Kuno (1971), but neither Kuno nor the semantic literature on existentials offer a detailed semantic analysis of them.

Kuno notes that codas with quantifiers generally take wide scope over pivots. This observation is also made by Bende-Farkas (1999), At least in some cases, they do so obligatorily. Sentence (81a) means that every ride is such that (at least) two people are on it, (81b) means that all relevant movies involve some Danish actors, sentence (81c) means that every thirty minute interval contains some event involving a bus (most likely an arrival or departure), and (81d) means that for most nights, there is a show that night.

Quantified codas pose a challenge for any analysis that takes the scope of the quantification in the pivot to be a property denoted by the coda, for two reasons:

- Quantified codas do not denote sets but rather quantify over an element in a set-denoting expression.
- Multiple quantified codas do not combine intersectively like predicates.

Quantified codas do not denote sets

Intuitively, qantified codas such as those in (81) are interpreted as introducing not the scope of quantification for the pivot, but a quantifier over entities from which scope sets are constructed. For example, consider a simple case such as (82).

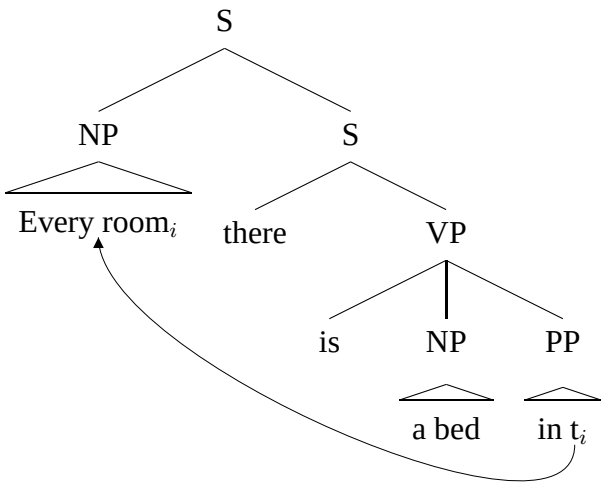
(82) There is a bed in most rooms.

The sentence obviously means that most rooms have a bed. The coda *in most rooms* introduces a quantifier, *most rooms*, quantifying over rooms from which the scope sets for the pivot *a bed* are constructed. This is represented informally in (83).

(83) For every room r, exists a bed b such that λx[in-$r(x)$](b).

In a framework in which semantic interpretation takes place on a syntactic level distinct from surface form, such as Montague Grammar or the various versions of transformational grammar in the GB tradition, the meaning of quantified codas is naturally represented as involving a syntactic displacement operation such as quantifier raising (QR) at LF or quantifying in. For example, the LF representation of (82), assuming Keenan's flat structure, would be along the lines of (84).

(84) **Quantified codas with QR**



The scope set for the GQ denoted by *a bed* here varies with assignments to a variable bound by the moved quantifier and denoted by its trace. Thus, quantified codas do not, strictly speaking, contribute a scope set.

Quantified codas contrast in this respect with quantified predicates in copular constructions. First, sentences such as (82) do not readily have a copular counterpart. A complication is introduced by the general infelicity of indefinite NPs as subjects in copular constructions on a non-generic interpretation, but the contrast persists when the NP corresponding to the pivot is replaced by one whose distribution in copular constructions is unproblematic.

(85) ?? Some bed/at least one bed is in every room.

However, there might be a purely structural reason why the quantified NP in the predicate cannot be raised out of the PP in copular clauses. Perhaps more telling is the fact that quantified predicates have readings that are systematially unavailable for quantified codas. The relevant readings are ones where the prepositional object takes narrow scope and the PP is interpreted as a regular $\langle e, t\rangle$ predicate, as in (86).

(86) a. Ike and Tina were on every ride in Coney Island.

b. Sylvester Stallone is in most movies.

(86a) involves the property of being an individual who has been on all the rides in the amusement park on Coney Island. This property is not available in (81a), which does not (and cannot) mean that two people are such that they have been on all the rides in some context. Similarly, (86b) involves the property of being an individual such that s/he appears in most movies. This property is again not available for (81b), which cannot be paraphrased as *There are some Danish actors who are in every movie*.[2]

In many cases, the potential property-denoting or narrow scope reading of a quantified coda is ruled out by world knowledge, as in (87).

(87) There's a cop on every corner.

Yet what the examples above show is that even when a narrow scope reading for the coda is not ruled out by world knowledge (some people are perfectly capable of going on all the rides in an amusement park), it is still not available.

It is important at this point to keep in mind the difference between scope and specificity. The fact that pivots have narrow scope relative to codas does not rule out a specific reading for them, e.g. for *two people* in (81a). The sentence would still be true in a situation in which every ride (in some amusement park) had the same two people on it, say Ike and Tina (at different times, of course). This is because an entailment relation holds between wide and narrow scope readings for indefinites, and cardinal quantifiers like *two* behave like indefinites in this respect. In other words, the scenario in which Ike and Tina are on every ride is just a special case of the general case in which each ride has two people on it. For this reason, the discourses in (88) are perfectly coherent but do not constitute evidence for a wide scope reading for the pivot.

[2]Note that the potential objection that *be* in sentence (86b) really means *appears* is immaterial, since it has exactly the same meaning in the existential in (81b).

(88) a. There were two people on every ride. They were Ike and Tina.

b. There were two people on every ride: Ike and Tina.

That codas obligatorily take widest scope can be discerned by changing the determiner in the pivot. For example, imagine a situation in which each ride in the amusement park is mounted by fifty people. Everyone goes on just one ride, except for Ike and Tina, who go on all of them. In this situation, it is false to say that there were exactly two people on every ride (there were fifty). But it is true in this situation to say that exactly two people were on every ride – Ike an Tina went on all the rides, but no other people did.

Two more examples from Kuno demonstrating the semantic contrast between a coda and a predicate are given in (89) and (90).

(89) a. There's only one kind of fish in every pond. (Kuno 1971)
(Necessarily: Every pond has just one kind of fish)

b. Only one kind of fish is in every pond.
(Possibly: Every pond has more than one kind of fish)

(90) a. There are many people here every day. (Kuno 1971)

b. Many people are here every day.

The contrast in (90) provides particularly clear evidence that codas are not predicates. In (90b), the phrase *every day* is clearly a predicate modifier: it operates on the predicate *be here* to form the predicate *be here every day*. This predicate is true of an individual if every day is a day in which that individual is here, and the sentence is true if there are many such individuals. This reading is unavailable to (90a), which only means that every day is a day on which many people are here. But *here* in (90a) is a coda on any analysis. If codas are predicates, there is no reason why they should behave any differently from post-copular predicates with respect to predicate modifiers.

The first problem posed by quantified PP codas for any answer to the existential question in which pivots and codas stand in a subject-predicate relation is therefore that such codas do not determine a scope set for the pivot. Even though quantified PPs do in principle have perfectly standard $\langle e, t\rangle$ readings when they appear as predicates, these readings are not available to codas.

Multiple quantified codas do not combine intersectively

The problem posed by quantified codas is exacerbated by cases in which there is more than one such coda, as in (91).

(91) There is a phone in most homes in some countries.

The semantic literature on existentials has not discussed such cases in any detail. If codas denoted sets or properties, then presumably multiple codas should be interpreted intersectively as conjuncts. However, an intersective interpretation does not yield the correct results for (91). The sentence means that some countries are such that in those countries, most homes have a phone. It does not mean that there is a phone that is in most homes and is also in some countries, nor does it mean that most homes and some countries are such that there is a phone in them.

Moreover, multiple quantified codas do not give rise to the kind of inferences expected if they were interpreted intersectively as sets. For example, (92a) does not entail either (92b) or (92c). An analysis in which codas contribute sets cannot explain these inference patterns.

(92) a. There are two phones in every home in most countries.
b. There are two phones in most countries.
c. There are two phones in every home.

Thus, in order to account for quantified and multiple codas, an analysis in which pivots and codas stand in a subject-predicate relation must be augmented with two assumptions. The first is that there is an obligatory rule of quantifier raising in codas. The second is that multiple codas constitute a single PP with NP-internal modifiers and are interpreted like inverse linked structures. I pursue instead an analysis which allows for genuine multiple codas.

4.1.2 Codas with readings unavailable to predicates

Part-whole and constitution readings

Existential constructions can express what may be called *part-whole* or *constitution* relations, as in (93).

(93) There are penalty kicks in soccer.

In some cases, existentials with such readings simply cannot be paraphrased with copular clauses in which the coda PP occurs as a predicate, as in the following examples (Kuno 1971; Kimball 1973):

(94) a. There is space in the margin. (Kuno 1971)
b. ?? Space is in the margin.

(95) a. There is some room in the car.
b. ?? Some room is in the car.

In other cases, a copular variant is readily available, but it is not a paraphrase of the existential. Such cases are exemplified in (96)–(99).

(96) a. There are no Arab ministers in Israel.
b. No Arab ministers are in Israel

(97) a. There are no committees here.
b. No committees are here.

(98) a. There are no wardens in this prison.
b. No wardens are in this prison.

(99) a. There are some residents in this house (but none are in the house).
b. Some residents are in this house (#but none are in the house).

(96a) is ambiguous. Its most salient reading (to my mind) involves the part-whole/constitution relation. On this reading the sentence means that no Arabs serve as ministers in the Israeli government, and can be paraphrased using the verb *have*, as in (100).

(100) Israel has no Arab ministers.

On another reading the sentence means that no Arab ministers (from any country) are present in Israel at the context time. (96b) on the other hand is not ambiguous. It only means that no Arab ministers are present in Israel at the context time, and unlike (96a) it cannot be paraphrased by (100).

The coda *in Israel* therefore has a meaning that is not available for the predicate *in Israel*. While the former can have a part-whole/constitution reading, the latter is only locative. The two readings are clearly truth-conditionally distinct. Until very recently, it was true that there were no Arab ministers in Israel.[3] However, it has often been the case that Arab ministers were present in Israel. If codas and pivots stand in a subject-predicate relation, the contrast between (96a) and (96b) is completely mysterious.

Similarly, (97a) on its most salient reading means that the institution the speaker is referring to does not have committees. On another reading it means that no committees (or, more precisely, committee members) are present at the location and time of context. (97b) on the other hand only has the latter reading, not the former. (98a) is ambiguous in the same way. On its most salient reading, it means that this is an alternative prison in which no wardens are employed to guard the inmates. On this reading the sentence can again be paraphrased as *This prison has no wardens*. (98b) is also at least two ways ambiguous. It can mean either that no people who served as wardens, either at this prison or at some other prison, are imprisoned in this prison, or it can mean that no wardens are present at this prison at the time of context. However the reading paraphrasable with *have* which is available to (98a) is not available to (98b). Finally, (99b) means that some residents of the house are present in the house at the context time. (99a) on the other hand can simply mean that the house has residents, not committing to their whereabouts at the context time.

The descriptive generalization about these examples is that existentials can express part-whole/constitution relations (ministers are constitutive parts of (some) countries, wardens are constitutive parts of a prison, etc.). Such a semantic relation does not in general hold between a subject and a predicate in a copular clause.[4] More examples of this contrast are given in (101)

(101) a. There are four doors in a sedan.

b. There are three sides in a triangle.

c. There was no sheriff in the town.

[3]The first Arab minister was appointed in January 2007.

[4]Locative PP predicates are not in general restricted to purely locative readings. As an example consider *There are some meat dishes on the menu*, which means the same as *Some meat dishes are on the menu*, and does not mean that the dishes are situated physically on the menu.

This type of reading for existentials was noticed for English by Kimball (1973)[5], who called it inalienable possession. Kimball saw in these cases evidence that existentials are inherently locative. However, the sense in which he meant this is completely different from the sense in which the equation of existentials with locatives is usually seen in the literature. For him, existentials are locative because all objects are inalienably possessed by locations and all events are inalienably possessed by their running times; existentials express this possessive relation. In other words what Kimball is really arguing is not that existentials are locative, but that they are possessive. Both the part-whole and constitution relations can be thought of as types of possession. The tight link between existentials and possessives both typologically and diachronically is very well known (Lyons 1967; Clark 1978; Freeze 1992; Zeitoun et al. 1999; Heine 1997; Abdoulaye 2006 among many others). However, it has never been factored into an explicit semantic analysis of existentials, and no existing account captures or predicts it in any way. Capturing the semantic affinity between existentials and possessives is one of the motivations for the approach to existentials developed in chapter 5. At this point, it is enough to note that this affinity is completely unexpected if pivots and codas stand in a subject-predicate relation, since corresponding copular clauses do not in general give rise to possessive readings.

Free relative codas

Another case where codas have readings unavailable to post-copular predicates is when the coda is a free relative, as in (102).

(102) a. There is a zoo where I come from.

b. A zoo is where I come from.

(102a) means that I come from a place featuring a zoo, whereas (102b) can only mean that I come from a zoo.

The coda *where I come from* in (102a) is interpreted as if it were the PP *in the place where I come from*. Thus, if the place where I come from is San Diego, the sentence means that there is a zoo in San Diego. The predicate *where I come from* in (102b), in contrast, is interpreted as the predicative NP *the place I come from*. This NP is predicated of the

[5]Kimball does not note the contrast in this respect between existentials and corresponding copulars. Rather, he claims that such copular counterparts are never grammatical.

subject, *a zoo*, and the sentence is true if there is a zoo which is the place I come from. The phenomenon is quite general. More examples are given in (103) and (104).

(103) a. There is a toilet where we went camping. $\neq$

b. A toilet is where we went camping.

(104) a. There was a war the last time someone killed a prince. $\neq$

b. A war was the last time someone killed a prince.

It might be objected that the free relative in examples like (102a) is not a coda at all, but rather an adjunct. However, this objection presupposes that codas are not adjuncts, but something else. But if codas are not adjuncts, then they are either internal modifiers in the pivot or predicates. The former option has already been ruled out in chapter 3, and the latter option is exactly what this chapter has been arguing against. In fact, semantically the relevant free relatives are indistinguishable from standard PP codas. For example, if I come from Israel, (105a) is truth-conditionally equivalent to (105b).

(105) a. There is a war [where I come from].

b. There is a war [in Israel].

Similarly, if I was born in Chicago, then (106a) and (106b) have the same meaning.

(106) a. There is a zoo where I was born.

b. There is a zoo in Chicago.

Hence, as far as the semantic contribution of codas to existential propositions and their semantic relation to pivots is concerned, FRs following a pivot are indistinguishable from paradigmatic PP codas.

In order to show that FRs in existentials are not predicates (and hence that codas are not predicates) a digression into the nature of free relatives (FRs) is necessarily. It has been observed by various authors (e.g. Emonds 1976; Larson 1985; McCawley 1988 and most recently Caponigro and Pearl To appear) that some free relatives can be interpreted as either NPs or PPs.

(107) a. I like where you're going. (NP interpretation)

b. You'll need this where you're going. (PP interpretation)

The immediate pre-theoretical observation about these examples is that in (107a) the FR is equivalent to an NP whereas in (107b) it is equivalent to a PP. Thus, a FR in an example like (107b) can be replaced with a PP conserving truth.[6] For example, if I am on my way to Hell, (107a) and (107b) can be paraphrased as in (108a) and (108b) respectively.

(108) a. I like Hell.

b. You'll need this in Hell.

Another fairly uncontroversial observation about the two FRs, and the NP and PP that replace them in (108a) and (108b) respectively, is their role in the predicational structure of the sentence. The FR/NP in (107a) and (108a) is an argument, whereas the FR/PP in (107b) and (108b) is a (verbal or sentential) modifier.

The different roles played by the FRs in the predication and their paraphrasability with either an NP or a PP correlate, of course, with their interpretation. In (107a) and (108a), where the FR is an argument and corresponds to an NP, it clearly refers to a place: Hell. Intuitively, the role of the FR in (107b) (and the PP in (108b) is to locate the event expressed in the rest of the clause. However, as will become clear later on, the exact nature of this function is a non-trivial issue. What is clear is that the FR in its modifier role does not refer to a location and behaves as if it were a PP.

PPs such as *in Hell* have another function beyond the two mentioned above (argument and modifier). They can also act as main semantic predicates in copular clauses such as (109).

(109) Orpheus is in Hell.

It is these predicative and modifier functions that are relevant to the contrast between existential and copular clauses exemplified in (102). The FR in (102b) is in predicative context. Generally, FRs in predicative contexts have only NP meanings to the exclusion of PP meanings. For example, the free relative *where I come from* in (102b) is interpreted as a predicative NP, denoting the property of *being the place from which I come*. This is not an idiosyncratic property of the FR *where I come from* in (102b), but a general property

[6] I thank Cleo Condoravdi for pointing this point out to me.

of FRs functioning as predicates.[7] For example, proper names, not readily interpretable as denoting a location, cannot felicitously occur as subjects in copular clauses with a FR predicate as in (110a). (110b) similarly does not have an interpretation that a demonstration occurred in the place where Mary Magdalene was stoned, but only that she was stoned at a demonstration.

(110) a. ?? Orpheus is where you're going.
$\neq$ Orpheus is in Hell.

b. A demonstration was where Mary Magdalene was stoned.

That FRs in predicative positions have only NP meanings and no PP meanings is also evidenced by the inference patterns. If the FR in (111a) had PP readings, then the inference in (111a) would be as seamless as the one in (111b). However, this inference is not valid.

(111) a. I grew up in New York
Penn Station is in New York
$\therefore\!\!\!/$ Penn Station is where I grew up.

b. I grew up in New York
Penn Station is in New York
$\therefore$ Penn Station is in the city I grew up in.

Thus, FRs in predicative positions have NP meanings whereas as modifiers they have PP meanings.[8] The interpretation of FRs in existentials as exemplified in the contrast in (102), (103) and (104) is as PPs, not NPs, and in this sense codas pattern with modifiers, not with predicates. The truth conditional difference between existentials and copulars with FRs stems therefore from the difference between the modifier function and the predicate function played by the FR.

[7] There are exceptions to this generalization with such set expressions as *Love is where you find it* and also with non-set expression examples like *Home is where you want it to be* or *Make sure everything is where you left it*.

[8] I do not enter here the interesting question of whether this systematic interpretational difference entails two distinct structures for FRs, one involving an NP and the other a PP with an empty preposition (see Caponigro and Pearl To appear for a suggestion along these lines).

(112) The interpretation and function of free relatives in existentials and copulars

CONSTRUCTION	INTERPRETATION	FUNCTION
Existentials	PP/*NP	modifier
Copulars	*PP/NP	predicate

In this light, the objection that FRs are adjuncts rather than codas turns from an objection into an empirical generalization which a semantic theory of existentials should model: codas behave semantically not like predicates, but like modifiers (to wit, their paraphrasability with FRs).

Temporal interpretation

Shifting attention from locative codas to temporal ones reveals an interesting contrast between the interpretation of temporal PPs as codas and the interpretation of the same PPs as predicates in copular constructions. Specifically, the contrast arises for PPs relating duration, such as *until noon* or *for 10 hours*. English copular sentences with such PPs are often decidedly odd to native speakers and also seem to be difficult to find in corpora.[9] Nevertheless, speakers I have consulted with converge in their intuitions about the meaning of such examples, to the extent that they are acceptable.

(113) a. There were no contracts for more than a year.
b. No contracts were for more than a year.

(114) a. There were no TV programs until midnight.
b. ? No TV programs were until midnight.

(115) a. There were no flights until evening.
b. ? No flights were until evening.

Consider (115) as an example. While (115a) intuitively means that no flights left before evening, (115b) means that no flight lasted until evening, i.e. that all relevant flights had landed before evening. Suppose that there are two flights, f1 and f2; the contrast can then be shown graphically in (116), where $\overrightarrow{Evening}$ is the onset of evening, $\vec{f1}$ and $\vec{f2}$ are the

[9] For example, as far as I can tell none are attested in the BNC. Examples are difficult to search for on the web, but they are clearly not abundant there either.

departure times of the first and second flights respectively, and $\overleftarrow{f1}$ and $\overleftarrow{f2}$ their respective arrival times. The same meanings are relevant for (114).

(116) a. Scenario consistent with (115a):
- - - - - - - - - $\overrightarrow{Evening}$+++$\overrightarrow{f1}$++$\overrightarrow{f2}$++++

b. Scenario consistent with (115b):
- - - - $\overleftarrow{f1}$- - - - - $\overleftarrow{f2}$- - $\overrightarrow{Evening}$+++++++

Exactly the same contrast with exactly the same meanings involved can be found in Hebrew, where again the copular variants strike speakers as somewhat odd.

(117) a. yeS harbe tisot ad xacot.
EX many flights until midnight
There are many flights until midnight. (But few later.)

b. ?harbe tisot hen ad xacot.
many flights cop[3.f.pl] until midnight
Many flights are/run until midnight.

At the heart of these contrasts is the fact that the copula in Hebrew and at least to some degree copular *be* in English can support aspectual information compatible with the meaning of the PP predicate. In each of the copular examples above the verb *be* is used as if in the role of an aspectual verb like *last* or *go on*.

The contrast with the existential in each case could be related to a lexical difference between the existential and non-existential copulas in English and Hebrew, namely that existential copulas are not capable of carrying such aspectual information. But I know of no general reason why such a lexical contrast might arise, and without such a general explanation positing a lexcial difference seems ad hoc. In any case, the relevant descriptive generalization is that, as in the previous cases discussed, temporal PP codas have meanings different from and unavailable to post-copular predicates.

4.1.3 Licensing of free choice *any*

Codas but not copular predicates license free choice *any*, as shown in (118)–(120). (118b–d) show that it is not the indefiniteness of the subject NP that induces ungrammaticality.

(118) a. There's a lion in any zoo.

b. *A lion is in any zoo.

c. *The lion is in any zoo.

d. *Lions are in any zoo.

(119) a. There is a common flaw in any study that uses the knockout model.[10]

b. ?? A common flaw is in any study that uses the knockout model.

(120) There was a strong military presence around any shipping facilities for port security reasons, so this factor would have to be kept in mind.[11]

If codas are predicates, it is completely mysterious why they should license free choice *any* when post-copular predicates do not.

4.2 Interim summary

All the data discussed in this chapter so far (quantified codas, temporal PP codas, free relative codas and licensing of free choice *any*) point to semantic differences between codas and predicates. The first desideratum for an adequate answer to the existential question is therefore that codas be distinguished semantically from predicates. The analysis in Keenan (1987) does not fulfill this desideratum as it is formulated, and must therefore be revised.

4.3 Context dependence and bare existentials

The second desideratum for an answer to the existential question which Keenan's analysis does not fulfill has to do with the simple observation that bare existentials are context-dependent. English and Hebrew examples of bare existentials are given in (121) and (122).

(121) a. There is still some discrimination. (Switchboard)

b. There's still time.

c. There's no coffee.

d. There were only two seats.

[10] heart.bmjjournals.com/cgi/content/full/91/8/1080

[11] http://www.greenspun.com/bboard/q-and-a-fetch-msg.tcl?msg_id=00ANFt

(122) a. yeS mayim xamim.
EX water[pl] hot[pl]
There's hot water.

b. yeS hamon makom.
EX much place
There's a lot of space.

All the GQ analyses discussed in chapter 3 follow Barwise and Cooper (1981) in assuming the analysis of bare existentials I have called *strong existentialism*, namely that they are interpreted as if containing a trivial predicate denoting the universal property, i.e. the property applying to everything in the domain of quantification. This property is sometimes modeled as the property of self–identity $\lambda x[x = x]$, since the extension of this property in any model is the domain of the model.

While strong existentialism yields intuitively correct truth conditions in some cases, it clearly yields unintuitive truth conditions in others. For example, while (121a) can be used to assert that discrimination does not exist in the domain of quantification (or no longer does), this is not its most natural meaning.[12] Rather it normally means that some context that is salient in the discussion is such that there is still discrimination in that context. Similarly (121b) does not mean that coffee does not exist in the domain of quantification. Rather it means that in some context, coffee has run out and is unavailable. Thus, the scope set of the pivot in a bare existential is contextually determined and is often not the domain but a subset of it.

That the scope set of pivots in bare existentials is not the domain of the model is also evidenced by the fact that (123) is perfectly felicitous, and that the inference in (124) is not valid.[13]

(123) There's no coffee, but I can go get some from the store.

(124) a. There's no coffee.

b. $\nrightarrow$ There's no coffee at the store.

[12] An even less natural meaning results if the universal property is associated with an extensionally equivalent property that has a different descriptive content, such as self–identity. The paraphrase "no discrimination is self-identical" is clearly infelicitous.

[13] I thank Cleo Condoravdi for pointing this inference pattern out to me.

If the scope of quantification in the first disjunct in (123) were the domain of quantfication, the sentence would entail that no coffee exists, and the disjunction would be necessarily false, which it is not. Similarly, if (124a) is interpreted as quantifying over the domain, then since *no* is downward monotone, (124b) would follow logically (if the domain of the model contains no coffee then any subset of this domain also contains no coffee), which it does not.

The context sensitivity of bare existentials has often been observed in the literature. For example, (Borschev and Partee 2001:22) write: "It is important that existence is always understood with respect to some LOCation. An implicit LOCation must be given by the context. This is usually "here" or "there", "now" or "then"". An answer to the existential question must explicate what it means to be "understood with respect to some LOCation" and what the nature is of the presumed implicit element in bare existentials. Saying that the implicit element is "usually "here" or "there", "now" or "then"" is not satisfactory. Clearly there are many cases where the implicit element does not have any of these readings. For example, a sentence like *There are many ways to skin a rabbit* does not mean that there are many ways to skin a rabbit here, now, there or then.

In fact, no explicit semantics has correctly modeled this context sensitivity. Partee (2004, (1999)) attempts to merge the intuition that the implicit element in bare existentials is the universal property or a trivial predicate "exist" with the intuition that this implicit element is somehow implied by context. According to Partee, the predicate "exist" or the property $\lambda x[x = x]$ is "the existential generalization of a missing XP argument in a construction whose full form is ... there be NP XP". She then provides the meanings in (125) for *there be* in a bare existential (I add types to the variables for clarity where relevant):

(125) *there is/are* (without coda):
$\lambda P_{\langle\langle e,t\rangle,t\rangle}[\exists Q_{\langle\langle e,t\rangle}[P(Q)]]$ = $\lambda P[P(\lambda z[z = z])]$ = $\lambda P[P(\text{exist})]$ (= Partee's (19a))

However, the expressions in (125) are not equivalent. The last two expressions, $\lambda P[P(\lambda z[z = z])]$ and $\lambda P[P(\text{exist})]$, denote the set of GQs that contain the entire domain of quantification, and are therefore versions of strong existentialism, which was already argued against above.

The expression $\lambda P[\exists Q[P(Q)]]$ denotes a different set of GQs, the set of non-empty ones. This meaning for bare existentials predicts that any existential with a coda entails the

corresponing bare existential. This is because by simple existental generalization, (126) holds for any set A and any GQ $\mathcal{P}$,

(126) $\mathcal{P}(A) \rightarrow \exists Q_{\langle e,t\rangle}[\mathcal{P}(Q)]$

However, it is easy to see that the inference from an existential with a coda to the corresponding bare existential is never valid for non-monotone and downward montone determiners. For example, if there are no prophets on my boat, it does not follow that there are no prophets, and if there is exactly one prophet on my boat it does not follow that there is exactly one prophet.

Strong existentialism captures this easily. By definition, (127) holds for all and only upward-monotone quantifiers.

(127) For any two sets $A \subseteq B$, $\mathcal{P}(A) \rightarrow \mathcal{P}(B)$.

Since strong existentialism models bare existentials as $\mathcal{P}(E)$, where $\mathcal{P}$ is the quantifier denoted by the pivot, a bare existential is entailed by an existential with a coda only if the latter involves an upward-monotone quantifier.

But if bare existentials involve existential quantification over the scope set then the inference from an existential with a coda to the corresponding bare existential is *always* valid, regardless of the properties of the GQ, as shown in (126) above. For example, if no prophets have a beard, then it follows that there is some set (the set of bearded people) that does not contain prophets and hence that there is a set that falls in the denotation of the GQ denoted by *no prophets*, and hence, on Partee's suggestion, that there are no prophets. But of course it does not follow from the fact that no prophets have beards that there are no prophets. Thus, the meaning of bare existentials cannot involve existential quantification over the scope set.

For upward monotone quantifiers, existential quantification over the scope set and strong existentialism both predict an inference from existentials with a coda to bare existentials. However, this inference is not always intuitively valid either. For example, it follows from (128a) that there is a set P such that the GQ *three empty seats* holds of P, and therefore (128a) is predicted to entail (128b).

(128) a. There are three empty seats in the reserved section.

b. There are three empty seats.

However, the way in which such sentences are used does not intuitively license this inference. For example, in a situation in which I am entering a concert hall and looking for a place to sit, and in which all the seats in the non-reserved sections have been taken, (128a) might be true, but (128b) is intuitively false. Again this is because in the described context, (128b) is naturally interpreted neither as a statement that three empty seats exist nor as a statement that they exist somewhere or with some property, but rather as a claim about the availability/existence of empty seats in the relevant context, i.e. in the set of seats in which I can potentially sit.

The conclusion from this discussion is that bare existentials do not involve existential quantification over the scope set, nor do they always involve the entire domain (though they sometimes do). Rather, the scope set in bare existentials is provided by context.

4.4 Summary

This chapter presented data suggesting two desiderata that an answer to the existential question should meet:

1. The relation between codas and pivots should be semantically distiguished from predication.

2. The scope set in bare existentials should be contextually determined.

In addition to these two desiderata, a constraint was established at the end of chapter 3, namely that codas make a contribution to the scope rather than the restriction of the quantification introduced by the pivot. In other words, what is required is a theory in which codas contribute to the scope of quantification, but do so in a way different from predicates, and in which, in the absence of codas, the scope of quantfication is contributed by context. The next chapter suggests such a theory.

Chapter 5

An analysis of existential propositions

This chapter presents my analysis of existential propositions. The analysis proposes an answer to the existential question that meets the two desiderata discussed in the previous chapter, and explains the various types of data discussed there.

5.1 The core predication in existentials

My approach to answering the existential question is by determining what the core predication in existentials is – what is the main predicate, and what is/are its argument(s).

All the analyses considered so far have viewed pivots as the arguments of some predicate: an instantiation predicate for McNally, the universal property for Zucchi, and either the coda or the universal property for Keenan. The suggestion I argue for here is that pivots are the main predicates of existential constructions, as sometimes suggested in the syntactic literature (e.g. by Jenkins 1975; Williams 1984). Initial motivation for such a view comes from the observation, discussed in chapter 2, that pivots are the only elements of existential clauses that are obligatory across languages. Codas are always optional and copulas sometimes are. If the main predicate of an existential construction is some element other than the pivot, this is quite surprising given what is generally known about clause structure.

5.1.1 Pivots as the main predicates in existentials

While it has been claimed in the literature that pivots are main predicates, this claim has not been supported by an explicit semantic analysis that would explain what kind of predicative role pivots have semantically. In other words, what is the semantic content of the pivot predicate?

I have adopted a GQ analysis for pivots. Most of the discussion of GQs in the semantic literature focuses on GQ-denoting expressions in argument positions. But since GQs are sets of sets, it is (at least) equally intuitive to think of them as expressing (second order) *properties* of sets. For example, the GQ *two clowns* is a property that is true of a set if that set *contains* two clowns, and the GQ *every clown* is the property of sets that is true of a set if it contains every clown.

More generally, it is well known that for all relations expressible by natural language determiners, if the relation holds between the restrictor set `Rest` and the scope set `Scope`, it also holds between `Rest` and the intersection `Int` of `Rest` and `Scope` (this is Barwise and Cooper's *conservativity universal*). As a consequence, any GQ can be construed as conveying information about `Int`, either that it has some cardinality, or that its cardinality has some property (such as being bigger than seven, or bigger than the cardinality of `Rest`$-$`Int`). And since `Int` is always a subset of the `Scope` (including when `Int` is the empty set), conveying information about `Int` is just conveying information about what `Scope` contains or does not contain, and specifically about the cardinality of the set of members of `Rest` contained in `Scope`.

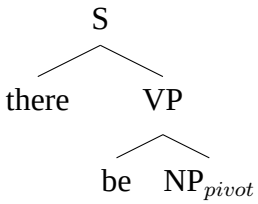
The descriptive content of GQs as predicates is therefore a *containment* relation predicated of the scope set, as in (129).

(129) **GQs as predicates**:
An NP of form `[Det N]` denotes a property $\mathcal{P}_{\langle\langle e,t\rangle,t\rangle}$ of sets such that for any set P, $P \in \mathcal{P}$ iff P contains d elements of [[`N`]], where d is a cardinality, an element in a set of cardinalities or a proportion determined by [[`Det`]].

A GQ denotation for pivots is thus particularly suitable for modeling them as the main predicates of existential constructions. The natural question is then how the pivot predicate composes with its semantic argument. Syntactically, pivots are fully saturated NPs and do not select for any complements. The basic structure I assume for an English existential is

given in (130).

(130) **Basic structure of existentials**:



Given these assumptions, the semantic argument of pivots is only present semantically, not syntactically. In other words, it is an implicit argument. The view of the core predication in existentials argued for here, and so the answer I offer for the existential question, can be represented informally as in (164).

(131) Pivot(implicit argument)

This answer follows McNally's analysis in viewing bare existentials as basic and as expressing the core meaning of an existential clause. The only role available for codas in this picture is as modifiers operating on the main predication expressed by the pivot and its implicit argument, and in this sense too my approach is closer to McNally's analysis than to Keenan's. However, before moving on to discuss the role of codas, some motivation is required for the view that pivots have implicit arguments.

5.1.2 Bare existentials and implicit arguments

A comparison of bare existentials with other linguistic contexts involving implicit arguments provides strong empirical support for the analysis suggested above, and also reveals much about the range of meanings bare existentials can have, and their interaction with context.

Implicit arguments (of the type relevant here) include "missing" objects of transitive verbs as well as such predicates as *local* in "a *local* bar" or *related* in "a *related* matter". Fillmore (1986) identified two types of readings for missing objects: an existential quantification reading (132a) and a definite reading (132b).

(132) a. I ate. (= I ate something)

b. I noticed. (= I noticed that)

Condoravdi and Gawron (1996) (CG) show that the implicit arguments of non-verbal lexical predicates such as *local* involve the definite reading and not the existential one. CG show further that definite implicit arguments have three kinds of readings in relation to context: deictic, anaphoric and bound–variable readings. They point out that the availability of all three types of readings distinguishes implicit arguments from other context–dependent arguments such as pronouns. The three readings of implicit arguments are demonstrated in (133).

(133) a. **Deictic**: A local bar is selling cheap beer.

b. **Anaphoric**: We stayed two weeks in the village. A local bar was selling cheap beer.

c. **Bound variable**: Every fan watched the game in a local bar.

The fact that pronouns lack some of these readings is shown in (134), CG's example (13).

(134) a. Every man who bet on the Superbowl won.

b. Every man who bet on the Superbowl won the bet.

c. Every man who bet on the Superbowl won it.

While (134b) is equivalent to (134a), (134c) is not and can only mean that everyone who bet on the Superbowl also won the Superbowl. What this clearly shows is that the value of an implicit argument can be retrieved from context without an overt linguistic antecedent being present, whereas a pronoun must be bound to a possible antecedent if there is one. It is perhaps worth pointing out that this contrast between implicit arguments and pronouns is not an idiosyncrasy of English grammar but a general semantic fact. Exactly the same contrast can be reproduced in Hebrew.

(135) kol mi Se-hitarev al ha-misxak niceax.
all who that-bet[3.m.sg.pst] on the-game win[3.m.sg.pst]
Everyone who bet on the game won.

(136) kol mi Se-hitarev al ha-misxak niceax ba-hitarvut.
all who that-bet[3.m.sg.pst] on the-game win[3.m.sg.pst] in.the-betting
Every man who bet on the game won the bet.

(137) kol mi Se-hitarev al ha-misxak niceax bo.
all who that-bet[3.m.sg.pst] on the-game win[3.m.sg.pst] in[3.m.sg]
Every man who bet on the game won it.

Getting back to bare existentials, it is easy to see that the implicit argument of the GQ denoted by the pivot has all and only the interpretations available to definite implicit arguments. That this argument does not receive an existentially quantified reading was already shown in the discussion of the context dependence of bare existentials in section 4.3. That this argument can have deictic, anaphoric and bound variable readings is shown in (138).

(138) a. There's no more food. (**Deictic**)
b. We had to leave the village. There was no more food. (**Anaphoric**)
c. Every village is abandoned when there is no more food.
(**Bound variable**)

The contrast between implicit arguments and pronouns in (134) can also be reproduced with existentials, as exemplified in (139)–(141).[1]

(139) a. Jacob fled to Egypt because there was a famine.
b. Jacob fled to Egypt because there was a famine there.

(140) a. The Austro-Hungarian emperor travelled to Istanbul because there was a siege.
b. The Austro-Hungarian emperor travelled to Istanbul because there was a siege there.

(141) a. Nobody at the screening noticed that there was violence.
b. Nobody at the screening noticed that there was violence there.

The natural interpretation of (139a) is that Jacob is fleeing to Egypt because the place he is living in is famine struck. (139b) on the other hand can only mean that the famine is in Egypt and for some reason Jacob is fleeing there. In (140a), the emperor is likely

[1] Strictly speaking, the pronouns in these exmaples are not really parallel to the implicit arguments they are contrasted with, since pivots are saturated and can never actually have an explicit argument. The adverbial pronouns are codas, which are modifiers. However, in the relevant cases this does not affect the semantic argument.

traveling to Istanbul because there is a siege in Vienna which some diplomacy (or a quick surrender) might help to lift. But in (140b) the siege must be in Istanbul. Finally, one natural interpretation of (141a) is that no people noticed that there was violence in the movie. This interpretation is not available however for (141b), which can only mean that nobody noticed there was violence at the screening.

The parallelism between the interpretations available to bare existentials and those available in linguistic contexts involving implicit arguments thus lends much empirical support for the claim that pivot predicates have an implicit argument.

At the same time, assuming that pivots have implicit set arguments makes it possible to model the variety of readings available to bare existentials and the role of context in determining the scope of quantification in existentials. In each of the three examples above, an entity implied by a matrix constituent is introduced as a discourse referent in the common ground. The implicit argument of the pivot, its scope set, is a set of entities related by some contextually determined relation to this discourse referent.[2]

In general then the implicit argument that forms the scope set of the pivot is a set contributed by context. I refer to such sets as *contextual domains*. Contextual domains are essentially similar to the context sets familiar from the literature on contextual domain restriction (e.g. Westerståhl 1984; Von Fintel 1994; Roberts 1995; Gawron 1996; Stanley and Gendler Szabó 2000). For example, the sentence in (142) is not understood to entail that animals are now extinct.

[2]Bende-Farkas (1999) makes an interesting related suggestion, modeling what I call the implicit argument of the pivot as a location discourse referent introduced by *there be*. However, as already discussed, there are languages where no overt material is available to introduce this discourse referent. Furthermore, Bende-Farkas' approach requires her to combine *there be* with the determiner in the pivot as a property modifier. I find the idea that *there be Det* is a complex determiner somewhat unintuitive, especially with non-existential determiners (in Keenan's sense) such as *most* or *every*. Bende-Farkas is not completely explicit about the combination of such determiners with *there be* and with codas, but if I understand her suggestion correctly, it assigns unintuitive truth conditions to existentials with non-existential pivots. For example, a sentence like *??There is every student on the bus* (or its perfectly grammatical Hebrew counterpart) receives a meaning along the lines of "For every student located in some location τ, τ is on the bus", which is a vacuous quantification since the variable over students in the restriction appears nowhere in the scope. It is not clear to me what meaning her analysis assigns to a sentence like *??There are most students on the bus* or *There were most of the usual people there*.

(142) Coli endotoxin caused death in all animals within 16 to 29 hours.[3]

Generally, what is involved in such cases is that a contextually supplied set is understood to intersect with the common noun in the meaning of the relevant quantified expression. Thus the quantified expression *all animals* in (142) is interpreted as if some covert PP such as *in the experiment* were modifying the head noun *animals*. As with the implicit argument of pivots, here too context must supply a salient discourse referent, the experiment, and the context set is constructed as a set of entities related to this discourse referent by some contextually salient relation. More generally, one can speak of the *contextual domain of an entity*, the context set determined through a salient discourse referent and relation. Contextual domains of entities can be defined generally as in (143), where R is a contextually determined relation, and τ, τ' are any types.

(143) **Contextual domains of entities**:
For every element α of type τ, let d_α be the *contextual domain* of α, where $d_\alpha =_{def} \lambda y_{\tau'}[R_{\langle\tau,\langle\tau',t\rangle\rangle}(\alpha, y)]$

Throughout the rest of this chapter I use d as the variable letter for contextual domains. Any such domain is of some type $\langle\tau, t\rangle$, i.e. denotes a set of some kind, e.g. a set of times, individuals or events. When relevant, I specify the type. I use d in order to ighlight the fact that contextual domains are not sets denoted by predicate symbols.

The only difference between context sets and contextual domains, i.e. the implicit arguments of pivots, is in their role in the predication in which they participate. Context sets are implicit modifiers of one of the arguments in the core predication. The implicit argument of a pivot is the single argument of a main predicate. In a sense then, contextual domains are the semantic subjects of existentials. This is in line with the intuition sometimes voiced in the literature that existentials are "about" the context (cf. Erteschik-Shir's (1997) notion of "stage topic").

5.2 A semantics for bare existentials

The proposition expressed by a bare existential is thus achieved by applying a GQ predicate to some set. The meaning I assign to bare existential is exemplified in (144) for the sentence

[3] jcm.asm.org/cgi/reprint/41/7/3051.pdf

There's no coffee.[4]

(144) a. [[*No coffee*]] = $\lambda P_{\langle e,t\rangle}[\mathbf{no}(\lambda x[\text{coffee}(x)], P)]$

b. [[*there's no coffee*]] = $\mathbf{no}(\lambda x[\text{coffee}(x)], d_u) =$
$\mathbf{no}(\lambda x[\text{coffee}(x), \lambda y_e[R(u, y)])$

(144a) is the meaning of the pivot predicate, the standard GQ meaning. The meaning in (144b) is derived from (144a) as follows. On the assumption that expletives and existential copulas do not contribute any meaning (see chapter 3), a bare existential is comprised semantically of just the pivot predicate. Since no expression is available to saturate this predicate, a value for the variable P is assigned from context in a process that might be termed *contextual closure*. Contextual closure is just β-reduction where the value of P is contextually determined. The contextual domain d_u is the set of entities related to u by R, where u is some entity.[5] The value of d_u can be, for example, the domain E of the model, as in strong existentialism, by choosing any value for u and resolving R to some trivial relation, e.g. the relation that holds of two entities if there exists a set of which they are both members. Since all entities are members of E, the set of things that stand in this relation to any entity u will be the domain E (assuming that all entities stand in the trivial relation to themselves).

Following are some examples to make the work performed by domains more concrete. Consider first the case in (144). Intuitively, the entity relative to which the contextual domain is defined is the time and place of utterance, $\langle t_u, l_u\rangle$, which I abbreviate as st_u.[6] The contextual domain of the time/place of utterance is then $d_{st_u} = \lambda y_e[R(st_u, y)]$, the set of things related by R to the spatiotemporal parameters of utterance. There are many ways by which things can be related to the spatiotemporal parameters of a context, but one of the salient ones for concrete entities such as coffee is simply the relation of being

[4]The meanings of determiners are written throughout in bold, e.g. **no** is taken to stand for the more elaborate $\lambda P_{\langle e,t\rangle}\lambda Q_{\langle e,t\rangle}[P \cap Q = \emptyset]$, etc.

[5]Though *contextual closure* is not a standard term in the literature, the process it describes is fairly standard, especially in the semantics of temporality, where it is assumed practically universally in the determination of the contextual interval within which some predication is said to hold (cf. Reichenbach's (1947) R-time or Klein's (1994) "topic time" or Dowty's (1982) indexical temporal constant i^*).

[6]I represent the spatiotemporal parameters of utterance as a tuple here for convenience. It does not matter for my analysis how space–time units are represented or what type they are assigned, as long as it can be quantified over.

located within these parameters (i.e. occupying a sublocation of the contextual location at a subinterval of the contextual interval). The meaning of (144) on this interpretation is given in (145).[7]

(145) $\mathbf{no}(\lambda x[\text{coffee}(x)], \lambda y[R(st_u, y)])$

However, R is underspecified and there is much pragmatics involved in its actual interpretation. For example (144) can be used to assert that coffee is *available*, whether it is present in the spatiotemporal parameters or not.

Next consider an existential with an event-denoting nominal such as (146).

(146) There was an accident.

Intuitively, this sentence claims about some contextual interval I in the past (before speech time) that an accident occurred within it. The relation R is in this case interpreted as the subinterval relation, $\subseteq$. The contextual domain of I, d_I, is therefore the set of subintevals of I, and the sentence is true if D_I contains an interval that is the running time of an accident. For simplicity, I assume here that events are interchangeable with their running times, and represent the meaning of *accident* as a property of intervals. An interval j has the property *accident* if it is the running time of an accident. The meaning of the sentence is given in (147), where I is the contextual interval.

(147) $\mathbf{a}(\lambda j[\text{accident}(j)], \lambda y_{\langle i \rangle}[y \subseteq I])$

This analysis of bare existentials avoids the pitfalls of bare existentialism. It also fulfills the second desideratum for an answer to the existential question discussed in chapter 4: it models the main predication in existentials as involving context sets, and hence makes bare existentials context dependent.

5.3 Codas as contextual modifiers

As already mentioned, on the view I am arguing for, codas do not play any role in the main predication expressed by an existential sentence. This is a positive result given the first

[7] Here too pragmatics and world knowledge plays a role in determining what counts as being located in the spatiotemporal parameters of a context. Normally if some coffee is spilled on the floor in my kitchen, this is not sufficient for me to felicitously utter *there's coffee* to a guest.

desideratum for an answer to the existential question discussed in chapter 4, namely that codas not be assimilated to predicates. But recall that it was established in chapter 3 that codas make a contribution to the scope of quantifiction. In terms of the proposal outlined so far, this means that codas must somehow determine the value for the implicit argument of the pivot, since this implicit argument is the scope set.

I suggest that codas be viewed, following McNally, as adjuncts contributing contextual modifiers. However, while some codas might be depictives as in McNally's analysis, many of them are not amenable to such a treatment, and are more intuitively modeled on a par with sentential modifiers such as temporal and locational PPs. For example, consider (148).

(148) There will be a quiz every week.

(148) does not intuitively express a property of quizzes, and *every week* does not name such a property. The coda in this example rather seems to set the context for the interpretation of the existential proposition expressed by *There will be a quiz*.

In terms of the analysis of bare existentials developed in the previous section, the role of codas can be seen simply as setting the value of the contextual domain that is the implicit argument of the pivot. In this respect too codas are parallel to sentential modifiers. For example, compare the simple sentence modified by a temporal PP such as (149a) with an existential in (149b).

(149) a. [Miriam left] in 1967.

b. [There was a war] in 1967.

Intuitively, the modifier *in 1967* in (149a) provides the time interval within which the sentence *Miriam left* is to be interpreted. My claim is that the role of the coda in (149b) is similarly to provide the time interval within which the sentence *There was a war* is interpreted. Capturing this intuitive parallelism requires however some theory of contextual modification.

5.3.1 The semantics of contextual modifiers

Formally, the main clause in (149a), *Miriam left*, can be viewed as denoting the set of intervals containing an event of Miriam leaving. This can be represented as in (150) (abstracting

away from tense).[8]

(150) **The meaning of** *Miriam left*:
$\lambda I_{\langle i,t\rangle}[\mathbf{a}(\lambda i[\text{left}(m)(i)], \lambda j[j \subseteq I])]$

Note that in (150) an existential quantification over intervals is involved (written as the determiner *a*, and equivalent to the standard existential quantification over events in event semantics), and the scope set is a set of intervals that can be viewed as a contextual domain: the set of intervals that stand in the subinterval relation to I, or in the terminology introduced earlier, d_i.

The role of the contextual modifier *in 1967* is to restrict the value of the interval variable I, so that the interval within which Miriam left is an interval in 1967. In much of the literature on temporal modification, temporal PPs such as *in 1967* are treated as predicates of a Davidsonian event variable, on a par with adverbial modifiers such as *with a knife* or *quietly*, and are interpreted intersectively in a logical form along the lines of (151).

(151) $\exists e[\text{left}(m, e)\&\text{in}(e, 1967)]$

However, Pratt and Francez (2001) (PF) show that, for reasons similar to those raised in section 4.1.1 for quantified codas, temporal PP modifiers with quantifiers cannot be viewed as predicates of events and cannot be interpreted intersectively. PF suggest instead an analysis of temporal PP modifiers as generalized quantifiers over intervals.[9] PFs analysis is quite complex, and I reproduce here only as much as is relevant for the discussion of codas.[10] For PF, the meaning of a sentence like *Miriam left* is as in (152), where x is a

[8]This representation again makes the simplifying assumption that events are interchangeable with their running time. In a Davidsonian event semantics, the representation would rather be along the lines of (i).

(i) $\lambda I_{\langle i,t\rangle}[\exists e[\text{leave}(m, e)]\&\text{time}(e) \subseteq I]$

However, I use the formulation in (150) for various reasons that will become clear below. Because every event has a unique running time (though not vice versa: each interval can be the running time of countless events), nothing is lost by using this formulation.

[9]A treatment of temporal PP modifiers as generalized quantifiers over intervals can be found already in Dowty (1982). However, Dowty only considers existential quantification and therefore retains the view that temporal modifiers are interpreted intersectively.

[10]See also von Stechow 2002 for important critical discussion of PF's analysis and its interaction with tense, aspect and various other phenomena, and Artstein 2005 for discussion of the interaction of matrix

variable over eventualities, viewed as elements of type e, and $\top$ is a trivial property that holds of everything. This meaning is essentially identical to the one in (150), and says that the contextual interval I is an interval in which an event of Miriam leaving occurred.

(152) $\lambda I[\mathbf{a}(\lambda x[\text{leave}(m)(x)\ \&\ time(x) \subseteq I], \top)]$

Temporal modifiers are then modelled as sets of sets of intervals, or more intuitively sets of properties of intervals. For example, the modifier *during some meeting* is the set of all properties of intervals that hold of an interval during some meeting in the contextual interval.

(153) [[during some meeting]] =
$\lambda\mathcal{P}_{\langle\langle i,t\rangle,t\rangle}\lambda I[\mathbf{some}(\lambda x[\text{meeting}(x)\&\ time(x) \subseteq I], \lambda y[\mathcal{P}(time(y))])]$

The combination of the meaning of the modifier and that of a sentence like *Miriam left* is computed by simple function application and yields the representation in (154), which is the correct one.

(154) **PF's derivation of** *Miriam left during some meeting*
$\lambda I[\mathbf{some}(\lambda x[\text{meeting}(x)\&\ time(x) \subseteq I],$
$\lambda y[\mathbf{a}(\lambda z[\text{left}(m)(z)\&\ time(z) \subseteq time(x)], \top])]$

PF model the meanings of sentences[11] as properties of times. Specifically, as properties of intervals that contribute a restriction to the existential quantification over events in the sentence. The scope of quantification is for them always the trivial property. Thus, a sentence like *Miriam left* is paraphrased as *an event of Miriam leaving within interval I exists*. This is reminiscent of the analysis of bare existentials that I have called strong existentialism. But since quantification over events is generally existential (at least in the cases considered), and hence existential in Keenan's sense, this meaning is always equivalent to the same meaning with the temporal restriction actually occurring in the scope. Thus, the two paraphrases in (155) are equivalent.

(155) a. An event of Miriam leaving within I exists.

quantifiers with quantifiers in temporal modifiers.

[11] More precisely, what they call *finalized* meanings of sentences, i.e. the meaning of sentences open to modification

b. An event of Miriam leaving is within I.

Existentials, including ones with event-denoting nominals, involve a wider range of quantification, and as discussed above require that codas make a contribution to the scope rather than the restriction of quantification. I thus suggest a modified version of PF's semantics for sentences in which they denote GQs over contextual intervals rather than properties of such intervals, and in which the contextual interval, exactly like the contextual domain argument of a pivot, occurs in the scope of quantification. For example, the meaning I assign to a sentence like *Miriam left* is in (156). The property P is a set of times.

(156) **New meaning for** *Miriam left*
$\lambda P_{\langle i,t\rangle}[\mathbf{a}(\lambda i[\text{leave}(m)(i)], P)]$

Sentences, like pivots, are fully saturated and so their scope set cannot be contributed by any element in the core predication. It must be retrieved from context, and the process by which this is done in the absence of modifiers is the same process that I have called *contextual closure* above: the meaning of the sentence is just "applied" to some contextual set, typically constructed from a salient discourse referent and a relation. In the case of sentences, the relvant discourse referent is the topic time (or R-time), and the relation is the subinterval relation $\subseteq$. In the absence of modifiers, the meaning of *Miriam left* is thus determined to be (157), where I is the topic interval.

(157) **New meaning for** *Miriam left* **after contextual closure**
$\mathbf{a}(\lambda i[\text{leave}(m)(i)], d_I)$ =
$\mathbf{a}(\lambda i[\text{leave}(m)(i)], \lambda j[j \subseteq I])$

This modification necessiates also a minor modification in the representation of temporal modifiers. Instead of denoting GQs over intervals, temporal modifiers must now have a yet higher type, and denote sets of such GQs. For example, the meaning of the contextual modifier *in 1967* is the set of GQs that apply to the set of subintervals of the interval 1967, given in (158).

(158) [[in 1967]] = $\lambda\mathcal{P}_{\langle\langle i,t\rangle,t\rangle}[\mathcal{P}(\lambda i[i \subseteq 1967])]$

With this meaning, temporal modifiers can combine by simple function application with the new, pre-contextual closure meaning of sentences, e.g. to the meaning in (156). This is shown in (159). To increase readability, I use @ to mean "applied to".

(159) **Derivation of** *Miriam left in 1967*:
[[in 1967]] ([[Miriam left]]) =
$\lambda\mathcal{P}_{\langle\langle i,t\rangle,t\rangle}[\mathcal{P}(\lambda i'[i' \subseteq 1967])]$@($\lambda P_{\langle i,t\rangle}[\mathbf{a}(\lambda i[\text{leave}(m)(i)], P)]$)=
$\lambda P_{\langle i,t\rangle}[\mathbf{a}(\lambda i[\text{leave}(m)(i)], P)]$@($\lambda i'[i' \subseteq 1967]$) =
$\mathbf{a}(\lambda i[\text{leave}(m)(i)], \lambda i'[i' \subseteq 1967])$

With these modifications at hand, it is simple to model codas as contextual modifiers, since the meaning of pivots is essentially the same as the meaning of sentences. Consider again sentence (149b) above, repeated here.

(160) [There was a war] in 1967.

The meaning of the matrix existential according to the analysis of bare existentials above, before contextual closure occurs, is just the meaning of the pivot, given in (161).

(161) **The meaning of** *there was a war* **before contextual closure**:
$\lambda P_{\langle i,t\rangle}[a(\lambda i[\text{war}(i)], P)]$

The meaning of the coda *in 1967* is the same as the meaning of the contextual modifier in *Miriam left in 1967* given in (158) above, which is equivalent to (162) using the notation for contextual domains introduced above.

(162) [[in 1967]] = $\lambda\mathcal{P}_{\langle\langle i,t\rangle,t\rangle}[\mathcal{P}(d_{1967})]$

The combination of a coda with a modifier is then achieved by applying the meaning of the modifier to that of the bare existential as in (163).

(163) **Derivation of** *there was a war in 1967*:
[[in 1967]]([[there was a war]]) =
$\lambda\mathcal{P}_{\langle\langle i,t\rangle,t\rangle}[\mathcal{P}(d_{1967})]$@($\lambda P_{\langle i,t\rangle}[a(\lambda i[\text{war}(i)], P)]$) =
$a(\lambda i[\text{war}(i)], d_{1967})$ =
$a(\lambda i[\text{war}(i)], \lambda i'[i' \subseteq 1967)])$

The general semantic structure of an existential with a coda that emerges from this analyis is the one given in (164).

(164) [[coda]]([[pivot]])

This analysis of codas as contextual modifiers thus clearly fulfills the desideratum that codas are not assimilated to predicates. Furthermore, it also satisfies the requirement that codas make a contribution to the scope of quantification rather than the restriction. A more general consequence of this analysis is that at least in some contexts, sentences and NPs receive similar interpretations as GQs over contextual variables, with the scope set contributed by context. One way in which this may be a positive consequence is that it provides the first step in explaining the fact, mentioned in section 2.4.2, that NPs can occur with sentential meanings in examples like (165). I cannot, however, pursue this issue further here.

(165) No free wireless means we're not staying.

This concludes the exposition of the answer I propose for the existential question. To recap, the core predication in existentials is achieved by applying the pivot predicate to its implicit argument, a contextual domain often constructed from a salient entity and a contextually salient relation. The rest of this chapter is dedicated to discussing how the proposed answer makes sense of the various types of data raised in the previous chapter reagarding the differences between codas and predicates.

5.4 Quantified and multiple codas

Section 4.1.1 discussed PP codas that involve quantified expressions in the complement of the preposition, as in (166a). Quantified codas, however, need not be PPs; they can also be quantified adverbials as in (166b). Furthermore, there can be multiple codas, quantified or not, as in (166c).

(166) a. There was a prophet on every ship.
b. There were prophets everywhere.
c. There was a prophet in a corner on every ship.

It was shown that such codas do not have property readings with the quantified expression scoping within the PP, but that the quantification in the coda must outscope that in the pivot. As discussed in the previous section, similar observations about scope formed the main motivation for PF's (2001) analysis of quantified temporal sentential modifiers. Such

modifiers must outscope the existential quantification over events in the sentences they modify.

On the current analysis, quantified codas are analyzed in exactly the same way as non-quantified ones. For example, the meaning of the coda *on every ship*, like that of the coda *in 1967* discussed above, is a set of GQs. Specifically, those GQs that hold of the contextual domain constructed from every ship (in some relevant context) and the relation *on*. In other words, *on every ship* denotes the set of propositions that hold relative to the contextual domain defined for every ship by the things on that ship. This is represented in (167), where ${d^{on}}_y$ is the contextual domain $\lambda x_e[\text{on}(y, x)]$.

(167) [[on every ship]] = $\lambda\mathcal{P}_{\langle\langle e,t\rangle,t\rangle}[\mathbf{every}(\lambda x[\text{ship}(x), \lambda y[\mathcal{P}({d^{on}}_y)])]$

The coda thus introduces a quantification that binds a variable corresponding to the discourse referent relative to which the contextual domain argument for the pivot is constructed. The coda also contributes the relation with which this domain is constructed. The coda combines with the meaning of the existential by functional application.

(168) **Derivation of** *there is a prophet on every ship*
[[on every ship]]([[there is a prophet]]) =
$\lambda\mathcal{P}_{\langle\langle e,t\rangle,t\rangle}[\mathbf{every}(\lambda x[\text{ship}(x)], \lambda y[\mathcal{P}({d^{on}}_y)])]@(\lambda P[\mathbf{a}(\lambda z[\text{prophet}(z)], P)]) =$
$\mathbf{every}(\lambda x[\text{ship}(x)], \lambda y[\lambda P[\mathbf{a}(\lambda z[\text{prophet}(z)], P)]])@({d^{on}}_y) =$
$\mathbf{every}(\lambda x[\text{ship}(x)], \lambda y[\mathbf{a}(\lambda z[\text{prophet}(z)], {d^{on}}_y)])$

Thus, the approach to codas as contextual modifiers analyzed, with some modification, along the lines of Pratt and Francez (2001) or von Stechow (2002), yields the correct scopal behavior for quantified codas as a direct result of function application. Codas are simply modifiers that take scope over the element they modify, just as sentential modifiers scope above the existential quantification over the Davidsonian event variable.

At this point the analysis encounters a problem, because as it is formulated it cannot accommodate multiple codas. The final result of the derivation in (168) is an expression of type t, and so not of the proper type for further modification by another coda.

This problem does not arise in the system of Pratt and Francez (2001), since they treat modifiers as always involving abstraction over both a property of times and a contextual variable. Recall for example, the meaning they assign to the modifier *during some meeting* in (153) above, repeated here.

(169) [[during some meeting]] =
$\lambda\mathcal{P}_{\langle\langle i,t\rangle,t\rangle}\lambda I[\mathbf{some}(\lambda x[\text{meeting}(x)\& \mathit{time}(x) \subseteq I], \lambda y[\mathcal{P}(\mathit{time}(y))])]$

When this meaning is applied to a sentential meaning, the result is a lambda-abstract abstracting over a contextual variable that restricts the interpretation of the noun in the modifier (i.e. of *meeting* in (169)).

The way PF achieve abstraction over a contextual variable however has two somewhat unattractive features. The first is that all nouns are treated as inherently relational, i.e. associated with an interval embedding their "temporal extent", as in (170).

(170) **Nouns as inherently relational** (Pratt and Francez 2001):
[[noun]] $= \lambda x\lambda I[\text{noun}(x) \wedge \mathit{time}(x) \subseteq I]$

This seems unappealing as an analysis of the descriptive content of nouns. The second is that in order for the abstraction over contextual intervals to remain available in a modifier, PF must combine nouns with determiners by means of a special operation they call *pseudoapplication*, the details of which are not important here. This is an ad hoc operation, not needed in any other semantic context.

The important purpose that these features of PF's analysis are meant to serve is that of abstracting over a context set restricting a domain of a quantification in the usual way. I therefore assume simply that, given a quantificational structure, it is always possible to introduce a restriction by intersecting with the restrictor set. I call this process *contextualization*, and characterize it generally as in (171), where $\mathcal{Q}$ is some quantificational operator, and C a contextually determined set.

(171) **Contextualization**:
$\mathcal{Q}(\lambda x[P(x)], \lambda y[Q(y)]) \rightarrow \lambda C[\mathcal{Q}(\lambda x[P(x)\ \&\ C(x)], \lambda y[Q(y)])]$

While this process might also seem ad hoc, it is arguably less so than the combination of the relational noun approach with pseudoapplication. Such a process is very likely needed in any case to model contextual domain restriction in cases where the restricting set is bound by some other expression, as in (172).

(172) Everyone who ran an experiment knew that many rats were blind.

Applying contextualization to the combination of a coda with an existential introduces the variable needed for further modification by another coda to apply. For example, the

result of applying the coda *on every ship* to *there is a prophet* in (168) above was the formula in (173a). The expression resulting from the application of contextualization, given in (173b), is a GQ of the right type, and can act as the argument of another coda.

(173) a. $\mathbf{every}(\lambda x[\text{ship}(x)], \lambda y[\mathbf{a}(\lambda z[\text{prophet}(z)], {d^{on}}_y)])$

b. $\lambda P[\mathbf{every}(\lambda x[\text{ship}(x)\ \&\ P(x)], \lambda y[\mathbf{a}(\lambda z[\text{prophet}(z)], {d^{on}}_y)])$

5.5 Meaning differences between codas and predicates

In section 4.1.2 it was pointed out that codas can have meanings unavailable to post-copular predicates. The first exemple of this was the observation, going back at least to Kimball (1973), that existentials but not their copular counteraprts have part-whole and constitution readings. The relevant contrast is repeated in (174).

(174) a. There is no prime minister in the U.S.

b. No prime minister is in the U.S.

Since the existential and copular examples consist of exactly the same material, any difference in meaning must come from the configuration in which the relevant parts occur, i.e. from the mode of combination.

I suggest that the difference is rooted in the interpretations available to the preposition *in* when it is a post-copular predicate and when it is part of a coda modifier. As a post-copular predicate, the preposition acts as the main predicate of the construction, and semantically selects the subject argument. Prototypically, however, parts are *existentially dependent* on the wholes of which they are parts. For example, a hole in a bucket does not exist outside or without the bucket. The bucket on the other hand exists independently of the hole. Since independent existence is presumably a subject property (cf. Dowty 1991), the part-whole relation is not readily expressed by a predication in which the existentially-dependent part is the subject. Copular sentences in which *in* is the main predicate are thus blocked from expressing a part-whole relation since that would entail having an existentially-dependent subject.

In a PP modifier on the other hand, the preposition is not part of the core predication at all. Its role is to express the kind of modification involved, e.g. the subinterval relation in the case of temporal PPs. In an existential expressing a part-whole relation, the expression

expressing the part is the main predicate, not the subject, and hence no problem arises with existential-dependence. Modifier PPs can thus express part-whole relations because the (implicit) argument in the predication the value of which they restrict is a whole and hence existentially independent.

The fact that modificational *in* allows part-whole and constitutional readings can be seen also in non-existential contexts, such as post-nominal modification.

(175) a. Prime Ministers in the U.S. are elected by Congress.

b. Knights in chess can move over other pieces.

In other words, the existential pivot on the proposed analysis is a predicate of sets. One kind of set that the pivot can predicate over is the contextual domain of an entity – a set of entities related to a discourse referent by some relation. The set of entities related by the (constitutive) part-of relation to some whole is a perfectly natural instance of a contextual domain.

In the case of quantified codas, the quantification is intuitively over a set of entities that comprise wholes, and the scope of quantification is the property of containing (or not) some quantity or proportion of parts of some sort. Consider, for example, the meaning assigned by the current analysis to (176a), paraphrased informally in (176b).

(176) a. There is a junior member in every committee.

b. Every committee x is such that d_x contains a junior member.

The sentence expresses a quantification over committees as wholes. The scope set in this case can be described as the set of wholes such that their parts (in this case, members) include a junior member.

Since the part-of relation is not necessarily transitive, cases of multiple part-whole codas do not yield conjunctive inferences, as shown in (177).

(177) a. There are two doors in every car in most races.

b. $\nrightarrow$ There are two doors in every car.

c. $\nrightarrow$ There are two doors in most races.

The intuitive meaning of this sentence is that every race is such that every car that is part of it is such that its set of parts contains two doors. In terms of the definition of contexts

developed earlier, the meaning of the sentence can be represented as in (178), where d_x is used for the contextual domain defined by the set of things standing in the (constitutive) part-of relation to x.

(178) $\mathbf{most}(\lambda r[\text{race}(r)],$
$\lambda r'[\mathbf{every}(\lambda c[\text{car}(c)\ \&\ \underline{c \in d_{r'}}\ ],$
$\lambda c'[\mathbf{two}(\lambda x[\text{door}(x)], \lambda y[y \in d_{c'}\ ])])])$

It is clear from this meaning why the relevant entailments do not go through. The two codas do not combine intersectively as predicates of an eventuality variable or a spatiotemporal variable. Rather, the first coda restricts the contextual domain that functions as the argument of the pivot predicate to those domains that are the part-sets of some car. The second coda restricts the relevant cars to cars that are parts of a certain race. Dropping either of these restrictions completely changes the domain of quantification relevant for the interpretation of the rest of the sentence.

5.6 Licensing of free choice any

As shown in section 4.1.3 above, so-called free choice (FC) *any* is licensed in codas but not in postcopular predicates. The proposed analysis of codas as modifiers provides a fairly simple explanation of this fact given certain assumptions about the meaning of FC *any*.

It is well known that FC *any* has readings in which it seems to be interpreted as an indefinite (179a) and others in which it is interpreted as a wide scope universal (179b) (see e.g. Horn 1972, 2000; Dayal 1998; Giannakidou 2001)

(179) a. Press any key to continue. (Giannakidou 2001)
(= Press a key)

b. Any fool can think of words that rhyme. (Morrissey, Sing your life, 1991)
(= Every fool can...)

Here I assume what Horn (2000) calls an *indefinitist* analysis of FC *any*, according to which it is interpreted as a generic indefinite, i.e. an indefinite in the scope of a silent generic operator. That FC *any* is best described as a generic indefinite in the context of codas is evidenced by its interchangeability with such an indefinite, as shown in (180).

(180) a. There is a zoo-keeper in any zoo.

b. There is a zoo-keeper in a zoo.

Both sentences are characterizing in the sense of Krifka et al. (1995) and mean that zoos generally have a zoo-keeper. Note that the preposition *in* here is not predicative *in* but modificational *in*, and receives a constitutive part reading. The sentences do not mean that zoos are generally such that the zoo-keeper is in the zoo, but rather that there is a person acting in the capacity of a zoo-keeper. Informally the sentences can be represented as in (181).

(181) $\text{GEN}_x\ [\text{zoo}(x)]\ [\exists y[\text{zoo-keeper}(y)\ \&\ \text{in}(y, x)]]$

A complete analysis of FC *any* would presumably include meaning not present for the indefinite generic, e.g. requirements for domain widening and strengthening (Kadmon and Landman 1993) or association with a scale (Lee and Horn 1994). For present purposes this aspect of *any* can be ignored.

On the analysis proposed here, codas with *any* can be treated simply as quantified codas with the generic operartor GEN acting as the quantifier. The meaning of *in any zoo* or *in a zoo* would then be as in (182).

(182) $\lambda\mathcal{P}_{\langle\langle e,t\rangle,t\rangle}[\text{GEN}(\lambda x[\text{zoo}(x)], \lambda y[\mathcal{P}({d^{in}}_y)])]$

Applying this meaning to the bare existential *there is a zoo-keeper* has the effect of binding the implicit domain argument of the pivot to the generic operator. The result is as in (183).

(183) $\text{GEN}(\lambda x[\text{zoo}(x)], \lambda y[\mathbf{a}(\lambda z[\text{zoo-keeper}(z)], \lambda u[u \in {d^{in}}_y])])$

Analyzing FC *any* as an indefinite that is bound by an operator rather than an existential or a universal sheds more light on its infelicity in predicate position. Generic indefinites are generally not acceptable in predicates. For example, (184a) does not allow a generic reading of *a jail*.

(184) a. Miriam is in a jail. (# on generic reading of *a jail*)

b. #Miriam is in any jail.

The problem seems to be one of scope. As discussed in section 4.1.1, quantified PPs like *in every house* are only construable as predicates if the quantifier does not scope out of the

PP. The generic operator involved in the examples in (184), on the other hand, must take wide scope in order for the rest of the sentence to form its nuclear scope.

This analysis of codas with FC *any* entails that codas can in general contribute a restriction to a quantification not explicitly contributed by the NP in the coda. This is a desirable feature, since in fact codas also contribute the restriction of an adverb of quantification when one is present in an existential. For example, a sentence like (185a) means that most zoos have a zoo-keeper, and can be informally represented as in (185b), where d_x is the contextual domain contributed by a zoo, in this case the set of constitutive parts of that zoo.

(185) a. There is usually a zoo-keeper in a zoo.

b. USUALLY$_x$[zoo(x)] [$\exists y$[zoo-keeper(y) & $y \in d_x$]

The analysis of codas as modifiers, and of pivots as predicates with implicit contextual domain arguments thus provides a natural way of capturing the interaction of existentials with adverbs of quantfication. This interaction is another aspect in which existentials contrast with their copular counerparts. Compare (185a) with (186).

(186) A zoo-keeper is usually in a zoo.

Various authors (e.g. Heim (1987) and Kim (1997)) have pointed out in the copular clause the subject NP *a zoo-keeper* forms the restriction of the quantificational adverb. In the existential in (185a) on the other hand, the NP in the coda forms the restriction, and the NP *a zoo-keeper* is part of the scope.

Kim (1997) explains this contrast in terms of information structure.[12] The NP subject of a copular clause is the topic of the sentence, whereas in an existential the pivot is part of the assertion. Since topic and focus generally map onto the restriction and scope of quantificational adverbs respectively (e.g. Chierchia 1992; Rooth 1995), the relevant NP is mapped to the scope in an existential, to the restriction in a copular clause. The intuition that existentials differ from copular clauses in information structure, and particularly that existential pivots are focus elements is common in the literature (Babby 1980; Kuroda 1972; Sasse 1995; Erteschik Shir 1997; Borschev and Partee 2001, *inter alia*)[13]. Work by

[12]Kim's analysis is the only one I am aware of that attempts a model theoretic (specifically, situation semantic) formalization of the information structural difference between existential and copular sentences.

[13]Though other than Kim's analysis I know of no attempt at making this idea precise.

Lambrecht (1994; 2000) situates this intuition in a larger theory of information structure and its interaction with sentence form, and Kim develops a situation semantic account of existentials which enables her to formalize information articulation.

On the current analysis this contrast between existentials and copulars follows from their different propositional or predicational structures. In existentials, pivots are the main predicates, and like other predicates form the assertion or focus and are mapped to the nuclear scope of quantificational adverbs. Codas are sentential modifiers and like other sentential modifiers may form the restriction of a quantificational adverb. For example, the natural interpretation of (187) is that most situations in which Miriam is on a ship are situations in which he falls asleep.

(187) Miriam usually falls asleep on ships.

The generalization that emerges from this discussion is that codas can contribute the restriction of a quantificational operator, whether it come from within the coda itself or from an external operator such as an adverb of quantification. The theory of existential propositions proposed here anticiaptes this behavior of codas since (a) it models them as modifiers rather than predicates and (b) it makes available an implicit argument in the pivot for the quantificational operator to bind.

5.7 Adjectival codas and the predicate restriction

So far I have only discussed PP codas. However, English and perhaps other languages allow also adjectives to act as codas. That adjectives can be real codas, i.e. not internal modifiers of the pivot but separate constituents contributing to the scope of quantification can be discerned in the same way as for other codas, by using pivots with non-existential determiners in the sense of Keenan (1987). For example, the sentence in (188) does not quantify over kinds of vegetables that are available but over kinds of vegetables in general. The sentence is true if in some markets one could find a token of most kinds of vegetables.[14] Thus adjectival codas are real codas and must be treated by any analysis of existentials.

(188) There were most kinds of vegetables available in some markets.

[14]This of course entails that most kinds of vegetables are also kinds of available vegetables, but the reverse entailment does not hold.

For the analysis suggested here, this means that adjectival codas must be treated as modifiers. When adjectives occur as VP or S modifiers, as in (189), they are interpreted as depictives.

(189) The fish swallowed Miriam alive.

McNally (1992) analyzes adjectival codas as depictives. She views their role as restricting the spatiotemporal parameters within which the main predication in an existential takes place. I follow the core intuition of her analysis here, but implement it in a rather different way that is adapted to the general approach to existential propositions I have been arguing for. The analysis I suggest is rooted in the intuition that coda adjectives differ from predicate adjectives in that they must be linked to a contextual variable.

An important generalization about both depictives and adjectival codas that has often been made in the literature is that they are restricted to adjectives expressing so-called "stage level" predicates. For codas, this is known as the "predicate restriction" and is exemplified in (190).

(190) a. *There is a man evil/holy/weird.

b. There is a man sick/available/drunk.

This contrast was apparently first observed by Milsark (1974). The difference between infividual and stage level predicates (ILPs and SLPs) goes back to Carlson (1977), and there is no consensus on how exactly it is to be characterized. One intuitive characterization is that ILPs are properties for which there is no expectation that they change over time (even though they might in fact do so), whereas SLPs are properties for which there is such an expectation. However, this characterization is vague, perhaps too vague to be operational (see Fernald 2000 for discussion).

The generalization that codas are restricted to SLPs fits well with another well known generalization that bare indefinites cannot receive generic interpretations as pivots, as shown in (191), which cannot mean that beers in general are in the fridge.

(191) There are beers in the fridge.

Carlson (1977) observed that bare plurals can be interpreted both generically and existentially with ILPs, but that SLPs rule out the generic reading. Thus, (192a) is interpreted

either as a statement about people in general or about some people in some particular context. (192b) on the other hand can only be interpreted as saying that people in general are evil.

(192) a. People are drunk. (SLP, generic or existential reading)
b. People are evil. (ILP, only generic reading)

It is important to note that while adjectival codas intuitively denote properties of individuls and hence have the denotation of predicates, this does not mean that they behave like main predicates rather than modifiers in general. One difference between adjectival predicates and adjectival predicative modifiers (beyond the fact that the latter are restricted to SLPs whereas no restriction holds for the former) can be seen in the contrast between (193a) and (193b) (cf. (90) in section 4.1.1).

(193) a. There were exactly three people drunk most of the time.
b. Exactly three people were drunk most of the time.

While the two share a reading on which most of the relevant times are times at which exactly three people were drunk, (193b) also has a reading in which *most of the time* acts as a predicate modifier, modifying the predicate *drunk*. On this reading the sentence means that exactly three people are such that they were drunk most of the time. This might be true even in a situation in which there are no times at which exactly three people are drunk (for example if at each time a maximum of two people are drunk). (193a) cannot be true in such a situation. In other words, if an adjectival codas is followed by a quantified one, the quantified coda must outscope it and cannot apply to it as a predicate modifier.

The main intuition behind McNally's analysis of adjectival codas (and of depictives more generally) is that they contribute a spatiotemporal region, i.e. a contextual parameter, within which the instantiation of the pivot property holds. This is done via what she calls the "hold time/location" of that property relative to the instantiating individual(s), i.e. the interval and/or location at which the property holds of the individual.

This intuition can easily be accommodated in the current framework by modeling adjectival codas in essentially the same manner as was proposed for PP codas. Specifically, McNally's view of adjectival modifiers makes them essentially relations between individuals and times. An adjective modifier contributes the set of individuals such that the hold

time of the property named by the adjective is a subinterval of the topic time. This meaning can be modeled as in (194), using *drunk* as an example. I write $P(x)(j)$ for "j is the hold time of property P relative to individual x", and I_t for the topic time.

(194) **Meaning for adjectival codas**
[[drunk]]$_{coda}$ = $\lambda\mathcal{P}_{\langle\langle e,t\rangle,t\rangle}[\mathbf{a}(\lambda i[i \subseteq I_t], \lambda j[\mathcal{P}(\lambda x[\text{drunk}(x)(j)])])]$

In terms of contextual domains, the contextual domain defined by any adjectival coda is the set of individuals for which the hold time of the property named by the adjective is a subinterval of the topic time. This meaning can combine with an existential such as *There were two people* in the same way as PP codas do, as shown in (195).

(195) **Deivation of** *there were two sailors drunk*
[[drunk]]([[there were two sailors]]) =
$\lambda\mathcal{P}_{\langle\langle e,t\rangle,t\rangle}[\mathbf{a}(\lambda i[i \subseteq I_t], \lambda j[\mathcal{P}(\lambda x[\text{drunk}(x)(j)])])]@$
$\lambda P_{\langle e,t\rangle}[\mathbf{two}(\lambda y[\text{sailor}(y)], P)]$ =
$\mathbf{a}(\lambda i[i \subseteq I_t], \lambda j[\mathbf{two}(\lambda y[\text{sailor}(y)], \lambda x[\text{drunk}(x)(j)])])$

The resulting meaning is truth-conditionally identical to McNally's, but does not involve an instantiation analysis.[15]

This analysis captures the predicate restriction in the same way as McNally's does, i.e. by modeling modifying adjectives as restricting the spatiotemporal parameters within which the main predication in an existential holds. Furthermore, this analysis does not depend on there being any difference in the lexical meanings of SLPs and ILPs such as the presence vs. absence of a spatiotemporal argument (e.g. as in Kratzer 1995). In principle, any property is associated with some hold time and can hence act as a coda. However, since codas restrict the predication in the existential to a particular contextual domain, an adjective will be felicitous in an existential only if the set of elements that have the property it denotes at that domain might be reasonably expected not to have it in some other domain. This analysis thus supports a pragmatic view of the ILP-SLP distinction that relates it to the presence or absence of a presupposition of temporal persistence, along the lines suggested in Condoravdi (1997) (see also McNally 1993).

[15]Nor does it involve a special rule of adjunct interpretation involving control.

This approach to codas also sheds light on the contrast between coda adjectives and regular prenominal adjectival modifiers exemplified in (196). While (196a) can be true or false[16], (196b) is contradictory.

(196) a. The meeting was fully atteneded. There were many missing people.

b. #The meeting was fully attended. There were many people missing.

On the adaptation of McNally's analysis suggested above, the adjectival coda *missing* in (196b) has an implicit argument, a spatiotemporal parameter at which the property it denotes holds of some entity or set of entities. As discussed in section (5.1.2), implicit arguments are linked to contextually salient discourse referents. In the case of (196b), the value for the implicit spatiotemporal parameter is understood to be that contributed by the NP *the meeting* in the first sentence. The time and location of the relevant meeting are thus chosen as the topic interval and the meaning of the existential *there were many people missing* can be represented as in (197), assuming for simplicity that *the meeting* simply contributes a location $\mathcal{L}_{meeting}$, and using $\subseteq$ for the sublocation relation.[17]

(197) $\mathbf{a}(\lambda\ell[\ell \subseteq \mathcal{L}_{meeting}], \lambda\ell'[\mathbf{many}(\lambda y[\text{person}(y)], \lambda x[\neg\text{at}(x)(\ell')])])$

It is clear why this meaning for the existential in (196b) is not consistent with the first sentence in that example, stating that the meeting at $\mathcal{L}_{meeting}$ was fully attended. Assuming that the representation of the NP *missing people* in (196a) on the other hand just involves an intersective adjective *missing* denoting the set of people who have been declared missing, no such inconsistency arises.

Finally, this analysis of adjectival codas as modifiers highlights a more general semantic affinity between them and adjectival postnominal modifiers. For example, consider the semantic contrast between the two examples in (198), an existential variant of examples discussed in Bolinger (1967) and more recently by Larson (2000).

(198) a. There are no visible stars.

[16]For example, suppose there is an association where people who have been declared missing (e.g. teenage runaways) can enlist to get various types of support. Suppose this association has weekly meetings which missing people are free to attend without the risk of police or parental intervention. The truth of (196a) depends on how many missing people show up.

[17]The relevant location could also vary with quantification over meetings, e.g. if they first sentence has *most meetings* rather than *the meeting*.

b. There are no stars visible.

While (198a) can mean that the world does not contain stars that are in principle visible, (198b) only means that no stars are such that they are visible at the time of context. This is why (199) is not contradictory.

(199) There are no visible stars visible.

Bolinger's and Larson's discussions establish that this kind of contrast is also a general feature distinguishing postnominal modifiers from prenominal ones in non-existential contexts. For example, Larson (2000) points out that (200a) and (200b) differ in truth conditions. While (200a) is generally true, (200b) is often false.

(200) a. The visible stars include Capella.

b. The stars visible include Capella.

The semantic effect is identical to that in the existential examples in (198): postnominal modification yields what Bolinger calls a *temporary property* whereas prenominal modification yields what he calls an *enduring property*. In other words the so-called temporary property is one linked to a *specific* contextually determined time, whereas the so-called enduring property is not. Furthermore, the predicate restriction applies equally to the postnominal modifier in a non-existential context like (200) as it does to existential codas, as shown in (201).

(201) a. The bright stars include Capella.

b. *The stars bright include Capella.

While providing an analysis of postnominal modification is well beyond the scope of this work, these data contribute more evidence for the analysis of codas as modifiers rather than predicates, and the analysis suggested here can again be seen as a first step towards a more general and unified theory of modification.

5.8 Summary

This chapter presented my formal analysis for existentials. I summarize here the main features of the analysis. Pivots denote generalized quantifiers. The meaning of a bare

existential is the meaning of its pivot. The meaning of a bare existential like *there is a prophet* is as in (202).

(202) [[there is a prophet]] = [[a prophet]] = $\lambda P_{\langle e,t\rangle}[\mathbf{a}(\lambda x[\text{prophet}(x)], P)]$.

Since no expression is available to contribute a value for P, its value is determined to be a *contextual domain*. For any entity, the contextual domain of that entity is defined as in (203).

(203) **Contextual domains of entities**:
For every element α of type τ, let d_α be the *contextual domain* of α, where $d_\alpha =_{def} \lambda y_{\tau'}[R_{\langle\tau,\langle\tau',t\rangle\rangle}(\alpha, y)]$

The value of the contextual domain is determined in one of two ways:
• Contextual closure: In the absence of modification, the value of the contextual domain is d_u, the set of entities related to a contextually given entity u by the underspecified relation R.
• Modification by codas: Codas are contextual modifiers that combine by function application with the meanings of bare existentials before contextual closure. Codas contribute a value for R, and determine a value or range of values for u. This is shown in (204) for the sentence *There is a prophet on every ship*.

(204) [[on every ship]]([[there is a prophet]]) =
$\lambda\mathcal{P}_{\langle\langle e,t\rangle,t\rangle}[\mathbf{every}(\lambda x[\text{ship}(x)], \lambda y[\mathcal{P}(d^{on}{}_y)])]@(\lambda P[\mathbf{a}(\lambda z[\text{prophet}(z)], P)])$ =
$\mathbf{every}(\lambda x[\text{ship}(x)], \lambda y[\lambda P[\mathbf{a}(\lambda z[\text{prophet}(z)], P)]])@(d^{on}{}_y)$ =
$\mathbf{every}(\lambda x[\text{ship}(x)], \lambda y[\mathbf{a}(\lambda z[\text{prophet}(z)], d^{on}{}_y)])$

The restriction of any quantificational structure is opened for further restriction through an operation of *contextualization*, defined as in (205).

(205) **Contextualization**:
$\mathcal{Q}(\lambda x[P(x)], \lambda y[Q(y)]) \rightarrow \lambda C[\mathcal{Q}(\lambda x[P(x)\ \&\ C(x)], \lambda y[Q(y)])]$

The meaning of an existential with more than one coda is achieved by applying each coda to the result of applying contextualization to the formula resulting from the combination of the preceding coda either with a bare existential or with the result of a previous contextualization. For example, the meaning of an existential sentence like *there is a prophet*

on every ship in some harbor is derived as follows. (206) shows the result of applying contextualization to the meaning of *there is a prophet on every ship* in (204).

(206) Contextualization of (204):
$\lambda P[\mathbf{every}(\lambda x[\text{ship}(x)\ \&\ P(x)], \lambda y[\mathbf{a}(\lambda z[\text{prophet}(z)], d^{on}{}_{y})])$

(207) shows the meaning of the coda *in every harbor* and (208) the meaning of the combination of this coda with (206), the result of contextualizing (204).

(207) [[in some harbor]] = $\lambda\mathcal{P}_{\langle\langle e,t\rangle,t\rangle}[\mathbf{some}(\lambda u[\text{harbor}(u)], \lambda v[\mathcal{P}(d^{in}{}_{v})])]$.

(208) [[in every harbor]](206) =
$\lambda\mathcal{P}_{\langle\langle e,t\rangle,t\rangle}[\mathbf{some}(\lambda u[\text{harbor}(u)], \lambda v[\mathcal{P}(d^{in}{}_{v})])]@$
$(\lambda P[\mathbf{every}(\lambda x[\text{ship}(x)\ \&\ P(x)], \lambda y[\mathbf{a}(\lambda z[\text{prophet}(z)], d^{on}{}_{y})])]) =$

$\mathbf{some}(\lambda u[\text{harbor}(u)],$
$\quad\lambda v[\mathbf{every}(\lambda x[\text{ship}(x)\ \&\ x \in d^{in}{}_{v}],$
$\quad\quad\lambda y[\mathbf{a}(\lambda z[\text{prophet}(z)], d^{on}{}_{y})])])$

I exemplified and discussed the parallelism between codas and contextual modifiers, and showed how this analysis captures various properties of both. I also showed how this analysis captures the range of data discussed in chapter 4.

Chapter 6

The definiteness effect

Perhaps the best known and most widely studied topic in the analysis of existentials is a contrast in the degree to which certain types of NPs occur naturally in the construction. This contrast, which has come to be known as the *definiteness effect* (DE), is exemplified in (209).

(209) a. There is a/some/one/no book in the library.
b. ??There is the/this/that/my book in the library.
c. ??There is Jacob/him in the library.
d. ??There's every/most/both books in the library.

Two issues are raised by the DE. The first is what is the correct descriptive generalization involved, and the second is what explains that generalization.

6.1 The descriptive generalization

In the semantic literature the DE is often viewed as a ban on certain NP types in the existential construction. The following NP types have all been argued not to occur in existentials:
• Definite NPs (NPs whose determiner is *the*, a demonstrative or a possessive)
• Proper names
• Pronouns
• NPs with determiners including *every, most, all, both, each*

As has been pointed out repeatedly in the literature for at least three decades (e.g. Bolinger 1977; Milsark 1974, 1977; Hannay 1985; Ziv 1982; McNally 1992; Ward and Birner 1995; Abbott 1993 *inter alia*), the characterization of the DE as a ban on the NP types listed above is too strong. All of these NP types do in fact occur as pivots in English as well as in various other languages. The examples in (210) shows this for definites, proper names and pronouns. The examples in (211) show it for NPs with quantificational determiners. The examples in (212) exemplify the same for Hebrew.

(210) a. There's always **the option of a self induced coma**.[1]
(Definite determiner)

b. Fortunately there was **my income** to fall back on.[2]
(Possessive determiner)

c. For the older listeners there's **John Lennon**, **Dire Straits**, **Love** and, wait for it, Barry Manilow does Frank Sinatra - nice![3]
(Proper name)

d. Instead of a couple hundred other passengers, there was **her**, two flight attendants, a pilot, copilot and enough food to feed Rhode Island.[4]
(Pronoun)

e. There was **this great maze of tunnels that you could walk through** in the caverns.[5]
(Demonstrative determiner)

[1] http://www.sciforums.com/showthread.php?t=53593

[2] www.occams-razor.info/life_2005

[3] news.bbc.co.uk/1/hi/entertainment/ new_music_releases/223381.stm

[4] http://www.ereader.com/product/book/excerpt/25928?book=The_Desert_Rogues_Part_2

[5] www.epinions.com/content_231433670276

(211) a. In language and literature there are **most of the major histories and descriptive works** and a comprehensive collection of periodicals.[6]

b. There were **most of the normal birds** up on Mt. Ord on the 24th.[7]

c. And you'll recall then, of course, there were **both sides** in the case, both represented by counsel, and you were given some instructions about having to decide based on the evidence and follow the law and the instructions.[8]

(212) a. yeS et **kulam** ba-sifriya. (HEBREW)
EX acc all[3.pl] in.def-library
They have them all in the library. (lit.: There is all of them in the library)

b. yeS et **rov** **ha-misxakim** ba-maxSev.
EX acc most the-games in.def-computer
Most of the games can be found in the computer. (Lit.: There is most of the games ...)

c. yeS et **milxama ve-Salom** ba-maxsan.
EX acc war and-peace in.def-storage
There's 'War and Peace' in the storage.

Such examples make clear that the relevant generalization is not that certain NP types are banned from the construction. Nevertheless, the examples in (209) above are decidedly odd for most native speakers of English. The empirical generalization is therefore that, at least in some languages, certain NP types occur in existential constructions in a restricted way. A characterization of the DE should thus state not only what NPs occur freely in existentials, but also what conditions determine when NPs that do not occur freely nevertheless occur in the construction.

In fact, the examples provided in (210) and (211) all fall under well known classes of exceptions to the DE. The classes can be characterized roughly as follows:

- Contextualized Existentials (CEs, Abbott 1992): Existentals with no coda and a formally definite NP, proper name or pronoun which cannot initiate a discourse (e.g. (210a-d)). Such examples are sometimes also called *list*-existentials (Milsark 1974; Rando and Napoli 1978).

[6] www.library.uiuc.edu/spx/collectionhighlights.htm

[7] listserv.arizona.edu/cgi-bin/ wa?A2=ind9504d&L=birdwest&P=962

[8] http://www.cnn.com/US/9703/okc.trial/transcripts/september/093097.pm.txt

- Type-denoting pivots (Lumsden 1988; McNally 1992): Pivots in which the head noun denotes a type rather than tokens of a type (e.g. the examples in (211)).
- Fake definites: Pivots which are formally definite but semantically equivalent to an indefinite. These include examples with demonstratives such as (210e).

Of these three categories, only the first two are relevant in the current context. Even without understanding why fake definites are formally definite, it is clear that they are semantically indefinite.[9] For example, sentence (213a) does not assume familiarity with the excuse made by the speaker, nor uniqueness of that excuse, and is completely equivalent to (213b). The behavior of fake definites in existentials is therefore unsurprising.

(213) a. I made up this really stupid excuse.

b. I made up a really stupid excuse.

While these two broad cases might well not exhaust the exceptions to the DE, they are the core types of exceptions discussed in the literaure, and I restrict myself to them here. Thus, an explanation for the DE should subsume type-denoting pivots and CEs.

Explanations for the DE abound. Semantic (e.g. Milsark 1974, 1977; Keenan 1987, 2003, syntactic (e.g. Chomsky 1981; Belletti 1988; Safir 1982) and pragmatic (e.g. Ward and Birner 1995; Abbott 1992; Zucchi 1995) explanations have all been suggested. I do not discuss syntactic explanations here. Since the DE discriminates NP types between which there is no obvious syntactic difference (e.g. the NPs *every apple* and *some apple*, or pivots ranging over tokens vs. ones ranging over types), a syntactic characterization does not seem to be forthcoming.

The analysis and discussion of existential propositions presented and argued for so far in this work has had nothing to say about the DE. This might seem like a lacuna, but in fact I believe that this is as it should be, and that the existential question is logically independent

[9]The example in (210a) is interesting since it resembles so-called *weak definites*, namely NPs such as *the body of a cat*. Weak definites are known to behave like indefinites in various contexts and to be licit in existentials (Poesio 1994; Barker 2004; Rawlins 2005). Whether or not the relevant example is a case of a weak definite is however unclear to me. For example, the indefinite article can be omitted in (210a) (cf. *the option of self-induced trauma* but this is not generally the case with weak definites (cf. the **the body of cat*. I leave this issue for future research. Below I also suggest that NPs quantifying over kinds or types, e.g. *every kind of animal*, are similar to weak definites in that they are interpreted as indefinites. This parallel too must be left unexplored here.

of (and logically prior to) any explanation of the DE. The discussion of semantic theories of existential propositions in chapter 3 clearly shows that while explaining the DE is a crucial goal of all of them, the answers they provide for the existential question is completely independent from any explanation of the DE. The only exception is McNally's analysis, which coupled with certain assumptions about quantification, does make predictions about part of the DE. This is discussed in section 6.2.1.

I thus follow Abbot (1992; 1993; 1997) in arguing that the DE is not a semantic phenomenon but rather should be related to the general pragmatic function of the existential construction. On the analysis of existentials I am arguing for, their function is to predicate properties of contextual domains. My suggestion is that the DE arises from the fact that pivots are predicates and hence by default focal. NPs that are not readily construable as foci, namely NPs with topical properties, are blocked from occurring in the construction if there is a truth conditionally equivalent construction in which they are sentence topics rather than foci. That pivots are focal elements has also been argued by Abbott and by Lambrecht (2000). My proposal is also related to Lambrecht's in that it derives the DE from a contrast between existentials and other constructions, as well as to approaches to the DE based on competition between existentials and their copular counterparts (e.g. Mikkelsen 2002 and Beaver et al. 2006), though it differs from both types of approaches in crucial ways discussed in section 6.4.

6.2 Determiner approaches

One line of research attempts to characterize the DE in terms of the semantic nature of the quantifiers denoted by the determiner in the pivot NP. I call approaches within this line of research *determiner approaches*.

A determiner approach was to my knowledge first proposed by Barwise and Cooper (1981) (BC), and later developed by Keenan (1987). A determiner approach is also adopted in Zucchi (1995), Keenan (2003) and most recently Peters and Westerståhl (2006). As discussed in chapter 3, all of these authors provide GQ analyses of existentials.

BC's characterization of the DE as well as their explanation for it relies on their semantic classification of determiners into *weak* and *strong* ones. The distinction between *weak* and *strong* was originally proposed by Milsark (1974). Milsark used the terms more

or less descriptively to contrast those NPs that are felicitous as pivots but infelicitous as subjects of individual level predicates (ILPs) with those NPs felicitous as subjects of ILPs but infelicitous as pivots. Since their introduction by Milsark, these terms have been re-defined in various ways in accordance with attempts to pinpoint the semantic/pragmatic generalization underlying them (see McNally and Van Geenhoven 1998 for a critical survey of the various interpretations of the distinction in the literature). (214) gives Barwise and Cooper's characterization of the distinction.

(214) **Barwise & Cooper's characterization of Weak/Strong determiners**:
A determiner D is positive/negative strong if, for any set A and in every model M, A is a member/is not a member of the GQ $D(A)$ whenever it is defined. Otherwise, D is weak.

For example, the determiner *every* is such that for any set A, A is in the denotation of the quantifier *every A* (intuitively, the sentence *Every A is an A* is true in all models, even those in which A is empty). In contrast, the determiner *three* does not have this property. In a model where there are no gods (or where there is only one god), the sentence *three gods are gods* is false. BC's claim is that NPs headed by strong determiners (as well as other strong NPs such as proper names) are odd in existentials.

As a characterization of the DE, BC's generalization cannot be correct, at least not at face value, since it excludes CEs and type-denoting pivots, both of which involve strong determiners. If some NPs with strong determiners are licit as pivots and others not, then the distribution of NP types in pivot position must be determined by something other than the strength of the determiner.

BCs characterization is an instance of what Keenan (2003) calls the *Det generalization*.

(215) **The Det generalization** (Keenan 2003:189):
Whether a DP built from a Det and an appropriate number of nominals is natural in *there*-sentences is decided by the choice of Det.

Any characterization of the DE in terms of a Det generalization thus faces an empirical problem. While it seems clear that the nature of the determiner, or at least the nature of the GQ denoted by an NP, influences its distribution in existentials, it cannot be the only factor involved.

BC's explanation for the DE is also problematic. Their explanation is that strong pivots give rise to trivial (i.e. tautological or contradictory) readings. As discussed in section 3.2, the meaning they assign to an existential construction, states that the domain of quantification E is a member of the quantifier denoted by the pivot. Because of the universal of conservativity (see section 5.1.1), any quantifier $D(A)$ is such that if $D(A, B)$ is true then $D(A, (A \cap B))$ is also true. But since for any set A, $A \cap E$ is just A, then if an existential of the form $D(A, E)$ is true then $D(A, A)$ is true. But $D(A, A)$ is by definition true in all models for any positive strong determiner, and so an existential with a strong determiner is true in all models[10] and hence trivial. This is thus a pragmatic explanation: certain existentials are anomalous because uninformative. The obvious problem with BC's explanation (pointed out by e.g. Keenan 1987) is that there is no general relation between grammaticality and triviality. Many trivial statements are perfectly grammatical, and there is no reason why existentials should be any different.

The most explicit determiner approach to the DE is that found in Keenan (1987). Keenan's claims about the DE are weaker than BC's. First, he does not claim that any NPs are ruled out in existentials, but rather describes the DE as a restriction on the occurrence of certain NPs *with a particular reading*, which he calls the *existential* reading, defined below. Second, his purpose is not to explain the DE, but only to characterize the set of NPs that occur as pivots with an existential reading.

Keenan calls the class of NPs that occur in existentials with an existential reading *existential NPs*. Existential NPs are those constructed with *existential determiners*, defined as in (216), where the property 1 is the universal property that applies to everything in the domain.

(216) **Existential determiners** (Keenan 1987:291)

a. A basic determiner is called *existential* iff it is always interpreted as an existential function, where:

b. A function f from properties to sets of properties is existential iff for all properties p, q, $p \in f(q)$ iff $1 \in f(p, q)$

Keenan's generalization is that only existential NPs occur in existential sentences with an existential reading. The existential reading is characterized as follows (Keenan 1987:288):

[10] More precisely, in all models in which the GQ denoted by the pivot is defined.

"To say that the (a)-sentences in [(217) and (218)] are understood on an existential reading is to say that they are true in the same conditions as the (b)-sentences, using the technical sense of *exist/individual*."

(217) a. There are more than two boys in the yard.
b. More than two boys in the yard exist/are individuals.

(218) a. There is every student in the yard.
b. Every student in the yard exists/is an individual.

As Keenan notes, to the degree that (218a) is interpretable, it does not seem to mean the same as (218b). While the latter is trivially true in all models, to the degree that the former is meaningful, it is true only if all the students are in the yard. Thus (218a) does not have an existential reading.[11] Keenan also shows that some NPs that occur freely in existentials come out strong on BC's account, but are existential on his account, and hence that his characterization is an imporvement on the one based on the weak-strong distinction.

It is important to note however that the "existential" meaning characterized by Keenan is not particularly related to existential sentences. It is equally a characterization of the difference between (219) and (220), neither of which involves existentials in any relevant sense.

[11]Recall that in section 3.3 I used the contrast between existential and non-existential NPs to show that codas contribute to the scope and not the restriction of the quantifier in the pivot. For non-existential pivots the scope set must be a set determined by the coda. The scope set for the quantifier on an Keenan's existential reading is always the universal property 1.

(219) a. More than two fishermen caught a mermaid. =

b. More than two fishermen who caught a mermaid exist/are individuals.

(220) a. Every fisherman caught a mermaid. $\neq$

b. Every fisherman who caught a mermaid exists/is an individual. (Trivially true)

The fact that non-existential pivots do not have existential readings in existentials is true by definition. What Keenan calls the "existential" reading is simply the English paraphrase of the second clause of the biconditional in the definition of existential determiners in (216): $1 \in f(p, q)$. Since f is the denotation of a determiner, p, q are the restrictor and scope sets respectively, and 1 is the domain, what this clause says is "*f p*'s that are *q*'s exist". Thus existential NPs in Keenan's sense have an "existential" reading by definition, whatever the construction they appear in.

The question therefore remains why NPs denoting GQs for which (216b) does *not* hold distribute any differently in existentials than those denoting GQs for which it does? Furthermore, Keenan's account says nothing about cases in which non-existential NPs occur in existentials other than their not having an existential reading, which by definition they do not have. His accont cannot explain why non-existential NPs improve in certain contexts.

Zucchi (1995) and Keenan (2003) present two more determiner approaches to the DE. Zucchi's account is pragmatic and has to do with a distinction between presuppositional determiners and non-presuppositional ones. A presuppositional determiner is one which can be used felicitously only if the common ground of the conversation contains the proposition that the restriction set is not empty. For example, an NP with the determiner *most*, e.g. *most prisoners*, presupposes the existence of prisoners. Zucchi then posits a pragmatic felicity condition on existentials, which states that an existential sentence is acceptable only in a context which does not contain any information about the intersection of the set denoted by the common noun in the pivot and that denoted by the coda.

Recall that in Zucchi's semantics codas are taken to restrict the domain relative to which the common noun is interpreted. The intersection of the common noun with the coda therefore serves as the restrictor set for the determiner in the pivot. Thus, a presuppositional pivot presupposes that the restrictor set (the intersection of the common noun with the coda) is not empty, but the felicity condition on existentials requires that the context not include any information about this set. Presuppositional pivots therefore give rise to a clash with

the felicity conditions on existentials, and this is why they are generally excluded from the construction.

Zucchi thus provides both a characterization of the DE and an explanation. Keenan (2003) points out various ways in which Zucchi's characterization of the DE is problematic. For example, a determiner like *all* need not be presuppositional, as shown in (221), which does not presuppose that there are shoplifters.

(221) All shoplifters will be prosecuted.

Zucchi's characterization, like BC's, also has nothing to say about the cases in which presuppositional determiners *are* acceptable in existentials. He gives no account of why changing the common noun in the pivot to e.g. *type of N* or *kind of N* for example should in any way change the acceptability of the sentence.

Zucchi's account is also problematic as an explanation of the DE. As pointed out by Keenan (2003), non-presuppositional determiners create no problem in an existental sentence even when the context includes the information that the pivot and coda have a non-empty intersection, violating the presumed felicity condition on existentials. The discourse in (222), for example, is fine.

(222) A: There are at least seven grammars in my office.
B: Yes, there are seven, and I'll bring two more.

A's utterance introduces into the common ground the fact that the set of grammars in my office is not empty, as well as the fact that the cardinality of that set is (at least) 7. But on Zucchi's account, B's utterance requires that information not to be specified in the common ground.

Keenan (2003) provides yet another determiner-based characterization of the DE. He claims that determiners licensed in pivot NPs are only those determiners that are what he calls second-argument conservative, defined as in (223).

(223) **Second-argument conservativity**:
A determiner D is consevative on its second argument iff for all $A, B \subseteq E$, $D(A, B) = D((A \cap B), B)$

A quantifier is second-argument conservative if it can be interpreted to quantify over a universe that is restricted by (the denotation of) its second argument. In other words, the

truth of a quantification introduced by such a quantifier can be determined by restricting the domain of quantification to the scope set. For example, to know whether *three soccer players cried* is true, one only needs to look at the set of people who cried. Nothing else matters. However, this is not the case for a sentence like *every soccer player cried*. To verify this sentence one must look both at the set of criers and at the set of soccer players, and see that all members of the former are also members of the latter.

Second argument conservativity in itself still does not characterize either CEs or type-denoting pivots, which involve determiners that are not second-argument conservative, or (in the case of proper names and pronouns) do not involve determiners at all.[12]. However, Keenan relates the characterization of the DE based on second-argument conservativity in an illuminating way to the nature of existential propositions. He does so by alluding to Zucchi's view that the coda provides the domain of evaluation for existentials. However, unlike Zucchi, he does not take this to mean that the coda restricts the domain for the interpretation of the common noun in the pivot. Instead, he interprets this view to mean that "in determining the interpretation (truth) of sentences like (224) we can limit ourselves to consideration of objects in the garden - we need not consider objects not in the garden."

(224) There are three students in the garden.

The intuition that motivates the relevance of second-argument conservativity is thus very similar to the one I have been arguing for: existentials express propositions about a contextually restricted domain – the domain determined by the coda. Second-argument conservative quantifiers are particularly natural as predicates of such domains, since it is possible to verify whether the properties they express hold of a domain by just looking at that domain,

[12]Keenan is not unaware of these cases. He explicitly excludes CEs from consideration on the ground that they are not preserved under negation and questioning. I am not convinced that this is so, given naturally occurring examples like (i) and (ii).

(i) Aside from other questions, isn't there still the politics played by politicians? (www.metamute.org/en/node/7124)

(ii) Well there isn't the issue of a second resolution today, so that issue doesn't arise at the present time. (From an interview with Tony Blair on http://www.britainusa.com)

In any case this line of argument cannot be used to exclude type-denoting pivots.

rather than its relation to other sets. In section 6.5 I argue that second-argument conservativity can be related to a more general assumptions about the information-structural properties of predicates. Specifically, I argue that the preference for second-argument conservative quantifiers in existentials is due to a requirement that predicates be focal.

6.2.1 McNally's approach

McNally's answer to the existential question is the only one I am aware of that actually entails that quantified NPs such as *every boy* and *most boys* are ruled out of the construction. Furthermore her analysis enables her to explain the acceptability of type-denoting pivots. However, her account requires abandoning the general analysis of NPs as GQs and adopting certain controversial assumptions.

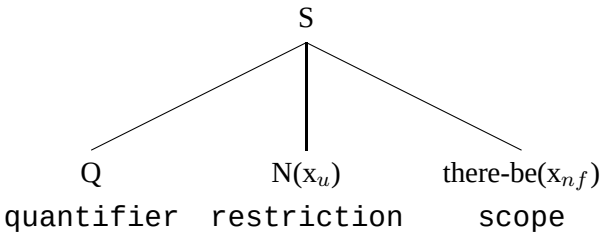
McNally argues that the DE is not derivable from a single factor, but instead is the result of the interaction of two independent constraints. The first has to do with the denotation of pivots, the second with the pragmatics of the construction.

As discussed in chapter 3, in McNally's analysis existential propositions are formed by applying an instantiation predicate to a nominalized function argument which is the denotation of the pivot. An existential says of the property denoted by the pivot that it is instantiated (or not) at some index. McNally's (1998) truth conditions for existentials are repeated in (225).

(225) **McNally's truth conditions for existentials** (McNally 1998:376):
For all models M, $[[NP]]^{M,g} \in [[$ *there be* $]]^{M,g}$ iff $[[NP]]^{M,g}$ is non-empty.

The first half of McNally's account of the DE has to do with quantification. She adopts the treatment of quantification in Heim (1982), where a distinction is drawn between quantificational and non-quantificational NPs. In Heim's system, NPs with weak determiners are not considered quantificational but rather are interpreted as variables like indefinites. Furthermore all nouns raise to a position outside the matrix clause, and all quantifiers raise to a yet higher position, giving rise to a tripartite structure. The logical structure assigned by McNally to an existential with a quantificational NP can be represented schematically as in (226), where Q represents the relation introduced by the determiner in the pivot and N represents the common noun in the pivot. (In fact McNally's structure, as well as Heim's, is not flat, but this is immaterial here).

(226) **McNally's structure for quantified pivots**:



In McNally's theory, such a structure cannot receive an interpretation because of a sortal mismatch between the variable in the restriction and the one in the nuclear scope of the quantifier. The common noun N introduces an individual variable (of type u, a subtype of e in property theory), but the variable associated with the argument of the predicate *be instantiated* is of type nf, the type of nominalized functions. However, the structure can receive an interpretation if the raised quantifier quantifies over nominalized functions rather than individuals. McNally can thus account for the fact that quantificational NPs that are generally restricted in English existentials become perfectly grammatical with type-denoting pivots.

To stress the robustness of the relevant facts, more examples of such pivots are given in (227).

(227) a. There was every brand of tasteless, instant noodle known to the world but not a single can of baked beans or spaghetti.[13]

b. There will be every type of craft imaginable.[14]

c. The press are going to have a field day because there will be every type of murderer in Edinburgh wanting earlier release dates.[15]

d. In terms of whisky selection, there were most types of oddballs represented.[16]

e. Nor is it true that during the colonial period there were both kinds of establishments.[17]

Type-denoting pivots need not involve explicit reference to types. The examples in (228)

[13] www.geocities.com/psychofrog/alms/feb0607.html

[14] www.associatedcontent.com/article/56759/fall_festivals_in_arkansas.html

[15] edinburghnews.scotsman.com/index.cfm?id=71192005

[16] www.royalmilewhiskies.com/ viewindex.asp?article_id=tast_japanetc

[17] links.jstor.org/ sici?sici=0002-9319(198707)31%3A3%3C255%3ATFFCAS%3E2.0.CO%3B2-J

do not involve a noun like *type* or *kind*. Nevertheless, the sentences are understood as involving instances of types.

(228) a. In addition there are most of the usual fast food establishments.[18]

b. There's most sizes in stock though so any Haro dealer could order a frame.[19]

McNally assigns the common nouns in type-denoting pivots a nominalized function denotation. The quantificational structures such pivots give rise to, therefore, do not give rise to a type mismatch between restriction and scope. For example, a sentence like (229a) can be paraphrased as in (229b).

(229) a. There is every sort of animal in this zoo.

b. Every sort of animal is instantiated by a token in this zoo.

This is a highly attractive feature of McNally's account. However it depends entirely on the correctness of her instantiation analysis, as well as on her assumptions about quantification. Several arguments against the former were advanced in chapter 3. The latter assumptions are also controversial in general. They commit McNally to a view of all NPs with cardinal determiners, downward monotone determiners and non-monotone determiners as non-quantificational (i.e. property-denoting). Otherwise they would give rise to a sortal mismatch of the type found with quantifiers like *every*. Thus, all cardinal determiners such as *three* or *a dozen* are not quantifiers on McNally's view but rather have adjectival meanings, denoting properties of plural individuals, and combining intersectively with the head noun. The determiner *no* is decomposed into sentential negation and an indefinite NP (i.e. *no= not ... a*).[20] Similarly, expressions such as *exactly* in *exactly five* or *at most* in *at most five* must receive adverbial meanings, and in McNally (1998) they are treated as sentential adverbs. While this move might in the end turn out to be desirable, it should not be made without decisive evidence in its favor, since it constitutes a significant loss of generality and uniformity in the analysis of NPs.[21]

[18] www.aruba-rentals.com

[19] archive.mtbr.com/20/0EFB7FA2.php

[20] The decomposition of downward monotone determiners has also been strongly argued for in contexts unrelated to existentials. For example, the phnomenon of split scope of negative indefinites under modals seems to necessitate such a decomposition (see Penka 2007).

[21] There is at least some evidence showing that determiner uses of e.g. *at most* are different from adverbial

Finally, the most problematic aspect of such a view of quantification is the fact, discussed in section 3.1.1, that the kinds of pivots that McNally would have to treat as property-denoting can in fact scope above modal operators, as in (230).

(230) There could be three winners in this race.

Thus, although I find McNally's explanation for the DE with strong quantifiers intriguing, its plausibility is in the final analysis tied up with the plausibility of an instantiation analysis of existentials and of various controversial assumptions about quantification.

The other part of McNally's explanation for the DE, deals with the conditions under which definites are licensed in pivots, and is pragmatic in nature. It is therefore addressed in the next section.

To summarize, I have discussed three semantic approaches to the DE: BCs account in terms of quantifier strength, determiner approaches such as Keenan (1987) and Zucchi (1995), and McNally's account in terms of sortal mismatches. The explanations offered by BC and Zucchi are pragmatic in nature and have both been argued against in the literature. The determiner approach in Keenan (1987) only characterizes a certain class of determiners (those denoting relations between sets such that if they hold between two sets A, B,, then they also hold between $(A \cap B)$ and the domain), but does not explain why these determiners appear naturally in pivots (see Ludlow 1991 for a similar argument). McNally's aproach to (part of) the DE goes further than other purely semantic approaches in explaining the empirical phenomena since it derives it from the general semantics of the construction. It furthermore accounts for type-denoting pivots. However, it stands and falls with her instantiation analysis and entails giving up a uniform GQ semantics for NPs. The most promising semantic approach to the DE to my mind is Keenan's (2003) analysis in terms of second-argument conservativity. However, this analysis (like all determiner analyses) is limited to NPs with determiners, and must be augmented to includes proper names and pronouns, and without further elaboration does not account for CEs or type-denoting pivots.

uses. The latter are compatible with determiners such as *no* or *few*. The former are not.

(*i*) a. At most, there will be no major delays.

b. *There will be at most no major delays.

(ii) a. At most there will be few guest.

b. *There will be at most few guests.

(iii) a. At most there will be only wine.

b. *There will be at most only wine.

6.3 Pragmatic approaches

There are at least two types of pragmatic accounts of the DE in the literature. The first kind explains it in terms of the discursive function of the construction. For example, Ward and Birner (1995:723) (WB) take the DE to be "epiphenomenal, the result of an imperfect correlation between the cognitive status to which definiteness in general is sensitive and that to which the referent of the postverbal NP of a *there*-sentence is sensitive." According to WB, the restriction on definite pivots is that they be construable as *hearer new*:

> ...all existential *there*-sentences with definite postverbal NPs can be accounted for by a single pragmatic principle: that the postverbal NP of a *there*-sentence represents an entity that is not presumed by the speaker to constitute shared knowledge. That is, the speaker treats the postverbal NP in *there*-sentences as representing a HEARER-NEW entity (Prince (1992)), where a hearer-new entity is one that the speaker does not assume to exist within the hearer's knowledge store. (Ward and Birner 1995:728)

The DE is then the result of a clash between this restriction and the licensing condition for definites, that they be uniquely identifiable in the context. Definite pivots are licensed when the requirement that they be uniquely identifiable does not clash with being hearer new.

This approach to the DE is also adopted for definites by McNally. In terms of her theory, the condition on definite pivots is described as follows (McNally 1998:384): "the existential predicate carries a linguistic pragmatic ... condition that its argument license the introduction of a novel, as opposed to a familiar, referent into the (relevant subdomain of) the common ground of the conversation." On her analysis, of course, pivots do not denote entities but properties, and hence they do not directly introduce a discourse referent. Instead the relevant discourse referent is inferred from the fact that the property denoted by the pivot is instantiated and hence that there is an entity instantiating it.

There are various empirical and conceptual problems with pragmatic accounts that make reference to the "cognitive status" of the entity denoted by the pivot.

One problem is empirical. It is simply not the case that the discourse referents introduced by pivots must be construable as hearer new (see e.g. Abbott 1992, 1993, 1997). As an example consider the Hebrew example in (231), inspired by Ziv (1982).

(231) halaxti le-MIT ki yeS Sam et xomsky.
go[1.sg.pst] to-MIT because EX there acc Chomsky
I went to MIT because they have Chomsky there.
(lit.: ...because there is Chomsky there)

The speaker of such a sentence seems fairly clearly to assume that her interlocutor knows who Chomsky is. At the very least, the sentence does not require that the interlocutor *not* know who Chomsky is. In fact, the hearer might very well know not only who Chomsky is, but also that he is at MIT. The hearer new information in this utterance is then that Chomsky's being at MIT constitutes the reason for the speaker's having gone to MIT. Perhaps the requirement for hearer new status is meant to be defined in a stricter way, e.g. that the discourse referent introduced by or inferred from the pivot be hearer new relevant to the conversational context. Even this restriction is too strong, at least in some languages. Consider for example the discourse in (232), which is standard in colloquial modern Hebrew (though not in written varieties) and in which the pivot is a pronoun.

(232) A: lama halaxt le-MIT im at lo ohevet et xomsky?
why go[2.f.s.pst] to-MIT if you[f] not like[f.s.prs] acc Chomsky?
Why did you go to MIT if you don't like Chomsky?

B: lo yadati Se-yeS oto Sam.
neg know[1.s] that-EX him there
I didn't know he was there. (Lit: I didn't know there is him there.)

In this discourse the discourse referent introduced by Chomsky is most probably in the common ground for both hearer and speaker already when speaker A asks her question, and it is most certainly in the common ground when B answers with an existential sentence.

For WB, an entity counts as hearer new also if it represents new tokens of hearer-old types. This is meant to capture examples such as (233).

(233) There was the usual crowd at the beach today.

However, it makes little sense to talk about the pivot introducing a new token of the hearer-old type *Chomsky* in (231) or in (232). While it seems that names can in fact be construed as something similar to a type, as in e.g. the Hebrew example in (234), in (231) and in (232) clearly both speaker and hearer are or at least can be talking about a single instantiation of Chomsky or Stallone.

(234) yeS et stalone ba-seret ha-ze?
EX acc Stallone in.def-movie the-this?
Is Stallone in this movie? (Lit: Is there Stallone in this movie?)

Furthermore, it is not clear how the formulation of the hearer-newness restriction should extend to negative existentials. Consider the Hebrew examples in (235), where the pivot is again pronominal.

(235) ha-beaya im ha-sefer ha-ze Se en oto be-Sum xanut.
the-problem with the-book the-this that sc e him in-neg store
The problem with this book is that its not in any store.
(Lit.: ... there isn't it in any store.)

The pronominal pivot in this example does not refer to an entity but to a type. The sentence says about some book that there are no tokens (copies) of it in any library. The question is what the discourse referent is for which one could in principle determine whether it is hearer-new or not. In this case it is not possible to infer a discourse referent from an instantiating entity because there are no such entities at the relevant indices.

A different pragmatic line is taken by Abbott 1992; 1993; 1997. Abbott defines the DE as the fact that CEs give rise to what are often called *list* readings, which she convincingly argues (especially in Abbott 1992) do not involve lists at all, but rather a specific, salient and pre-determined context. Her starting assumption is that existentials predicate existence of an entity or set of entities.[22] The main function of existentials according to her is "to draw the addressee's attention to the existence and/or location of the entity or entities denoted by the focus NP" (Abbott 1993:41). Pivots are therefore focal elements on a par with direct objects and typically convey new information. The DE arises because it is infelicitous to assert the existence of something that is already presupposed to exist. However, things presupposed to exist are not necesserily presupposed to exist in a particular context, and the prototypical function of a CE is to draw attention to or assert the existence of an entity as a reminder in some context in which it has been forgotten, or in the context of a particular goal that is being pursued. For example, in discussing possible tools with which to open a locked door, one speaker can say to another *well, there's always the baseball bat*.[23]

[22]Where existence is understood as existence in the discursive universe, not necessarily in the real world.

[23]At the mention of tools, I cannot resist allusion to the decidedly Heideggerian flavor of Abbott's characterization of contextualization. She writes (p.44): "Rarely is the mere existence of a member of some

Many things remain unclear in Abbott's analyis. She does not discuss quantified NPs in much detail and gives no general criterion for deciding which NPs presuppose existence and which do not. It is also not clear to me how Abbott's analysis distinguishes type-denoting pivots from token-denoting ones. Abbott's explanation of why CEs do not occur with codas specifying a specific context is also not clear to me. She writes: "With proper names and anaphoric definites, the predicative slot must be fixed before they are introduced. Since the referents for such NPs are, by definition, part of the discourse context, it is only appropriate to include them in an existential which has the the kind of reminding function noted above. But this presupposes some purpose or issue for which the entity in question might be suitable." However it is not strictly the case that the "predicative slot" must be fixed before the pivot is introduced. When the predicative slot is a purpose clause for example, it is perfectly natural as a coda. Thus, the contrast between (236a) and (236b) is left unexplained.

(236) a. There was my father to drive us from the airport.
b. ??There was my father at the party last night.

Furthermore, there seem to be cases where CEs in fact require a coda. For example, imagine a situation in which I take an envelope from your desk and am about to throw it in the recycling bin. But you know (and I don't) that the envelope contains our tickets to the circus. In such a situation it is natural for you to utter (237a) in an attempt to prevent the imminent misfortune, whereas uttering (237b) is less natural.

(237) a. There are the circus tickets in there.
b. There are the circus tickets.

Nevertheless, her account is superior to other pragmatic accounts in that it does not rely on hearer-newness and hence does not make wrong predictions. The difference between Abbott's analysis and an analysis based on hearer-newness such as Ward and Birner (1995) is subtle, but crucial. For the existence of a discourse referent in a given context to be new information, it is not required that this referent be new in any way. In fact, the kinds of list

category (such as a pencil, for example) of interest on its own. People need to know of the existence of entities of certain types in order to do something with them, and for that they need to know location or some other salient characteristic." If Abbott were Heidegger, she would say that for *Dasein*, things exist first and foremost as *zuhanden* 'ready-at-hand'.

readings at the center of Abbott's analysis usually call for entities that are very familiar to both speaker and addressee (cf. (236a). Thus, her analysis brings out an important intuition, reminiscent of the intuition behind second-argument conservativity, namely that a pivot is accepable in an existential if it can be used to say something new about a discourse salient domain of entities (for example, the entities available to open the door with). This is also the intuition that the analysis argued for in this work is aiming at. Pivots are predicates of contextual domains.

6.4 Contrastive approaches

Another family of approaches attempts to derive the DE from the relation between existentials and copular constructions. This approach is represented by e.g. Lambrecht (2000), Mikkelsen (2002) and Beaver et al. (2006). The main intuition of this kind of approach is that the distribution of NP types in pivot position is not determined by rules specific to the existential construction, but rather by the contrastive relation between existentials and their copular counterparts.

In Mikkelsen (2002) and Beaver et al. (2006), the DE is viewed as arising from the interaction of markedness constraints on subjects. Mikkelsen uses harmonic alignment constraints (Aissen 1999) to derive the distribution of pivots in Danish and English. The main point of her optimality theoretic analysis is that the NPs that are licensed in pivots are those that are not licensed in canonical subject position. She assumes that the licensing of subjects interacts with two general constraints. The first is a requirement that a certain structural position (SpecIP) be filled by overt material (formalized by means of a SUBJECT constraint), and the second is a dispreference for expletives (formalized as the constraint *EXPLETIVE), viewed as a faithfulness constraint, since expletives are not found in the input, which only includes semantically selected arguments). Given an input argument structure with an intransitive predicate P and an argument A, the question is whether `SpecIP` will be filled by the argument A or by an expletive. This question is decided by the relative ranking of *EXPLETIVE and the various markedness constraints on subjects derived from the harmonic alignment of a definiteness scale with a scale of grammatical relations. The DE thus arises in a language that prefers expletives to indefinite subjects. It is well known that many languages associate the subject category with high definiteness, either

marking an indefinite subject by some means or simply not allowing indefinite subjects at all (Keenan 1976; Givón 1976).

Mikkelsen only deals with definites, and the question arises whether her approach can be used to explain the full distribution of NPs in existentials in a non-stipulative manner. Beaver et al. (2006) attempt to extend Mikkelsen's analysis to a variety of NP types. Their basic idea is that an NP argument will occur more often as a pivot in an existential construction than as the subject in a corresponding copular construction if that NP ranks low enough on a variety of scales associated with subjecthood (e.g. the definiteness scale or the person/animacy scale; see Silverstein 1976; Aissen 1999) to be dispreferred as a canonical subject. Consequently, the DE is expected to correlate with an *indefiniteness effect*: an NP type that occurs often as a pivot should occur infrequently as the subject of a corresponding copular construction. Using quantitative corpus data from various languages, Beaver et al. examine the ratio between the occurrences of a range of NP types as subjects in copular clauses and their occurrences as pivots in a corresponding existential construction. An NP that occurs more often as a pivot than as a subject in a corresponding copular clause is said to be "existential". Comparing these ratios, they find that the degree to which any NP type is existential in the relevant sense is highly consistent across languages. Specifically, for any two NP types, NP_1 and NP_2, if NP_1 is more "existential" than NP_2 (i.e. occurs more often as pivot than as the subject of a corresponding copular) in one language, then it is more existential in all other languages as well. Furthermore, the degree to which NPs are existential correlates with their rank on the various scales.

While Beaver et al.'s results support the view that the DE as a phenomenon depends not only on existential constructions but also on the relation between existentials and copular constructions, these results cannot be considered an *explanation* for the DE. For example, nothing in their approach explains why strong NPs such as those headed by *every* or *both* are strongly non-existential (i.e. occur much less in existentials than in corresponding copular constructions) in all the languages they examine. Quantificational NPs are not related in any obvious way to either a definiteness scale or an animacy/person scale, and it not obvious why strong determiners should make the NPs they occur in better candidates for canonical subject realization.

More importantly, both Beaver et al.'s and Mikkelsen's accounts assume that existentials and copulars have the same predicate-argument structure, and depend on the possibility of positing a single "input" for which the two constructions form competing outputs. However, the discussion in chapter 4 clearly shows that many existentials simply do not have non-existential counterparts, or do not have such counterparts with a similar meaning. Furthermore, if the theory of existential propositions argued for in this work is correct, then the predicate-argument structures of the two constructions are never similar, and cannot both be members of the same candidate set for a given input.[24] Specifically, there is no NP argument in existentials, only an NP predicate.

Lambrecht (2000) presents a more pragmatic version of this general approach, based on the theory of the pragmatic structuring of propositions developed in Lambrecht (1994). In Lambrecht's system, propositions are pragmatically structured into a presupposition and an assertion. The functions *focus* and *topic* are relations between expressions and the propositions expressed by the sentences they appear in. An expression is a topic if its semantic contribution is part of the presupposition. An expression is a focus if its semantic contribution is part of the assertion. The mapping between predicate-argument articulations (or argument structure) and the pragmatic structure of a proposition is regulated in terms of the focus/assertion, and defines three *focus categories*:

1. **Predicate Focus** ("categorial"): The predicate is in focus, one argument, typically the grammatical subject, is topic.

2. **Argument Focus**: One argument is in focus, the rest of the sentence is topic.

3. **Sentence Focus** ("thetic"): Predicate and arguments are all in focus.

The focus categories and the focal status they assign to predicates and arguments can be summarized as in (238).

(238) **Lambrecht's focus categories** (= Lambrecht's (2)):

FOCUS CATEGORY	ARG. IN FOCUS	PRED IN FOCUS
Pedicate Focus	–	+
Argument Focus	+	–
Sentence Focus	+	+

[24]The same is true if McNally's analysis is adopted.

The canonical or unmarked focus category is Predicate Focus (PF), with a topic argument and a focal predicate. Sentence Focus (SF) constitutes the least marked alternative to PF, differing from it only in the focal value of the argument. Existentials are SF constructions, and stand in paradigmatic contrast to copular constructions, which are the corresponding PF constructions. The function of existentials is to mark that the pivot NP, is not topical but focal.[25] Thus, Lambrecht's system, like Mikkelsen's and Beaver et al.'s, presupposes that pivots are subjects. For him, marking subjects as focal means assimilating them to the prototypical focal arguments, namely to objects, and he provides a host of crosslinguistic evidence for the claim that subjects in SF constructions, pivots included, are subjects with object properties. From the perspective of the analysis proposed here, this is again a problem, because pivots are not seen as arguments at all, let alone as subjects.

Lambrecht makes no claims about the DE, but his approach entails that NPs that do not readily occur as pivots are NPs that are difficult to construe as objects, and hence does not seem like a promising route towards an explanation of the DE. It is difficult to imagine why e.g. strong NPs, proper names or pronouns would be any more difficult to construe as focal objects than indefinites.

6.5 A suggestion: predicates as foci

Another way to interpret Lambrecht's idea is to say that the contrast between existentials and copular clauses that is relevant to the DE is not between subjects and objects but rather between subjects and predicates. Existentials are indeed SF constructions, but what makes them SF constructions is not that they feature a non-topical subject realized as an object, but rather that they consist of a single NP predicate constituting the focus. Clearly predicates are no less prototypically focal then objects. In fact, what makes objects prototypical foci is the fact that they usually form part of the predicate.

[25]The intuition that the properties of existentials should be understood as stemming from their pragmatic contrast with copular constructions is also found in Dowty (1991). In discussing the typologically common association of subjects with topics, Dowty points out that "one consequence of this conventional association, presumably, is that existential constructions in many languages have a grammatical form that removes the NP from normal grammatical subject status, possibly replacing it with a dummy NP or locative (Clark 1978), thereby signifying that its referent is NOT connected to previous discourse in the way that subject status would otherwise indicate" (Dowty 1991:564).

Such a reinterpretation can also be used to understand the findings of Mikkelsen and Beaver et al. The properties they associate with subjects (e.g. definiteness or animacy) can equally well be associated with topics, making the relevant contrast one between topics and foci, and hence also between subjects and predicates.

My conjecture is therefore that since pivots are the main predicates of their constructions they must be focal, and that the crucial property of NPs determining their compatibility with pivot position is their topicality. Defining topicality, and especially sentence topicality (as opposed to discourse topicality) is notoriously difficult and I do not attempt to so so here. However, for most NP types that have been claimed to be problematic in existentials it is possible to say why they are likely to be topical in terms of the (admittedly vague) notion of *aboutness* (e.g. Reinhart 1982, 2005).

The simplest case is that of definites, proper names and pronouns. Such expressions are individual-denoting, specific, and their use is generally associated with a presupposition of familiarity, all of which makes them very likely to be aboutness-topics. The question is then why all of these types of NP in fact occur in existentials, particularly why they appear in CEs or 'list' contexts as discussed above. My suggestion is that the cases in which such NPs occur in existentials are cases in which they can be considered focal relative to the implicit contextual domain they predicate over. For example, consider a CE like (239).

(239) There's my father.

Such a sentence normally functions as an answer to a question (e.g. *Who can pick us up from the airport?*) or some other context evoking a set of alternatives. The context thus makes salient a set – the set of alternatives – and the issue of relevance is what the alternatives are. In other words, a possibly non-empty set of alternatives is introduced into the common ground and becomes the topic of conversation. A natural way to address this topic is with a sentence in which the set of alternatives is the aboutness topic or sentence topic. On the theory of existentials I am arguing for, existentials always convey predicates of contextually given sets and assert what these sets contain or do not contain, and are thus prime candidates for such a context.

The more difficult case is quantificational NPs such as *every boy* or *most boys*. Such NPs are generally seen as non-referential, and it is not obvious why they should be particularly topical. I follow a suggestion made by Beaver (2005) according to which the topicality

of a quantified expression is related to the *lives on* property defined by Barwise and Cooper (1981) as in (240).

(240) In a model $M = \langle E, [[\ ]]\rangle$, a quantifier Q lives on a set $A \subseteq E$ if Q is a set of subsets of E with the property that, for any $X \subseteq E$,
$X \in Q$ iff $(X \cap A) \in Q$.

For example, a quantifier like the one denoted by *every boy* lives on a set A if for any property P, if every boy is a P then every boy is a $(P \cap A)$. Thus since for any property P it is true that *every boy Ps* entails *every boy is a boy who Ps*, *every boy* can be said to live on the set enoted by *boy*. Another way of conceiving of the *lives on* property is simply this: a quantifier lives on a set if it is possible to evaluate the quantificational structure it introduces by just looking at that set. In other words, a quantifier lives on a set if it is conservative on that set. The conservativity universal, repeated in (241), assures that every quantifier expressible by a natural language determiner is conservative on its restrictor set.

(241) For any determiner D, and any two sets $A, B \subseteq E$,
$D(A, B) = D(A, (A \cap B))$

Thus any GQ constructed from a determiner and a common noun can live on the set denoted by the common noun, which is the restrictor set for that GQ. The GQ denoted by a pivot therefore can always live on the set denoted by the pivot's common noun.

Beaver suggests the *aboutness hypothesis* (which he relates to Lappin and Reinhart (1988)) in (242).

(242) **Aboutness hypothesis** (Beaver 2005):
A quantificational sentence must be about a set on which a quantifier in the sentence lives.

The aboutness topic of an existential sentence, on this suggestion, is the expression contributing the set on which the quantifier in the pivot lives. Since the quantifier denoted by the pivot can always live on the set denoted by its common noun, all pivots (viewed as GQs) are potentially the topics of the existential sentence in which they occur. But if pivots are to be predicates, they must be focal and hence at least relatively non-topical. Given the aboutness hypothesis, for a pivot to be non-topical would require for it not to live on a set

that it contains, i.e. to live on the scope set. The question is therefore wherether there are pivots that can live on their scope sets.

A quantifier that can live on its scope set is exactly a quantifier that is second-argument consevative as defined by Keenan (2003). Hence second-argument conservative pivots are pivots that are not topics by the aboutness hypothesis. All proportional GQs do not denote second-argument conservative quantifiers and so are always topics by the aboutness hypothesis.

The analysis of pivots as predicates of contextual domains thus reveals an attractive convergence of views. Lambrecht's and Abbott's claim that pivots are focal NPs, when interpreted as stemming from their predicative status (rather than their object status), fits smoothly with Keenan's generalization that pivots are second argument conservative, when the latter is interpreted as a property of predicates of domains. Furthermore, a view of pivots as predicates and hence as focal is also in line with the findings of Beaver et al., i.e. with the fact that the DE is gradient. NPs that are highly topical might still occur in an existential, nothing in the syntax or the semantics of the construction prevents this. However, if a truth conditionally equivalent construction is available in which such NPs can be topics (e.g. a truth conditionally equivalent copular clause), that construction will block the use of an existential. Similarly, if an NP is very low in topicality, for example if the only topic property it has is that it denotes a GQ and hence possibly qualifies as topic by the aboutness hypothesis, then the availability of a truth conditionally equivalent existential blocks its use as a topic in a copular clause (hence the crosslinguistic aversion to indefinite subjects).

The remaining issue is type-denoting pivots. It does not follow from anything I have said about topicality and the predicate status of pivots that certain topical quantified pivots should be less topical when quantifying over types. My suggestion is that what I have been calling type-denoting NPs are semantically not what they seem, and do not in fact involve quantification over types, kinds, varieties etc. If they did, then one would expect their scope sets to be prototypically contributed by kind-level predicates. But in fact such predicates are generally disallowed in the coda of existentials with kind-denoting NPs, as shown in (243).

(243) *There is every kind of dolphin common/widespread/extinct here.

On McNally's instantiation analysis this is not a problem. On that analysis, codas are

controlled by the entities instantiating the property dneoted by the pivot. The meaning of a sentence like **There is every kind of dolphin widespread* should therefore be (informally represented) as in (244).

(244) Every kind k which is a kind of dolphin is instatiated at a spatiotemporal index in which the entities instantiating it are widespread.

But this meaning involves predicating the kind-level predicate *widespread* of entities that are not kinds, and is therefore predicted to be odd. This kind of explanation is unavailable on a GQ analysis of pivots.

However, the core intuition behind McNally's analysis of type-denoting pivots is that the existential sentence makes a claim about the existence of instances of the kind named in the pivot. In a sense then the "real" quantification in an existential with kind-denoting pivot is an existential one over instances. My idea is that type-denoting pivots with strong quantifiers are semantically weak quantifications over instances.

Motivation for this idea comes from the observation that the pairs in (245) and (246) are semantically equivalent.

(245) a. There was every kind of plant in her lab.

b. There were plants of every kind in her lab.

(246) a. There was every variety of poodle in the show.

b. There were poodles of every variety in the show.

The GQ denoted by e.g. the pivot *every kind of plant* in an existential is therefore really the second-argument conservative, weak GQ represented in (247). This GQ is an unproblematic denotation for a pivot on any GQ analysis.

(247) $\lambda P_{\langle e,t\rangle}[\forall K_{\langle e,t\rangle}[\text{kind-of-plant}(K) \rightarrow \exists x_e[K(x)\ \&\ P(x)]]]$

The meaning of a type-denoting pivot thus involves a universal quantifier over kinds taking scope over the existential quantification over instances. This is exactly as expected if the NP *every kind of plant* is semantically interpreted in the same way as an NP involving a post-nominal modifier *of every kind*, since quantificational post-nominal modifiers generally give rise to so called inverse scope, as shown in (248) (see also section 4.1.1).

(248) A plate on every table is broken.

A complication for this approach arises from examples such as (249), pointed out to me by Cleo Condoravdi.

(249) There is every kind of dolphin thriving here.

This sentence seems to be about kinds, not instantiations, and therefore seems to show that kind-level predicates are possible codas, and that type-denoting quantificational pivots can in fact quantify over kinds. If this is the case then quantified type-denoting NPs are better characterizaed as ambiguous between GQs over instantiations and GQs over kinds. This is problematic for McNally's account which requires the instantiation interpretation, and as far as I can see such examples are not derivable in her system. On a GQ account of pivots they present no problem, since there is nothing in the semantics blocking quantification over kind-individuals.

However, pivots interpreted as quantifying over kinds will be regular universals and hence not second argument conservative, and they are therefore expected to be restricted in existentials. As shown in (243), this is indeed the case in general. The occurrence of occasional examples with kind-denoting universally quantified pivots is not unexpected on the current approach to the DE. While such NPs can be sentence topics according to the aboutness hypothesis, they would otherwise rate rather low on topicality, since they are not referential and furthermore quantify over abstract entities.

The proposal sketched here is prelimenary. It does not explain why NPs expressing existential quantification over instances actually look like universals, and it does not show how to derive the meaning of type-denoting pivots compositionally. Fleshing out a full analysis of type-denoting pivots and of wide scope post-nominal modifiers is beyond the scope of this work. However, I point out that this is not a completely unique case. A very similar thing happens with so called weak definites. For example, the definite NP in (250a) is paraphrasable as, and distributes like, a weak indefinite, as in (250b).

(250) a. The body of a sailor.

b. A sailor's body.

Finally, the approach to kind-denoting pivots sketched here provides a key to understanding some facts about the DE accross languages. As pointed out earlier, Hebrew allows very many NP types in existentials that are strongly restricted in English existentials,

including universals, proper names and pronouns, as exemplified in (251).

(251) a. yeS et kol ha-sfarim Sel=ax ba-sifriya.
EX acc all the-books of[3.f.s] in.def-library
The library carries all your books. (Lit.: There are all your books in the library.)

b. yeS et xomsky be-MIT.
EX acc Chomsky in-MIT
In MIT they have Chomsky. (Lit.: There is Chomsky in MIT.)[26]

c. ha-beaya im ha-perax ha-ze Se en oto be-Sum miStala.
the-problem with the-flower the-this that EX him in-neg nursery
The problem with this flower is that its not in any nursery.
(Lit.: ... there isn't him/it in any nursery.)

A brief consideration of all these examples reveals that they all involve type-denoting pivots interpreted with weak quantification over instantiations. Thus (251a) says that there are (indefinitely many) copies (or tokens) of each of your books in the library. similarly, (251c) does not claim about a particular flower that it cannot be found in any nursery, but rather claims about a type of flower that no instances of it can be found in any nursery.

(251b) is a more interesting case, since Chomsky is an indvidual, not a type. The key to such examples is in the meaning of codas. On the analysis of existentials argued for here, codas are modifiers contributing contextual domains. As discussed in chapter (4), modifiers typically encode part-whole relations. MIT, being an institution, has constitutive parts, and among its constitutive parts are the teaching faculty. (251b) can only be understood as a claim about MIT's teaching faculty, not as a claim about Chomsky's physical location. In fact, the sentence is completely consistent with Chomsky not being present at MIT at the time of utterance, or even with Chomsky rarely being present at MIT. The important point is that as a faculty member, Chomsky becomes something of a type, in the sense that any number of faculty-lists can include Chomsky as a member. The type *Chomsky* is therefore the set of occurrences of Chomsky as a part in some whole.

Thus, the variation between Hebrew and English is not so much in which NPs occur naturally in existentials sentences, but in which NPs can receive type interpretations. This is a positive result given a pragmatic view of the DE such as the one I am arguing for. The

[26]Note that this sentence is not a possessive sentence. Possessors in Hebrew are marked with dative case, which is distinct from the preposition *be* 'in'.

requirement that predicates be focal is not expected to vary significantly accross languages. But there is no reason to expect languages not to vary in the extent to which they allow NPs to receive type interpretations without overt marking.

6.6 Summary

This chapter started out with the observation that the existential question is logically independent from and logically prior to any explanation of the DE. In this respect, the question of what underlies or determines the distribution of NP types in existentials is secondary to the main topic of this work. Nevertheless, the analysis of existentials proposed in this work, and particularly the assumption that pivots are semantically the main predicates in the construction, can be linked in a productive way both to the distribution of NPs in English existentials and to crosslinguistic variation in this distribution.

It has been observed by many authors that the DE is not adequately described as a categorial ban on some class of NPs. Instead what is required is an explanation of why some NP types seem to require special circumstances to occur felicitously. Two particular instances of such special circumstances were discussed: so-called *list* readings of formally definite NPs and NPs involving quantification over kinds. I argued that approaches based on semantic properties of determiners cannot explain either of these cases, and that pragmatic explanations based on positing a hearer-newness constraint on pivots is empirically problematic as well as conceptually vague. Instead, I suggested that the DE arises as a consequence of the fact that pivots are predicates and as such required to be focal. Thus, while in principle no NPs are blocked from occurring as pivots, highly topical NPs such as definites, proper names and pronouns are generally blocked by truth-conditionally equivalent copular constructions in which they function as topics. Such NPs occur as pivots only when they must, i.e. in contexts where no such construction is available. For example, an NP that names or quantifies over a part that does not exist independently of a whole is blocked from occurring as a topic of a predicate naming or quantifying over the whole. Similarly, an NP naming or quantifying over the members of a set introduced explicitly as the aboutness topic in the conversational context (e.g. by a quesiton like *who can play Hamlet*) cannot itself be introduced as the aboutness topic and must be introduced as a focus.

Under certain assumptions about topicality and quantification, this approach was argued

to extend to quantificational NPs. NPs quantifying over kinds were analyzed as semantically indefinite. This analysis was furthermore claimed to explain the apparent lack of a DE in langauges like Hebrew. Finally, I claimed that this approach to the DE ties together various suggestions in the literature that have not been related to each other, such as Keenan's (2003) result that NPs that are natural pivots are conservative on their second argument, Abbott's (e.g. 1992) idea that definite pivots require contextualization in order to be focal.

Chapter 7

Conclusion and general implications

This work set out to explicate the nature of the propositions expressed by existential sentences. To conclude I summarize the argument laid out in the preceding chapters and the main insights they provide into the semantics of existential constructions.

I started out with the observation that pivots are the only constituents of an existential construction that are universally available and obligatory. I took this to suggest the hypothesis that, contrary to the suggestion of existing semantic analyses, pivots are not the subjects of some predicate but rather are themselves the main predicates of existential constructions. This raised the question what pivots are predicates of, and what they say of their subjects.

The answer I suggested is that pivots express (simple or complex) properties of contextual domains, which are contextually determined sets (for example, sets of individuals or sets of times). Specifically, pivots say about such contextual domains what they contain or do not contain. This answer echoes the intuition, found in non-formal research, that existentials are *about* the context or the discourse situation (Erteschik Shir 1997). I presented a formal theory of existential propositions fleshing out this answer. The core of this theory is that pivots are NPs denoting generalized quantifiers, i.e. sets of sets (though not necessarily sets of sets of individuals), and that they have an implicit argument corresponding to the scope set. The value of this argument is determined by context. The essential parameters that context must supply in order for the argument of the pivot to be determined are an entity (broadly construed, including individuals but also times, locations and possibly other types of entities) A corollary of this basic theory is that codas are not predicates but

modifiers, on a par with other contextual modifiers such as temporal and locative sentential modifiers.

The theory of existentials I propose is at the same time novel and conservative. In essence, it retains the semantics of existentials in Keenan (1987) and Keenan (2003), in which existential propositions are formed from a generalized quantifier and a set. It also retains the approach to codas in McNally (1992), according to whom they are adjunct modifiers, and shares with the analysis in Zucchi (1995) (also Keenan 2003) the intuition that the role of codas is to delimit a domain for the interpretation of the pivot. However, it also departs in crucial respects from each of these analyses. It departs from Keenan's analysis in that the scope set to which the pivot applies is not contributed directly by the coda. It departs from McNally's analysis in that pivots are not assigned property denotations, in that no instantiation predicate is assumed, and in that codas are not modeled as secondary predicates. It departs from Zucchi's analysis in that codas do not make a contribution to the restriction of the quantifier denoted by the pivot but to the scope.

Contrasting this theory with existing ones brings to light various phenomena that have not been considered in the literature before. These include the range of interpretations available to bare existentials, and various properties of codas which differentiate them from corresponding post-copular predicates, such as the expression of part-whole relations, the interpretation of codas with free relatives, codas with temporal expressions of duration, codas with quantifiers and codas with free choice items. I argued that these types of data are unexpected on existing approaches, and demonstrated how the proposed analysis handles them.

I also suggested an approach to the definiteness effect based on this analysis. This approach led me to two related conjectures about the semantics of pivot NPs involving kinds or types (e.g. *every kind of music*) and about crosslinguistic variation in the manifestation of the DE. I suggested that NPs involving quantification over kinds are in all relevant cases analyzable as existential quantifiers over instances and are hence unrestricted in pivot role. I then turned to the observation that modern Hebrew seems to freely license many NP types that are highly restricted in English existentials, such as proper names and personal pronouns. I pointed out that in all cases, such NPs in Hebrew were in fact interpreted as involving type/kind readings. The difference between Hebrew and English was therefore claimed to arise from differential availability of such readings for NPs not overtly involving

a type or kind denoting lexeme.

If the theory of existentials proposed here is generally correct, it has several more general implications for the grammar of existentials as well as for their relation to other constructions.

The proposed theory undermines a very widespread conception of the synchronic, diachronic and typological relation between existential, copular and possessive constructions. This view, named the *locative hypothesis* by Freeze (1992) (see also Lyons (1967); Clark (1978) among many others), sees the three constructions as having a single underlying structure with a shared semantics, in which an NP and some XP (corresponding to the pivot and the coda in existentials) stand in a subject-predicate relation. If I am right, then existentials and copular constructions involve completely different predications and do not share an underlying semantics. On the other hand, the semantics I propose goes a ways in elucidating the close affinity between existentials and possessives, since the basic relation expressed in an existential is one of *containment*, which can naturally be construed as a possessive relation. The details of an account of the existential-possessive relation in terms of the semantic theory developed here must however be left for future research.

Relatedly and more generally, if my analysis is on the right track, then a whole range of syntactic analyses of existentials, those based on a so-called small clause, cannot be correct either. Several authors in the syntactic literature have already argued this point (e.g. Jenkins 1975; Williams 1984; Hazout 2004), but they have not to my knowledge provided an alternative semantic analysis to the one implied by small clause analyses.

The semantic properties exhibited by codas are linked in my analysis to modification. Formally, codas are modeled using a mechanism required independently for contextual (temporal and locative) sentence modification (Pratt and Francez 2001; von Stechow 2002). Thus, the proposed theory can be seen as motivating a general theory of modification in terms of quantification over contextual variables. Existentials prove to be a rich locus for identifying the semantic properties of modifiers, such as their tendency to take wide scope, to map to the restriction of operators such as the generic operator and adverbs of quantification, and their ability to accommodate part-whole readings.

The analysis also has the interesting consequence that sentences and noun phrases both have generalized quantifier meanings. While I cannot explore this aspect of the analysis in any detail here, it is an intriguing result which might have important consequences

elsewhere in semantics and perhaps also morphosyntactic consequences.

Many other issues and questions of detail stemming from the answer given here to the existential question remain open. These have to do for instance with the nature of contextual determination, the semantics of implicit arguments and the status of unarticulated constituents, the nature of predication and its relation to formal operations such as function application.

Finally, if pivots are predicates then this should be reflected in their morphosyntactic realization across languages. In fact, based on preliminary research (partly reported in Francez 2006), there is evidence from a range of languages showing that pivots do not behave morphosyntactically like core arguments, whether subjects or objects, neither in terms of coding properties nor in terms of behavioral properties. The theory of existentials I argue for thus opens up new lines for the reinvestigation of the morphosyntax of existentials, which in turn may sharpen our understanding of the relation between meaning and morphosyntactic form.

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